BY THE U.S. GENERAL ACCOUNTING OFFICE

Report To The Attorney General

Heroin Statistics Can Be Made More Reliable

The Federal Government uses statistical indicators to assess the drug situation in the United States. Because of congressional concern about the indicators' reliability and because heroin is the Government's number one drug priority, GAO examined several statistical indicators the Government uses to assess its performance in the heroin fight.

All of the indicators examined have problems that affect their reliability. Since heroin abuse and trafficking are clandestine activities, complete confidence in the Government's heroin assessment will never be achieved. However, improvements are possible.

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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

GENERAL GOVERNMENT
DIVISION

B-198988

The Honorable Benjamin R. Civiletti
The Attorney General

Dear Mr. Attorney General:

This report discusses statistical indicators used by the Government to assess its impact on heroin abuse and supply in the United States. This review was made because of congressional concern about the reliability of the Government's drug situation analysis and because heroin is considered the Government's number one drug enforcement priority.

This report contains recommendations to you on pages 26, 35, 40, and 53. As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement on actions taken on our recommendations to the House Committee on Government Operations and the Senate Committee on Governmental Affairs not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

We are sending copies of this report to the Chairman, House Committee on Government Operations; the Chairman, Senate Committee on Governmental Affairs; the House and Senate Committees on Appropriations; the House and Senate Committees on the Judiciary; the Permanent Subcommittee on Investigations, Senate Committee on Governmental Affairs; the House Select Committee on Narcotics Abuse and Control;

the Subcommittee on Alcoholism and Drug Abuse, Senate Committee on Labor and Human Resources; the Subcommittee on Criminal Justice, Senate Committee on the Judiciary; the Secretary, Department of Health and Human Services; and the Administrator, Drug Enforcement Administration.

Sincerely yours,

for William J. Anderson
Director

GENERAL ACCOUNTING OFFICE
REPORT TO THE ATTORNEY GENERAL

HEROIN STATISTICS CAN BE MADE MORE RELIABLE

D I G E S T

Statistical indicators used to assess law enforcement efforts to combat heroin trafficking and abuse in the United States can be made more reliable. Because heroin use is such a clandestine activity, the statistically acceptable data gathering and reporting techniques necessary to accurately assess its availability and abuse cannot possibly be applied. Nevertheless, these statistics can be made more reliable.

--The data base used to determine retail heroin price and purity can and should be expanded, and the criteria used to qualify heroin samples for the indexes should be revised. (See ch. 2.)

--Heroin-related death and injury data should be monitored for accuracy in reporting. (See ch. 3.)

--Double counting and overstating should be eliminated from reported heroin removals (heroin purchased or seized by law enforcement authorities). (See ch. 4.)

--Reporting of indicators should be expanded by noting limitations in the way they are developed and how they can be used. (See ch. 6.)

The Drug Enforcement Administration has long been aware of the need to increase the reliability of some drug indicators and has taken or plans to take actions to remedy some problems. But DEA can do more.

RETAIL HEROIN PRICE AND PURITY INDICATORS CAN BE MORE RELIABLE

A larger and more representative data base is needed to improve the reliability of DEA's main indicators of heroin availability at the street level (the price and purity of the drug sold to a user).

Because DEA has refocused its attention from street level drug traffickers to those higher in the distribution system, the number of retail heroin purchases in the data base fell from about 400 each quarter in 1972 to about 100 each quarter in 1978. In addition, the majority of DEA's purchases are limited to a few cities in which major drug investigations are conducted. (See pp. 8 to 10.)

To bolster its data base, DEA initiated a program to obtain and analyze retail heroin purchases made by local police. For many reasons, however, the number of heroin samples submitted fell far short of DEA's goal. Although DEA made some attempts to encourage local police participation, it did not make a concerted effort to solve the problem and the program was discontinued. (See pp. 11 to 14.)

In addition, although it obtained fewer local police samples than it wanted, DEA has not used those that did qualify. DEA officials said that from a statistical standpoint the local samples represented a different population than the samples DEA gathered. However, GAO believes that the local samples are representative of the retail market level DEA's indexes were intended to reflect. (See pp. 14 and 15.)

DEA'S RETAIL CRITERIA NEED MODIFICATION

DEA's criteria, establishing price and purity limits on heroin purchases for use in measuring heroin availability at the retail level, are so broad that purchases

made at the wholesale level qualify. DEA defines the retail market as one dominated by dealers who sell single dosages directly to addicts. (See p. 20.)

Today, however, DEA's enforcement emphasis is directed toward higher levels of the heroin distribution chain. The result is that many of DEA's negotiated purchases are made above the pusher to addict level. For example, during the fourth quarter of 1978, 56 of the 98 buys used to compute the price index exceeded $100, 34 buys exceeded $500, and several cost more than $2,000. In comparison, heroin buys by local police, who generally operate at the pusher to addict level, seldom exceeded $100. (See pp. 20 to 24.)

HEROIN-RELATED DEATHS AND INJURIES--INCREASED ACCURACY NEEDED

Heroin death and injury statistics are, in part, the basis for the reported decreasing heroin problem in the United States. DEA reported that between 1975 and 1978, heroin deaths decreased by 74 percent and injuries, by 52 percent. However, DEA's heroin death and injury indicators are supported by inaccurate data from hospital emergency rooms and medical examiners. (See p. 27.)

A 1979 study by the Franklin Research Center found that (1) 45 percent of the hospital emergency room narcotics abuse cases treated were not reported and (2) in 8 percent of the cases reported, the narcotics identified were unreported or misreported. Clerical oversight and misunderstanding of reporting instructions were responsible for most errors. (See pp. 27 to 30.)

Furthermore, heroin-related death statistics are inaccurate because medical examiners do not report all heroin-related deaths. Underreporting occurred in three of four medical

examiners' offices GAO visited. Conversely, the effect of the errors on the trend line for drug-related deaths and injuries is unknown. Sufficient studies have not been done to show whether errors are made to the same extent year in and year out. If not, and the error rates were to differ significantly from year to year, the trends would be highly questionable. DEA needs to know the answer. (See pp. 30 to 34.)

HEROIN REMOVALS ARE GREATLY OVERSTATED

The usefulness of DEA's heroin removal statistics for assessing trends in heroin availability is hampered by its method of compiling and reporting the data.

The heroin removal statistics are overstated because the method used to compile and report removals does not prevent DEA and Customs Service from claiming credit for the same removals. Review of selected heroin removals showed that of 249 pounds of heroin Customs reported removed in 1976 and 204 pounds reported in 1978, at least 114 pounds in 1976 and 103 pounds in 1978 were also reported by DEA. (See p. 36.)

In addition, DEA overstates the amount of heroin removed because it reports it by gross weight instead of pure weight. For example, DEA statistics showed that 427 pounds of heroin were removed in 1978. However, in terms of pure heroin, only 87 pounds were removed; the remaining weight was caused by additives used to reduce the heroin's purity. As a result, reporting removals by their gross weight has distorted trends developed from such data. (See pp. 38 to 40.)

HEROIN ADDICT POPULATION ESTIMATES METHODOLOGY NEEDS VALIDATION

Heroin addict estimates are subject to limitations in both methodology and data.

To increase the estimates' reliability, the methodology used needs to be validated and the data used made more accurate. A project is underway to develop a better indicator methodology. (See pp. 41 to 50.)

INDICATOR LIMITATIONS NEED TO BE DISCLOSED

In congressional testimony, public statements, and Government publications, the heroin indicators are often cited without sufficient qualification. So cited, they give the impression that they are precise measures; however, they are not. When using these indicators, care should be taken to fully disclose data and methodology limitations so that indicator users can make better informed decisions. (See pp. 51 to 53.)

RECOMMENDATIONS

GAO makes several recommendations to the Attorney General which if implemented should make the statistics more reliable. The recommendations include the following:

--Reexamine the decision not to use local police heroin buys for computing price and purity indicators and the reasons for discontinuing the program.

--Monitor periodically and on a representative basis, the accuracy of reported heroin-related deaths and injuries.

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The findings in this report were discussed with DEA officials and their comments were considered in its preparation.

Contents

ABBREVIATIONS

GAO	General Accounting Office
DAWN	Drug Abuse Warning Network
DEA	Drug Enforcement Administration
NIDA	National Institute on Drug Abuse
STRIDE	System to Retrieve Information From Drug Evidence

CHAPTER 1

THE DRUG ENFORCEMENT ADMINISTRATION USES STATISTICAL INDICATORS TO MEASURE ENFORCEMENT EFFECTIVENESS

Because heroin is valuable and considered the most dangerous drug available, the ability to accurately measure and assess its supply and abuse is critical to law enforcement and rehabilitation managers and policymakers. Heroin's high price causes even small amounts of it to be extremely valuable. For example, on the basis of 1979 values computed by the Drug Enforcement Administration (DEA), the retail value of one pound of pure heroin is greater than $1 million. In addition, heroin can severely affect the health and social well-being of people who use it as well as people affected by those users. As a result, heroin is DEA's number one priority.

In 1979, DEA reported that the supply of heroin in the United States reached the lowest point of the decade. Testifying before a Senate Appropriations Subcommittee in November 1979, DEA's Administrator stated,

> "All of the indicators we use to trend heroin availability have consistently reflected a downward turn for the last three years. The retail purity has dropped from 6.6 percent in 1976 to 3.5 at the present time. In the same time period, the price has risen from $1.26 per milligram pure to $2.25. The heroin-related death rate has decreased from 150 deaths per month in 1976 to 30 per month at present. The heroin-related injury rate has dropped 52 percent since 1976. The number of heroin addicts has dropped from 560,000 in 1975 to below 450,000 in 1978 and the figure is still declining. Since these indicators have continued over a 3-year period, this positive impact on an adverse phenomenon of great social concern can properly be termed a real accomplishment--and one that is attributable to supply reduction efforts."

Also citing these indicators the 1979 Drug Strategy, prepared by the White House's Strategy Council on Drug Abuse, stated that the heroin epidemic of the late 1960's has subsided. Subsequently, DEA has reported an influx of heroin from countries in Southwest Asia. This influx has been

identified in laboratory analyses of heroin samples that proved to be of higher purity than heroin from other sources and in reports from hospitals showing higher heroin-related injury rates. These observations are based on heroin availability trends, in part, reflected by a number of statistical indicators developed by the Federal Government.

However, the clandestine nature of heroin trafficking and consumption prevents direct measurement of these activities. Consequently, the Federal Government uses indirect indicators to monitor the extent of domestic heroin abuse and availability. Trends developed from the indicators are used to indicate the Government's effectiveness in combatting the heroin problem. The indicators are frequently cited by Federal officials in congressional testimony and by the press in articles on the domestic heroin situation. DEA officials stated that the indicators are used to develop its budget, formulate policies and strategies, and allocate resources.

Whereas previously the Government's impact on the heroin problem was measured by the number of traffickers arrested and drugs seized, DEA believes its current statistical indicator system is a more sophisticated measurement method. The primary statistical indicators DEA uses to measure heroin abuse and availability in the United States are

--retail heroin purity,

--retail heroin price,

--heroin-related deaths, and

--heroin-related injuries.

Because individually DEA does not consider the indicators accurate or sensitive enough to provide a specific mirror image of the heroin situation, its heroin analysis is based on no one indicator but on trends shown from all indicators. When the indicators' trends are similar, DEA's confidence in the analysis is increased. In addition to the primary indicators, DEA uses secondary indicators, such as heroin addict population estimates developed by the Department of Health and Human Services' National Institute on Drug Abuse (NIDA), to corroborate its analysis. Additionally, DEA uses indicators, such as heroin removals (heroin samples purchases or seized by law enforcement authorities) to measure its enforcement effectiveness.

DEA develops and reports on all of the indicators, except for heroin addict estimates, in its quarterly Performance Measurement System report. DEA developed this report at the request of the Office of Management and Budget in 1971 to suitably measure how well DEA's programs were operating and to report the results to key executives in time for vital decisions. Its report is widely circulated both within and outside the Department of Justice.

RETAIL HEROIN PRICE AND PURITY INDICATORS ARE USED TO DESCRIBE THE HEROIN SUPPLY

The retail heroin price and purity indicators were developed to reflect heroin availability at the street level. According to DEA, trends in the indicators reflect supply changes. For example, if the supply of heroin declines, heroin traffickers, to meet the demand for the drug and maximize their profits, are likely to reduce the portion of heroin comprising the product they sell. At the retail street level, heroin traffickers reduce the amount of heroin in the packet or "bag" by substituting other substances, such as quinine, mannitol, sucrose or cornstarch, to achieve a desired sized product. Mixing substances with heroin is commonly referred to as cutting; and the substances used are cutting agents.

During a supply shortage, less heroin and more cutting agents are placed in the packets, thereby reducing the product's purity. However, the price of a standard retail packet generally remains the same. Since the heroin in the packet was reduced, the price paid for the heroin, in effect, has increased. During a period of heroin glut the converse is believed to be true; the packet's purity increases, and the price paid for the heroin decreases.

The retail price and purity indicators are based on heroin samples purchased or seized by DEA agents and DEA task forces. The samples are analyzed at DEA laboratories where purity information and the acquisition data (such as the place, date, and cost of acquisition) are entered into DEA's System to Retrieve Information from Drug Evidence (STRIDE) computer. Samples entered into STRIDE are subjected to retail qualifying criteria developed by DEA. Those samples that qualify comprise the retail heroin price and purity data bases.

HEROIN-RELATED DEATHS AND INJURIES ARE USED TO INDICATE HEROIN ABUSE

To help measure the extent heroin is used, DEA collects heroin death and injury data from the Drug Abuse Warning Network (DAWN). DAWN is a drug abuse data collection system developed by DEA and NIDA which collects data associated with drug abuse related crises as reported by hospital emergency rooms and drug related deaths as reported by medical examiners and coroners. The system, since its inception in 1972 has been operated by a contractor, IMS America Ltd. The cost of DAWN for May 1979 through April 1980 was about $1.8 million.

The system is voluntary although participants are provided a nominal fee for reporting. As of July 1979 approximately 600 hospital emergency rooms and 70 medical examiners and coroners in 24 standard metropolitan statistical areas around the country comprised the reporting system.

Not all facilities in each area are eligible to participate in the DAWN system. While all medical examiners and coroners are eligible, only non-Federal short-term general hospitals with 24 hour emergency service and at least 1,000 patient visits a year are eligible. Among eligible hospital facilities, participation varies between metropolitan areas. For example, the DAWN contractor estimated the degree of hospital coverage for the following metropolitan areas as of May 1978.

Metropolitan area	Degree of coverage note a (percent)
Atlanta	92
Buffalo	84
Chicago	55
Los Angeles	61
Miami	78
New York	51
Washington, D.C.	84

a/ Based on the total number of emergency room visits to eligible DAWN hospitals.

During the same period, participation by eligible medical examiners was far more complete. Full participation was achieved in almost all metropolitan areas.

Death and injury statistics reported in the Performance Measurement System are obtained from data provided by the DAWN contractor. DEA subjects each abuse episode to a drug hierarchy which results in cases of multiple drug abuse being reported only once. Multiple drug abuse cases are quite frequent. The hierarchy is based on the toxicity of the drugs involved. Since heroin is considered the most toxic substance any death or injury where heroin/morphine is found is reported as a heroin-related death or injury. Any other drugs found in the case are not reflected, no matter what their significance to the cause of the medical trauma.

Additionally, the injury statistics reported in the Performance Measurement System include estimates for selected cities. To compensate for low hospital emergency room participation in Chicago, Los Angeles, and New York, DEA estimates how many drug abuse episodes would have been reported had all eligible hospitals participated.

REMOVAL STATISTICS ARE USED TO MEASURE LAW ENFORCEMENT EFFECTIVENESS

Domestic heroin removals are seizures and purchases of heroin diverted from the illicit market by law enforcement authorities. Over the years, removal statistics have been used by DEA to indicate law enforcement accomplishments; law enforcement priorities; and the growth in popularity, trafficking, and abuse of various drugs. Congressional committees have compared estimates of the amount of heroin consumed in the United States with the amount of removals as indicative of Federal enforcement effectiveness.

Domestic removals are reported according to the following categories:

--DEA domestic removals.

--DEA/State and local cooperative removals.

--DEA/other Federal agency removals.

--DEA task force removals.

--U.S. Customs Service removals.

--Immigration and Naturalization Service removals.

--U.S. Coast Guard removals.

--Total domestic Federal and cooperative removals (a compilation of the above categories).

Removals by Customs, Immigration and Naturalization Service, and Coast Guard are obtained from reports submitted by those agencies. All other domestic removal statistics are obtained from DEA's STRIDE system.

HEROIN ADDICT POPULATION ESTIMATES ALSO INDICATE HEROIN ABUSE

According to NIDA, effective program planning and resource allocation depend on accurately assessing the magnitude of the drug abuse problem and identifying the communities with a particularly high prevalence of drug use and abuse. One method of assessing the magnitude of drug abuse is by estimating the size of the abusing population. NIDA's estimate of the heroin addict population is its effort to assess the magnitude of the heroin problem.

NIDA's most recent heroin addict population estimate, released in January 1980, reflected the 1978 addict population. The 1978 estimate of 373,000 addicts was 83,000 addicts fewer than NIDA's 1977 estimate. The 1978 estimate was far below NIDA's 1975 estimate of about 560,000 and, therefore, indicates a significant reduction in heroin abuse.

LAW ENFORCEMENT EFFORTS ARE ONLY ONE OF THE INFLUENCES ON HEROIN STATISTICS

Over the years Federal law enforcement agencies have emphasized reducing the supply of heroin in the United States. Such emphasis has resulted in notable and well-publicized reductions. 1/

The extent these successes can be attributed to law enforcement efforts is difficult to assess. Diplomatic

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1/ "See our prior report, Gains Made in Controlling Illegal Drugs, Yet the Drug Trade Flourishes," GGD-80-4, dated October 25, 1979.

initiatives and climatic conditions have also played large roles. Turkey's restriction on poppy cultivation coupled with law enforcement efforts suppressed the French-Turkish heroin connection in the early 1970s. Cold weather and drought aided Mexican poppy eradication efforts which reduced Mexican heroin availability in the United States in the late 1970s. And a prolonged drought during the 1978-79 growing season is believed to have significantly reduced Southeast Asian opium production.

Additionally, other difficult to measure factors affect the heroin problem in the United States. The effect on demand reduction caused by drug education; the growth of casual heroin use and multiple drug abuse; and shifts in drug preferences to less life threatening substances, like cocaine and marijuana, are difficult to assess.

Because so many different factors affect the demand as well as the supply for heroin, it is difficult to attribute changes to heroin indicators to any particular reasons. Certainly law enforcement has an impact, although, in many instances, its impact cannot be quantified. For instance, how many people do not abuse drugs or break the drug laws due to enforcement's deterrent effect is unmeasurable. Referring to drug statistical indicators, a 1977 report by the White House's Office of Drug Abuse Policy states that it is possible to say whether a situation has gotten better or worse, but it is difficult to say what caused the change. Drug law enforcement is only one of a variety of influences on the situation. The report goes on to caution careful use of the indicators and warns that direct causal links are impossible to make.

CHAPTER 2

THE RETAIL HEROIN PRICE AND PURITY INDICATORS CAN BE MORE RELIABLE

Although DEA recognizes the need to increase the size and geographic distribution of the data base used to reflect the retail (street level) availability of heroin, it has not done so. As DEA has directed its enforcement emphasis toward higher heroin distribution levels, the number of retail purchases comprising the data base has fallen. Furthermore, the data base is dominated by samples from only a few locations where DEA's enforcement activities are concentrated.

Because the data base is small, trends developed from this data lack certainty and should be used with caution. When more specific information is needed, such as the street level price and purity and the source of heroin in specific cities, DEA must go outside its system and initiate a special effort to obtain the data. A larger and more representative data base would improve the system's usefulness.

DEA's major effort to bolster the data base by using retail heroin samples submitted by local police has been discarded. DEA cites various problems with its effort but little evidence to show that concerted actions were taken to overcome these problems. DEA needs to re-examine its decision to exclude local police input from the data base.

Also, the criteria DEA established to qualify heroin purchases for measuring heroin availability at the retail level may have been reasonable when established, but are not so now. As a result, many of the samples used to compute the indexes are wholesale transactions.

NUMBER AND LOCATION OF RETAIL PURCHASES HAVE DECLINED

DEA has been continually concerned with the small number of samples for calculating the heroin price and purity indexes. When the indexes were first developed in 1971, the drug task

force program 1/ provided a substantial number of retail purchase samples. However, the task force program was phased out and DEA, in 1975, began focusing its efforts at higher drug distribution levels. As a result, obtaining an adequate number of retail purchase samples became an acute problem. The following chart illustrates the decline in the average number of retail purchase samples used to compute the quarterly national heroin price and purity indexes.

Calendar year	Average number of samples used for quarterly price index (purchases only)	Average number of samples used for quarterly purity index (purchases and seizures)
1972 (note a)	361	361
1973	308	308
1974 (note b)	290	290
1975	303	303
1976 (note c)	197	316
1977	126	290
1978	99	241
1979 (note a)	113	220

a/Average is based on three quarters' data.

b/Does not include January data.

c/Seizures first used to compute heroin purity.

As DEA's investigations became more complex, not only the number of samples but the number of locations at which the samples were acquired declined. The following example illustrates the data base's domination by few locations and their lack of representativeness.

1/A DEA task force is a joint Federal, State, and local enforcement effort to mount a cooperative and coordinated attack on drug traffickers in a given locality. Generally, the thrust of the program concentrated on the lowest street violator.

--In the fourth quarter of 1975, 201 retail purchases represented the price index. These samples were collected from 38 locations in 24 States and the District of Columbia. About 35 percent of the samples were collected from three locations: New York (44), Kansas City (13), and Denver (14). Several major U.S. cities contributed only a few samples: San Francisco (2), Detroit (3), Philadelphia (6), and Washington, D.C. (8). Several others, such as Los Angeles, Chicago, San Diego, and Las Vegas, did not provide samples. El Paso contributed three samples.

--In the fourth quarter of 1978, in comparison, 98 retail purchases represented the price index. These samples were collected from 21 locations in 13 States and the District of Columbia. About 71 percent of the samples were collected from three locations: New York City (32), San Diego (23), and El Paso (15). As in the 1975 period, several major U.S. cities contributed only a few samples: Los Angeles (1), San Francisco (1), Chicago (1), Detroit (1), Las Vegas (1), Philadelphia (3), and Washington, D.C. (2). Unlike that period, Kansas City contributed one sample and Denver contributed no samples.

DEA admits that obtaining a representative cross section of the retail market is difficult and that in recent years the problem has become even more acute. DEA attributes the problem to its enforcement concentration on wholesale and upper level traffickers. In addition, DEA recognizes that a preponderance of its data is obtained from major ports of entry. As a result, national price and purity tend to be weighted toward these ports.

DEA, concerned about the shrinking data base, requested a study by the Institute for Defense Analyses. The resultant report, Options for an Expanded Retail Drug Information System, April 1976, noted that because of DEA's policy to focus at higher levels of the distribution system,

> "* * * retail heroin price and purity trends now have poor geographic coverage * * * and are subject to fluctuations introduced by the small number of retail purchases and shifts in those DEA offices

which submit the retail samples. As a result, the reliability and stability of the price and purity trends * * * were considerably degraded in 1975."

The report recommended that DEA's limited data base be augmented through the inclusion of State and local police retail heroin purchases.

EFFORTS TO BOLSTER THE DATA BASE WERE NOT SUCCESSFUL

DEA's efforts to obtain local police heroin purchases to bolster a deteriorating retail data base failed to meet expectations and were discontinued. Other steps DEA took to improve its data include (1) statistical weighting and (2) purity data base expanding by including retail seizures. These DEA efforts were second best attempts to strengthen the data bases.

Use of local police input discontinued

In a November 1976 memorandum to domestic regional directors, DEA's Administrator summarized the problem of a deteriorating amount of street level heroin data. He stated that:

"DEA's capability to determine what drugs are available and how much at the retail level in the U.S. illicit domestic market is weakening, and all indicators are that it will continue to do so.

"This situation is very serious because DEA's capability is the only such in existence. If it continues to degenerate, neither DEA nor anyone else will be able to say with any surety what the drug situation is. This is happening because the retail level illicit drug samples (obtained by undercover purchases by DEA agents and State and local police) entering the DEA laboratories is diminishing, for a variety of reasons * * *.

"Without such strategic intelligence at the retail level, DEA and all other organizations concerned with the drug abuse problem will be severely restricted in their ability to plan, to apprise the American public of the severity of

the problem, or to identify those foreign countries which are the sources of drugs in the U.S. illicit market.

"DEA is attempting to reverse this process of deterioration. The solution, of course, is to get as much data concerning retail level illicit drugs from dispersed police departments * * *"

In response to the problem, DEA initiated a program in 1977 to obtain and analyze retail heroin purchases made by local police departments. The local samples would supplement those obtained by DEA and thus help improve the reliability of the price and purity indexes not only by increasing the number of samples but also by obtaining more representative coverage. However, the data obtained was never used.

Problems with the input

When DEA initiated the program, it selected 25 cities for participation on the basis of their importance in drug trafficking. DEA requested each city police department to send in a predetermined number of retail heroin samples on a monthly basis to a DEA laboratory for analysis. DEA hoped to acquire 321 samples each month. Of the 25 cities DEA selected, however, only 17 agreed to participate. The most frequent reasons cited for not submitting samples were (1) the local jurisdictions were prohibited from sending samples until the cases with which they were related were adjudicated and (2) DEA could obtain samples from task forces it had operating in the area.

Of the 17 cities that participated, 16 sent samples to DEA laboratories for analysis. New York City provided DEA with a monthly police laboratory report showing its analysis of local heroin samples. The 16 cities that participated provided far fewer than the 540 samples per quarter DEA hoped to obtain from them. Additionally, the number of cities submitting samples and the number they submitted began to decline in 1978.

The following schedule shows the number of samples provided DEA in 1977 and 1978 per quarter and the number of cities which submitted them.

	Quarter	Number samples	Cities submitting
1977	1	210	11
	2	298	13
	3	354	16
	4	299	15
1978	1	200	14
	2	194	12
	3	126	8
	4	152	11
1979	1	134	11
	2	91	8
	3	93	7

Not all the samples received by DEA could be used to compute the price and purity indicators. Some samples were received too late to be useful, others lacked needed purchase data or did not meet DEA's criteria for qualifying retail samples. For example, of the 152 local samples submitted to DEA during the fourth quarter 1978, DEA laboratories analyzed 144. Of those analyzed, 84 had related purchase data and of these only 46 met DEA's qualifying retail criteria.

Program discontinued

Because of declining participation, in February 1980, DEA discontinued its efforts to obtain local police heroin submissions. According to a DEA official, the number of local samples submitted did not meet expectations because some local police (1) lacked resources to prepare and transmit the samples to DEA, (2) had difficulty in obtaining samples because heroin was not readily available, (3) lacked interest, and (4) were only permitted to submit samples from cases that would not be prosecuted.

DEA officials stated that the local police's lack of interest was largely attributable to DEA's inability to provide them with promised feedback. As part of its selling of the program to local police, DEA was to provide participating police with detailed data they could use to assess the local heroin problem and its relationship to other areas and the Nation. Initially, DEA provided the

police with analyses of the data submitted. However, according to a DEA official, due to resource constraints, DEA could not continue to provide the feedback and therefore, ended the program in mid-1978.

Although DEA encouraged participating local police to provide more retail data, it did not make a concerted effort to solve the participation problem. DEA's efforts were primarily limited to its regional laboratory directors contacting local police to stress the data's importance. There is little evidence that DEA formally analyzed the program's data collection problems, devised strategies to overcome them, or developed alternative methods to obtain the data. Considering the Administrator's stress over the data's importance, DEA should have done more to overcome program difficulties.

Furthermore, DEA has not used the local police data to compute its indicators because it believes the local samples represent a population different from its own. According to DEA, the local samples are likely to be of lower purity than the samples DEA obtains because the local samples are obtained at the addict level. DEA has, however, used a significant number of street level heroin buys made by its agents for intelligence purposes in the indicators' computation.

Local samples submitted to DEA were generally lower in purity than DEA's samples. Rather than being a reason for not using local samples, we believe that the local samples are representative of the retail heroin market which DEA's indicators were intended to measure and, therefore, should be used. Until DEA refocused its enforcement emphasis toward higher level traffickers, most of the samples it used were street buys made by its own task forces. DEA's shifts in enforcement emphasis, which can affect indicator values, do not have much influence on street level transactions. In April 1977, DEA's Administrator noted this issue in testifying before a Subcommittee of the House Committee on Interstate and Foreign Commerce. He stated

> "* * * retail measurements would be most revealing because they reflect actual 'street' transactions, thereby most accurately describing the heroin addicts' market. By limiting our computations to

this level, we also precluded our being misled by an artificial rise in the purity figure that would otherwise result as DEA increasingly shifts its emphasis to investigations involving wholesalers and major criminal figures."

Local input would be helpful

Although the number of qualified purchased samples submitted was far less than what DEA had wanted, that number could have significantly bolstered the indicators' data bases. For example, the 46 qualified local samples obtained during the fourth quarter of 1978 would have significantly added to the 98 DEA purchases used. On the basis of the number of samples submitted in prior periods, local samples could have made an even greater contribution to the data bases.

DEA's plan to obtain additional heroin samples from local police in 25 cities would have helped to expand the geographical representativeness of its indicators' data bases as well as bolster the number of samples used. For example, in the first quarter of 1977, 2 of the 99 purchases used in the indicators were obtained in Washington, D.C. The average purity of DEA's samples was 8.1 percent. Although local police provided DEA with 54 additional qualified retail purchases whose average purity was 2.4 percent, these samples were not used to compute the indicators.

Additionally, between January 1977 and March 1978, a 15-month period, DEA used eight retail heroin samples from Miami in its calculations of retail purity. Had DEA used qualified samples submitted by local police, it could have used an additional 60 samples. During the same period, DEA used 5 samples from Minneapolis to calculate purity although local police had provided an additional 16 qualified samples. During several quarters within that time period, the only qualified samples available for the purity index from Miami and Minneapolis were local police samples.

Other actions taken to improve the data are less effective

In the absence of using local data, DEA has taken certain actions to improve the size and representativeness of its data base. The actions it has taken--(1) statistical weighting and (2) purity data base expanding by including retail seizures--are second best attempts to strengthen the

data base in lieu of obtaining additional qualified retail purchases. Although these efforts are attempts to improve the data, they have certain drawbacks that make them less effective than obtaining additional qualified purchases from diverse locations.

Statistical weighting

DEA statistically weights the exhibits from each region. DEA applies weighting because it realizes that a preponderance of its data is obtained from a few major ports of entry. Exhibits from these ports of entry dominate the data base.

To compensate for this tendency, DEA weights its heroin exhibits using the Federal Bureau of Investigation's Uniform Crime Reports drug-related arrest data. DEA believes that these reports are the best available sources for this purpose. Uniform Crime Reports are a compilation of arrest data submitted voluntarily by law enforcement agencies around the country. Through this arrest data, DEA is able to determine the proportion of arrests involving narcotic offenses in various areas of the country. These proportions, or weights, are then applied to the samples DEA uses in its data base to make them more representative of the country. For example, for the fourth quarter of 1978, DEA obtained 6 percent of its qualified heroin purchases (six samples) from the southern region. After weighting, the southern region represented 22 percent of the national heroin price indicator.

Use of the Uniform Crime Reports' data has certain drawbacks. First, the Reports' data used represents narcotic offense arrests, not necessarily the rate of heroin abuse or availability. As pointed out in the Reports, arrest practices, policies, and enforcement emphases often differ within and among law enforcement agencies and therefore influence the volume of arrests. Second, the Reports' data is incomplete. Not all law enforcement agencies submit data and of those that do, reporting can be inconsistent and inaccurate. Finally, the Reports' data is not current. Depending on which quarter's data the weights are applied to, they could be from 1 to 2 years old and, therefore, not actually representative of current narcotic arrests.

Even if the Reports' data adequately represented the heroin problem of an area, the number of retail samples

available in many areas are too limited to describe the retail market. For example, in the fourth quarter of 1978, DEA obtained retail purchases from 13 States and the District of Columbia. In 10 States and the District of Columbia, the retail prices were represented by five or fewer purchases. The Reports' data cannot compensate for this poor representation.

Retail seizures are used to bolster the purity data base

To bolster the retail purity indicator's declining data base, DEA decided in 1977 to use heroin seizures that met the retail weight and purity criteria. Since seizures do not have a related purchase price, they cannot be used to calculate the retail price indicator. Thus, the two indicators are based on different data universes. Using seizures to expand the data base has several disadvantages that make their use second best to obtaining additional heroin purchases.

One major disadvantage of using heroin seizures is that they do little to correct the geographic limitations of DEA's data base. Like purchases, seizures are obtained from locations where DEA's enforcement activities are concentrated. For example, of the 141 seizures used in the computation of the fourth quarter 1978 purity index, 103 were obtained from locations represented by qualified retail purchases. An additional 17 locations were represented by 38 seizures but these average only slightly more than 2 seizures per location, hardly enough to increase confidence in the data's representativeness.

Another disadvantage of using heroin seizures is determining the market level at which they were acquired. As previously noted, DEA's retail criteria allows many purchases to be acquired at wholesale levels. With seizures the intent of the seller to sell his product at that purity is unknown. Had the seizure not been made, the seller may have diluted the heroin further before selling it. Thus, using seizures may not be measuring purity at the retail level.

Additionally, since seizures do not have an associated purchase price, they are not subjected to the same retail qualifying criteria as DEA purchases. During the fourth

quarter of 1978, 30 of the 105 retail purchases that met the retail weight and purity criteria were disqualified because they did not meet the price criteria. However, the 141 seizures used by DEA could not be subjected to the same criteria. In effect, DEA uses different standards to qualify purchases and seizures.

SPECIAL MEASUREMENT EFFORTS MUST BE MADE

Because of the small size and limited locations of DEA's data base, special arrangements must be made to develop data on street level transactions. For example, to measure the suspected influx of Southwest Asian heroin, in March 1980, DEA had to initiate a special program to purchase heroin samples at the retail level in seven major U.S. cities. Citing instability in both the foreign and domestic heroin markets and the need to fill a critical gap in existing intelligence upon which to base strategy, policy, and resource decisions, DEA intends to purchase 245 heroin samples each quarter at the street level. This number is 100 percent higher than the average number of samples comprising the indicators' data bases for the entire country for the last few years.

DEA's street level intelligence effort will provide heroin data from the market level the price and purity indicators were intended to measure. This market level was the same level local police samples represented but whose samples could not be used since, according to DEA, they measured a different population. In fact because of two predecessor intelligence efforts in 1979 to purchase street level heroin samples in New York City, DEA was able to add about 70 qualified samples to its data bases. The fact that these samples were acquired from the same level the local police samples represented did not inhibit their use.

Analysis of the two intelligence efforts are quite revealing. The first effort was conducted in Harlem, which DEA considers the center of the narcotics trade for the New York area. Of the 49 street level samples acquired, 28 samples were of Southeast Asian origin, 11 were of European/Near East origin, and 10 were of Southwest Asian origin. None of the samples acquired were from Mexico, the principal heroin supplier to the U.S. since the mid-1970's. The average purity of the samples was 3 percent, which was not unusual based on samples obtained in prior periods.

The second intelligence effort was conducted about 2 months later. In this operation, 50 street level heroin samples were collected. However, instead of making the purchases in Harlem, the samples were collected from Manhattan's Lower East Side. In this operation about half the samples (24) were of Southwest Asian origin, 6 were of European/Near East origin, 6 were of Southeast Asian origin and 14 were of Mexican origin. The average purity of the samples was 8.5 percent, much higher than the national average purity (3.7 percent) during this period.

In March 1980, DEA's Administrator revealed the results of the New York intelligence efforts and warned about the influx of Southwest Asian heroin. While the percentage and purity of Southwest Asian heroin had significantly increased, Mexican type heroin had increased even more. The following chart illustrates the results of the New York intelligence operations.

Heroin type	Operation No. 1		Operation No. 2	
	Percent of sample	Average purity (percent)	Percent of sample	Average purity (percent)
Southwest Asian	20	2.8	48	8.0
Mexican	-	-	28	10.9
European/Near East	22	3.5	12	9.8
Southeast Asian	57	2.8	12	4.6
Total	a/100	3.0	100	8.5

a/Does not total to 100 due to rounding.

Care must be taken in drawing conclusions from the studies. The two intelligence operations may reflect a worsening heroin situation or an anomaly due to differences in where the data was gathered. Nevertheless, the variances in heroin purity point out the advantages of a broader, more representative sampling of retail heroin purchases on which availability indicators can be based.

CRITERIA USED TO QUALIFY RETAIL SAMPLES NEED TO BE MODIFIED BUT WILL REDUCE INPUTS

The retail criteria 1/ established in 1971 to qualify samples for use in the price and purity calculations may have been a reasonable reflection of retail then but are not so now. As a result, many of the samples used to compute the indexes are wholesale transactions.

Wholesale samples used to compute the index

The case files for the exhibits used to compile the fourth quarter 1978 retail price and purity indexes indicate that many of the exhibits used were wholesale rather than retail level purchases. According to DEA, the retail portion of the illicit market is dominated by single dosage unit dealers who sell directly to addicts. DEA's enforcement emphasis, however, has changed and is now directed toward higher levels of the heroin distribution chain. The result is that many DEA negotiated purchases are not made at the pusher-to-addict street level. For example, prices paid for 34 of the 98 buys used in DEA's fourth quarter 1978 price computation exceeded $500, with several costing more than $2,000.

A DEA enforcement official stated that many DEA purchases are made as a prelude to making a larger purchase. In these instances, the drug dealer believes the buyer will eventually purchase a larger amount and therefore the sample is sold at a wholesale price. Additionally, DEA is probably buying from a wholesaler and not a retailer, therefore, the sample's purity will be greater than a retail buy. The case files clearly show that many purchases were made at a wholesale level. The following examples were taken from purchases used for the fourth quarter 1978 indexes.

1/DEA's criteria for a retail heroin purchase is one which is 14 percent pure or less, weighs 14 grams or less, and costs $5 or less per milligram of pure heroin. Purchases exceeding the purity or weight criteria are considered wholesale exhibits. Purchases costing more than $5 per milligram pure are considered fraudulent buys ("burns" or rip-offs).

Case A

An informant told DEA officers that suspects were mid-level heroin and cocaine dealers. Intelligence information noted that suspects sell about $1,000 of heroin and cocaine each day. One suspect was contacted for the purpose of buying a half ounce of heroin. The suspect told the DEA officer that the heroin could be cut two times. The DEA officer purchased 12.7 grams of powder for $750. Laboratory analysis found that the purchase contained heroin and that it was 6.7 percent pure.

Case B

An informant told DEA officers that he could introduce them to an out-of-State suspect who was selling a quantity of heroin. DEA officers purchased two heroin exhibits from the suspect for $600, then returned the following day for another purchase. At this meeting, the suspect revealed that this second purchase would also cost $600, but added that had the officers made just one purchase instead of two, they could have paid $1,000 instead of $1,200. The officers argued that they should be charged only $400 for the second purchase to still bring their total charge for the two purchases to $1,000. The suspect finally agreed to sell the heroin for $450. Laboratory analysis revealed that the $450 heroin purchase, which qualified for the indexes, weighed 6.15 grams and was 12 percent pure. The officers subsequently made even larger purchases; the suspect offered to sell them ounces of heroin at a discount for being regular customers.

Case C

A suspect's relative contacted an informant to let him know that the suspect had a lot of "dope" and ask him if he knew anyone wanting to "score." The informant later contacted the suspect and told him that a man (DEA officer) who scored dope from him a long time ago was going to be in town for a few days. Subsequently, contact was made, and officers purchased 2 ounces of heroin for $1,900. A second contact was established for the purpose of buying another 2 ounces; however, when contact was made, the suspect could not deliver the full amount. He promised to get the remainder on

the following day. Officers purchased the amount in the suspect's possession for $400. Laboratory analysis of this purchase found that it weighed 9.4 grams and was 9 percent pure.

Local police operate at a lower level than DEA

In contrast, retail heroin purchased by local police disclosed that prices seldom exceeded $100. In Baltimore, street level heroin purchases were usually $50 or less. In Miami, purchases were usually $10 or less. Additionally, the Police Commissioner of New York City stated in an October 1979 DEA publication that in his city street purchases were $10. Confirming the low prices of street heroin in 1979, DEA's special intelligence effort in New York City paid an average of $18.95 for a packet of heroin.

The following chart indicates the prices paid for the samples used to compute DEA's fourth quarter 1978 retail heroin price.

Purchase price (dollars)	Number of samples	Cumulative percent
0 - 25	28	29
26 - 50	9	38
51 - 100	5	43
101 - 250	8	51
251 - 500	14	65
501 - 1,000	16	82
1,001 - 2,000	12	94
Over 2,000	6	100

Analysis of heroin purities of purchases which meet the retail criteria made by DEA agents and those made by local police also indicate that DEA generally operates above the retail street level. Of the 98 purchases made by DEA during the fourth quarter of 1978, 56 (57 percent) had purities greater than 4 percent. By comparison only 5 (11 percent) of the local police's 46 purchases were more than 4 percent pure. The following chart indicates the different enforcement levels reflected by the purities of DEA and local police purchases.

Purity range (percent)	Percent of samples Local police	DEA
0 - 1.0	11	2
1.1 - 2.0	15	13
2.1 - 3.0	26	19
3.1 - 4.0	37	8
4.1 - 5.0	2	20
5.1 - 6.0	2	10
6.1 and over	7	27
Total	100	a/100

a/Does not total to 100 due to rounding.

By including wholesale samples (those above the addict-pusher street level), DEA has created indexes that fail to measure the market they purport to represent.

Changes to DEA's qualifying criteria and practices are needed

One reason why large dollar heroin purchases qualify for the retail data base is due to DEA's practice of dividing large purchases by the number of packets purchased. For example, DEA made one purchase of 45 heroin packets for $2,475. Laboratory analysis determined that the heroin's purity, 4 percent, and cost per milligram pure, $1.01, met DEA's retail criteria. However, the buy's total powder weight of 61.29 grams far exceeded DEA's retail criteria of 14 grams or less. As a result, DEA divided the 45 packets purchased into the total weight and determined that 1 packet qualified as a retail purchase. Of the 98 purchases used by DEA to determine the heroin price index for the fourth quarter of 1978, 23 (23 percent) were the result of dividing multi-packet purchases.

Some wholesale purchases qualify because the purity of many street level samples' is very low. When DEA's criteria was established retail purities were quite high. For example, average retail heroin purity during 1970 was 9.6 percent. In 1979, DEA's average retail purity was about 3.5 percent and many street level purities were much lower. A heroin sample that meets DEA's 14 grams and 14 percent

pure criteria could be cut into 560 bags 1/ of 3.5-percent purity. The case examples noted on page 21 show that many wholesale samples are well within DEA's criteria.

One retail criterion that may have been reasonable once but is not so now is the $5 per milligram pure or less limitation. This criterion excludes some retail purchases from the data base. Purchases exceeding this criterion are considered "burns" or fraudulent transactions. However, a DEA intelligence official informed us that in today's market purchases greater than $5 per milligram pure heroin may be considered reasonable in some cities. Police officials of a large east coast city stated that heroin is presently being sold at about $9 a pure milligram at the retail level. The following chart shows by price per milligram pure the range of DEA exhibits, analyzed during the fourth quarter of 1978, that met the weight and purity criteria but not the price criteria.

Price/milligram pure heroin range	Number of exhibits
$ 5.01 - 10.00	17
10.01 - 15.00	1
15.01 - 20.00	6
20.01 - 25.00	3
Over 25.00	3
Total	30

DEA is reluctant to revise its retail criteria. DEA officials state that the criteria were designed to be broad and flexible because retail markets in various cities are diverse and so that continual criteria changes can be eliminated. In addition, DEA officials point out that the retail criteria have been applied consistently since 1972 and, thus, trends developed using a constant criteria are more reliable.

But the data that qualifies does not always measure the retail market. Because DEA's criteria were designed to reflect diverse market situations, retail transactions in some

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1/A bag is slang for a single dosage unit weighing 100 milligrams.

cities are wholesale transactions in others. Our analysis shows that many wholesale transactions are used to compute the retail indexes. Although DEA's criteria has not changed since 1972, the heroin market has changed and so has DEA's enforcement emphasis. To preclude being misled by these changes, the use of actual street transactions which describe the heroin addicts market would be the most revealing.

DEA needs to reassess its retail heroin purchase criteria to guarantee to the degree possible that samples used to comprise its data bases are retail transactions. DEA could better assure that the samples comprising the indicators' data bases are retail if it would (1) discontinue its practice of qualifying single packets out of unusually large purchases and (2) adopt a maximum purchase price criterion to eliminate high cost purchases. These actions would help to assure that indicator changes are not due to discretionary shifts in enforcement emphasis. If implemented, these changes would further reduce the number of samples that qualify for the indicators' data bases. However, to some extent, the reduction in the number of qualified samples could be offset if DEA would revise the price per milligram pure criterion to reflect retail market conditions.

CONCLUSIONS

To bolster confidence in the reliability of the price and purity indicators, DEA needs to increase the size and geographic distribution of the indicators' data bases. DEA recognizes that the indicators have weaknesses and admits that, since the data bases are small, trends developed from them lack certainty and should be used with caution.

DEA's major effort to bolster the data base with samples submitted by local police has been discarded. Although DEA encountered various problems with its effort, it can provide little evidence that it took concerted actions to overcome them. Other DEA actions to improve its data bases, statistical weighting and retail seizures inclusions, indicate DEA's concern to maintain reliable indexes. However, these actions are second best attempts which are less effective than using qualified purchases from diverse locations.

Even though local police provided DEA with many qualified samples, DEA has not used them to compute the indicators because it believes the local samples represent a population different from its own. The population generally represented by the local samples was the addict level.

This was the level the local samples were supposed to represent. Rather than being a reason for not using them, we believe this argues for their use.

Another data base weakness is that many of the samples used to compute the indicators are wholesale transactions. The retail criteria used to qualify samples for the data base may have been reasonable when established but are not so now.

DEA's program to purchase street level heroin in seven cities will help to increase the indicators' geographical distribution and, therefore, be more representative of the retail market. But care should be exercised when comparing national and regional price and purity trends since use of this data will alter the data bases market level and geographic representation. Additionally, since the program is primarily an intelligence gathering exercise, its continuity is not guaranteed. Local police data would be more consistently available and would help correct the size and geographic weaknesses of DEA's data bases. DEA officials point out that additional resources would be required to increase the data bases size and geographical representation.

RECOMMENDATIONS

We recommend that the Attorney General direct the DEA Administrator to

--reexamine the decision not to use local police heroin buys for computing the price and purity indicators and the reasons for discontinuing the program and

--modify the criteria for qualifying price and purity samples so that they more accurately reflect the retail market. DEA could provide greater assurance that the samples used were retail level samples if it would (1) discontinue its practice of qualifying single packets out of large purchases and (2) adopt a maximum purchase price criteria to eliminate high cost purchases.

CHAPTER 3

INACCURACIES INHIBIT CONFIDENCE IN HEROIN

DEATHS AND INJURIES INDICATORS

Heroin death and injury statistics are inaccurately reported--injuries more so than deaths. According to a one-time 1979 study, injuries are understated by 32 percent. Our review at selected medical examiners showed various reporting errors at those offices. To the extent the error rates are constant from year-to-year, trend indications of increases or decreases in heroin-related injuries and deaths are valid. Conversely, if the error rates were to differ significantly from year to year the trends would be highly questionable. Therefore, DEA needs to periodically monitor the reporting system's accuracy to determine whether the error rate is consistent and whether improvements in accuracy are occurring.

DEA's heroin death and injury statistics are, in part, the basis for the reported decline in the U.S. heroin problem. DEA reported that between 1975 and 1978, heroin deaths in 21 metropolitan areas declined by 74 percent and injuries by 52 percent. The following chart shows the average number of quarterly heroin deaths and injuries.

Calendar year	Deaths	Injuries
1975	448	4,486
1976	399	4,644
1977	149	2,892
1978	118	2,171

DEA officials believe that trends shown by death and injury indicators confirm trends shown by heroin availability indicators, price and purity. That is, when heroin availability decreases, heroin-related deaths and injuries similarly decrease.

HOSPITAL REPORTING INACCURATE, BUT CORRECTIVE ACTIONS HARD TO ACHIEVE

A March 1979 DAWN emergency room quality assurance study found that 45 percent of all narcotic abuse cases, including

heroin injuries, were not reported. The study, the first of its kind, based its findings on a random sample of 134 of the 593 hospital emergency rooms during the study period May through October 1977. Overall, the study found that 32 percent of all drug abuse cases were not reported. The study, which DEA contracted out to the Franklin Research Center, cost $216,430.

Reasons for underreporting

The study attributed most of the unreported drug cases to clerical oversight and misunderstanding of the reporting instructions. It noted that under the pressure of an emergency room situation, attending medical personnel may (1) find it impossible to obtain complete information from a patient and (2) be reluctant to request such information. In many hospitals the people responsible for DAWN reporting often have other more demanding tasks, and therefore, do not view the DAWN reporting as a major function of their job.

The most common example of clerical misunderstanding of instructions was the failure to report as narcotics cases patients in the emergency room for illnesses associated with chronic heroin use, such as hepatitis and blood poisoning. Although contrary to instructions, many reporters did not report drug abuse unless it was the patient's primary reason for being there and was so recorded in the emergency room log book.

Ensuring that every DAWN reporter fully understands the reporting requirements is difficult because of the high staff turnover in many hospital emergency rooms, the pressures under which people often work, and the large number of people and organizations involved. The study concluded that under these conditions, full reporting of all drug abuse episodes is difficult to achieve.

Also, because hospital participation is voluntary, requiring hospitals to give greater attention to DAWN reporting is difficult. Although hospitals receive a fee for participating, the Franklin study reported that the amount received does not cover all the expenses involved in collecting the data and preparing the required reports. However, the study found that generally reporters were making a conscientious effort to provide good data.

High hospital and reporter turnover

Training new reporters is a continuous requirement because of the high turnover of hospitals and hospital reporters. Because of the voluntary nature of the DAWN system, hospitals, for various reasons, can stop participating and many of them do. Even at those facilities which have continued to participate, changes have occurred in the personnel responsible for DAWN reporting.

Between March 1974 and April 1979, 152 or 25 percent of the 596 hospitals in the 21 metropolitan areas quit the DAWN system. The DAWN contractor tries to minimize the effect of facility turnover by replacing hospitals with others that are similar in size and location. Yet, of the 152 hospitals that left the network since March 1974, 103 were replaced as of April 1979.

Although statistics of reporter turnover are not kept, the Franklin study noted that the staff turnover was high. On the basis of a survey of 100 reporters, the study concluded that the training program needed strengthening. Among the survey's findings were that less than half the DAWN reporters were trained in person by the contractor and roughly 15 percent had no in-person training by either the contractor or other hospital personnel.

Drugs reported by hospitals are often misreported or misidentified

In addition to the large number of cases that went unreported to DAWN, the Franklin study found that 8 percent of the narcotics and 11.6 percent of all drugs identified in injury cases went unreported or were misreported to DAWN. Almost 85 percent of the errors were due to clerical oversight of information in the case records.

Also affecting the accuracy of DAWN is the attending physician's inability to correctly diagnose the emergency room patient's drug problem. At the DAWN contractor's request, a study was undertaken in the Denver metropolitan area to provide laboratory confirmation of emergency room or other clinical unit diagnosis of drug abuse. The analyses showed that the drugs suspected of abuse by the attending physician were confirmed by laboratory tests in only 59 percent of the cases. Although the number of cases was small, morphine (heroin metabolizes into morphine in the human body) was found in three times as many cases as suspected. Several

prior studies also confirm poor accuracy of clinical diagnoses. Those studies found that more or other drugs were involved than were suspected by the attending physicians. Although diagnostic inaccuracies are not a deficiency of the DAWN system, they do affect the quality of data reported by the system.

THE HEROIN-RELATED DEATH INDICATOR IS ALSO BOTHERED BY INACCURACIES

Like hospital reported injuries, heroin-related death statistics have accuracy problems. Coroners and medical examiners do not report all heroin-related death cases to DAWN. On the other hand, some deaths reported by DEA as heroin-related were actually caused by other drugs. Changes made by medical examiners to the policy and procedures for identifying the cause of death have also affected the number of deaths reported. The net effect of these reporting problems on heroin death trends is unknown.

Some deaths that were clearly heroin-related were not reported

According to medical examiner records, some deaths that were clearly related to heroin use were not reported to DAWN. In fact, underreporting of heroin-related deaths occurred in three of four medical examiners' offices we visited. Between October and December 1975, DEA reported 166 heroin-related deaths from the four examiners' offices. Our review identified 22 heroin deaths (13 percent) that should have been reported but were not. Additionally, three heroin deaths (5 percent) went unreported from these offices during the period July through September 1977. During that period DEA reported 67 heroin deaths from the four offices. The following cases are examples of ones which were not reported as heroin-related:

--In Los Angeles County, a 25-year old woman was found dead in her home. Narcotics paraphernalia including two balloons, a burnt spoon, and a syringe containing a pale brown liquid thought to be heroin, were also found in the home. Analysis of body fluids by the medical examiner showed evidence of heroin use. The medical examiner ruled death was caused by acute heroin/morphine intoxication due to injection of an overdose.

--In San Francisco, a man found his 21-year old stepson dead in the bathroom. Investigators found narcotic paraphernalia, including a syringe, in the bathroom sink. The medical examiner found old needle track marks and a fresh puncture on the left forearm of the victim. Analysis of body fluids showed evidence of recent heroin use. The medical examiner attributed death to poisoning by a morphine-type alkaloid.

Why these cases were not reported as heroin-related could not be determined.

DEA incorrectly reports some deaths as heroin-related

DEA's procedure for identifying heroin-related deaths from data reported to DAWN is faulty. As a result, many deaths where heroin played no role are reported as heroin-related. To increase the accuracy of the number of reported heroin-related deaths, DEA needs to capture deaths involving the use of heroin in a separate DAWN category.

Heroin is seldom found by medical examiners in the bodies of abuse victims because it metabolizes very rapidly in the body into morphine. DEA assumes that all instances where morphine is detected are heroin cases. All such cases are collected by DAWN in a "heroin/morphine" category. This procedure causes errors in heroin statistics because heroin is not the only drug converted to morphine in the body.

Deaths caused by codeine abuse are the ones most frequently mistaken for heroin deaths. Codeine, like heroin, is a narcotic substance. Medical examiners often detect morphine in the bodies of codeine abuse victims. In many cases both codeine and morphine are identified in the deceased. When both are detected DAWN records the codeine found in a codeine category and morphine that was converted from the codeine in the category heroin/morphine.

The following cases are examples of heroin-related deaths which DEA has incorrectly reported:

--In Los Angeles County, a wife discovered her 57-year-old husband lifeless in bed at the motel in which they were staying. The victim was on codeine medication for relief of pain following a hernia operation. Blood analysis revealed the presence of codeine, morphine, and other drugs.

The medical examiner ruled that death was caused by acute codeine intoxication.

--In San Francisco, a resident found her 28-year-old, female roommate dead in bed. The previous evening the victim had stated that a friend had given her some drugs and she was feeling fine. Investigators found a codeine medication and other prescription pills on a bedside table. The medical examiner detected codeine and morphine in the body fluids. The autopsy revealed old needle tracks. The medical examiner ruled death was caused by swallowing a morphine-type substance--the codeine pills.

Twenty of the 67 heroin-related deaths (30 percent) reported from the four medical examiners' offices during the period July through September 1977 did not involve the use of heroin although morphine was identified in the toxicological findings. For the period October through December 1975, 16 of the 166 reported heroin-related deaths (10 percent) did not involve the use of heroin.

DEA, however, could improve the accuracy of its heroin-related deaths reporting by putting deaths involving the use of heroin in a separate category. Deaths involving other drugs where morphine is found could be captured in a morphine/other category.

Policy and procedure changes influence the number of deaths reported

The number of heroin-related deaths reported to DAWN has been affected by changes to procedures and policies for identifying a heroin case. For example, the New York City Medical Examiner changed his procedure for reporting heroin deaths to DAWN. Under the new procedure instituted in September 1977, heroin deaths are reported to DAWN only after the Chief Medical Examiner reviews the case. Previously, heroin deaths were reported if the investigation or preliminary diagnosis implicated heroin use. As a result of this procedure change, some deaths were reported as heroin-related that the Chief Medical Examiner subsequently ruled there was insufficient evidence to cite heroin use as a cause of death. The DAWN contractor estimates that as a result of the change, heroin deaths reported from New York City decreased by 25 percent.

Similarly, the DAWN reporter for the Los Angeles County Medical Examiner from 1972 through 1978 used a procedure for identifying drug episodes which significantly underreported them and was subsequently changed. So severe were the reporting deficiencies from that office that DEA, in 1979, authorized funds for re-examination of Los Angeles County Medical Examiner records for a 3-year period, 1976-78. Re-examination of the records disclosed many previously unreported drug abuse cases (350 in 1978 alone) including some heroin-related deaths.

In addition, potential legal actions have affected medical examiners' cause-of-death determinations. A medical examiner official in Los Angeles said that deaths were previously listed as heroin-related even if heroin was not in the body but the cause of death (hepatitis, tetanus) was generally linked to heroin use. However, due to potential court suits to protect the victim's or surviving family's reputation, unless heroin is positively identified the tendency now is to not associate the death with heroin use.

COSTS LIMIT EFFORTS TO REDUCE REPORTING INACCURACIES

DEA and the DAWN contractor are aware that inaccuracies in the DAWN data exist and, therefore, have taken actions to improve the data. However, because of the size and nature of the DAWN system, particularly the hospital reporting part, insuring accuracy would be costly.

Since early in DAWN's development, the contractor has made efforts to verify the quality of data reported from hospitals with recognized problems, such as late and incomplete reporting. In addition, the contractor maintains a monitoring staff at the contractor's headquarters to respond to questions from DAWN reporters. Starting in late 1976, the contractor sent personnel to provide, among other things, on-the-job training and other assistance to reporters.

However, the number (four full-time personnel in 1979) of field specialists is small. And, considering the size of the DAWN system, 600 hospitals and 70 medical examiners, and the amount of hospital and reporter turnover, the affect of four field specialists' efforts to correct deficiencies and train reporters is limited. Although, both the DAWN contractor and the DEA DAWN project manager believe that more

field specialists would improve reporting accuracy, the number is limited by budget constraints. Costs involve not only salaries but also large travel expenses.

Because of the Franklin study, however, some steps are planned to improve DAWN accuracy. Among the steps being considered are (1) clarifying the DAWN instruction manual and (2) placing part-time contractor staff in three of the metropolitan areas for 1 year. The staff would be responsible for frequently contacting reporters to encourage good reporting, answer questions, and identify reporting problem areas. Each year three other DAWN metropolitan areas would be selected along with three part-time staffers. Again budget constraints were cited as limiting the number of staff and locations. Assuming the temporary staff works out, it will, at 3 reporting areas a year, take 8 years to cover the 24 areas. Given the high turnover of reporters, however, the effectiveness of their efforts will be limited.

DEA DOES NOT KNOW THE EFFECT OF ERRORS ON INDICATOR TRENDS

Although no one knows for sure, DEA officials believe that many of the errors identified by the Franklin study are such that they would have occurred to the same extent consistently throughout DAWN's existence. If so, trends developed from the indicator remain valid. If not, the trend line could be decidedly different. For example, if heroin-related injuries were underreported in only 10 percent of the cases in 1976 and 45 percent now, the trends portrayed by DEA's injury indicator would show a far less decline. DEA needs to determine if the errors identified by the Franklin study are made at a consistent rate and whether improvements in accuracy are occurring. Only then will DEA be assured that the trend shown by its injury indicator has not been influenced by reporting errors.

The Franklin study did not include a review of the accuracy of medical examiners reporting. Hence, DEA has even less knowledge about the confidence it can place in that part of the DAWN system.

CONCLUSIONS

DEA's heroin death and injury indicators are supported by inaccurate data. Inaccuracies are more prevalent in data

gathered from hospital emergency rooms than from medical examiners. A 1979 DEA contracted study by the Franklin Research Center found that (1) 45 percent of the emergency room narcotic abuse cases treated at DAWN participating hospitals were not reported and (2) 8 percent of the narcotics identified, in cases that were reported, were unreported or misreported. The study attributed most of the errors to clerical oversight and misunderstanding of reporting instructions.

The Franklin study did not include medical examiners' reporting. Our limited review at selected medical examiners indicates they also have accuracy problems. Overall, however, these problems are less severe than those affecting injury statistics.

The effect of the errors on the trend line for drug related deaths and injuries is unknown. There simply has not been sufficient studies to show whether errors are made to the same extent year in and year out. If not and the error rates were to differ significantly from year-to-year, the trends would be highly questionable. DEA needs to know the answer.

RECOMMENDATIONS

We recommend that the Attorney General direct the DEA Administrator to

--monitor periodically and on a representative basis, the accuracy of the DAWN system (both hospitals and medical examiners),

--report as heroin-related, only those deaths where heroin played a role, and

--accumulate in a separate DAWN category deaths due to morphine-related drugs, such as codeine.

CHAPTER 4

HEROIN REMOVAL STATISTICS ARE GREATLY OVERSTATED

The usefulness of DEA's heroin removal statistics is hampered by DEA's method of compiling and reporting the data. The reported statistics are greatly overstated because the system does not prevent the U.S. Customs Service and DEA from claiming credit for the same removals and because DEA reports removals by gross instead of pure weight.

SOME REMOVALS ARE COUNTED BY BOTH CUSTOMS AND DEA

Heroin removal statistics are compiled from both Customs and DEA reports. This method of reporting results in substantial overstatement of removals because Customs and DEA, in many instances, claim credit for the same removal.

Review of only those heroin removals reported by Customs during 1976 and 1978 that weighed 1,000 grams or more showed that, in 1976 at least 114 pounds and in 1978 at least 103 pounds of heroin were also claimed by DEA. The following chart illustrates the double countings.

Category	1976		1978	
	Number	Weight (pounds)	Number	Weight (pounds)
Removals reported by Customs	375	249	185	204
Removals reviewed by us	19	205	22	174
Removals also reported by DEA	8	114	10	103

Duplicate reports of heroin removals have occurred when DEA and Customs failed to acknowledge the other's contribution to a seizure. For example, Customs inspectors sometimes interdict a heroin smuggler at a border port of entry following the receipt of intelligence information from DEA. Although the seizure resulted from a cooperative effort, both Customs and DEA separately record the quantity of heroin seized in their data bases, sometimes not acknowledging the participation of the other agency. DEA reports the quantity seized on the basis of STRIDE reports as well as Customs' reports.

The following example illustrates this practice and how it results in overstating heroin removals.

On July 18, 1978, a Customs inspector at the border stopped a suspect whose car's license plates he identified from a DEA alert in a Treasury Department enforcement communications system. The Inspector found a large quantity of heroin in the suspect's possession. After arresting the suspect and seizing the evidence, the inspector, according to procedures, called DEA. He then transferred custody of the heroin and the suspect to DEA. Based on its field test, Customs recorded in its system that it had seized 11.9 pounds of heroin, including packaging. DEA meanwhile, sent the heroin to its laboratory for analysis and then recorded in its STRIDE system that it had seized 10.7 pounds of heroin (without packaging), failing to note Customs' involvement.

On July 27, 1978, another search of the suspect's car by Customs identified an additional quantity of heroin. As before this seizure was routinely transferred to DEA where it underwent laboratory analysis. Based on its field test, Customs recorded another 16.2 pounds seized. In addition, based on its analysis, DEA recorded 14.1 pounds seized. Again DEA failed to note Customs' involvement in its STRIDE report.

As a result of these actions, Customs' reported heroin removals to DEA included 28.1 pounds from this seizure. DEA's reported heroin removals included 24.8 pounds from this seizure. Therefore, heroin removals reported in the Performance Measurement System were overstated by 28.1 pounds.

According to DEA and Customs officials, all heroin seizures by Customs are transferred to DEA as required by the Reorganization Plan No. 2 of 1973. Under this plan, which created a single agency approach to drug enforcement, Customs is required to transfer to DEA any illicit narcotics, dangerous drugs, or related evidence seized. When DEA receives custody of a suspected drug, that drug is analyzed at a DEA laboratory and the results are entered into the STRIDE system.

On the reports they send with the evidence to the laboratories, DEA agents are required to identify the agents

who made the removal. In all but one instance, Customs' involvement in the case was noted on DEA's reports, but the information was not put into STRIDE. However, the STRIDE data is DEA's means for checking for double counted removals.

Using STRIDE data, DEA has provided Customs with periodic feedback of the laboratories' analysis. However, the format of the analysis has prevented Customs from matching the results with its own data. A Customs' official stated that removal data is most accurate when it is based on laboratory analysis. He explained that the removal reports Customs provides to DEA may not be completely accurate because they are based on field tests. Such field tests, he noted, may not always make accurate identifications. Additionally, the weights reported from field tests included the weight of the packaging as well as the powder.

To avoid duplicate reporting, DEA should obtain Customs heroin removal statistics from STRIDE's data base, not from Customs' reports. In addition, since STRIDE data is based on laboratory analyses, it is more reliable than Customs' reports which are based on agents' field tests.

Recent modifications to STRIDE should provide Customs the means to identify whether its removals are recognized. In late 1979, DEA modified the format of the report its agents use to transmit drug samples to the laboratories. The modification consists of placing a Customs generated case number on the report form for input to STRIDE. Placement of the Customs' number on all appropriate STRIDE inputs will allow Customs to monitor the laboratory analyses of its seizures, account for all evidence transferred to DEA, and alert DEA to any needed corrections.

DEA'S METHOD OF REPORTING OVERSTATES REMOVALS

DEA's method of reporting removals greatly overstates the amount of heroin removed and may effect the trend of removals. DEA reports heroin removals by gross weight which includes both the pure heroin and any cutting agents present. However, the relationship of cutting agents to heroin varies. As a result, the removals reported are overstated by the amount of cutting agents used. To more accurately report heroin removals, DEA should exclude the cutting agents.

The amount of heroin removed depends on the purity of the sample. Many DEA removals that are similar in gross weight have vastly different heroin content. The following examples illustrate this point.

Sample	Date removed	Gross weight (grams)	Pure weight (grams)	Percent pure note a
A	9/78	902	875	97.0
B	10/78	999	63	6.3
C	9/78	85	45	53.0
D	9/78	89	1	1.5
E	9/78	365	77	21.0
F	9/78	343	11	3.2

a/Computed from unrounded data

The amount that DEA's reporting method overstates heroin removals and distorts removal trends can best be seen by analyzing DEA removals for 1976, 1977, and 1978 as taken from STRIDE printouts.

Year	Number of removals	Gross weight (pounds)	Pure weight (pounds)	Percent overstated note a
1976	2,709	689	142	383
1977	2,053	462	64	627
1978	1,371	427	87	392

a/Computed from unrounded data

Using gross weight, the trend of DEA heroin removals between 1976 and 1978 shows a continuous decline. However, analysis of pure weights shows that the heroin removed actually declined by 55 percent between 1976 and 1977, rather than by 33 percent as shown by the gross weights, and increased 37 percent between 1977 and 1978 rather than declining by 8 percent.

REMOVAL TRENDS ARE DIFFICULT TO INTERPRET

As noted in chapter 1, heroin removal statistics have been used for many purposes. However, heroin removal trends are difficult to analyze and interpret because many different factors can effect removal activity. Reasons for trend changes may not be readily apparent. For example, a decline in heroin removals could indicate (1) a shift in enforcement priorities or agency resources, (2) more sophisticated and harder to detect smuggling techniques, (3) a shift in smuggling routes, (4) less heroin being sent to the United States due to better enforcement overseas, smaller opium yields overseas, or growing markets in other countries, or (5) less effective law enforcement. As a result, users of removal statistics should not draw conclusions from this data without other supporting information.

CONCLUSIONS

The usefulness of DEA's heroin removal statistics is hampered by DEA's method of compiling and reporting the data. The method DEA uses (1) overstates removals due to duplicate reporting by Customs and DEA and (2) exaggerates the quantities removed.

Both DEA and Customs compile heroin removal statistics. Duplicate reporting occurs when DEA and Customs fail to acknowledge the other's contribution to a seizure.

DEA should obtain Customs removal statistics from the STRIDE data base and not from Customs reports. The STRIDE system now requires reports involving Customs to note the Customs' case number. Hence, Customs can review STRIDE reports to assure that all Customs seizures are duly noted.

DEA can more accurately report heroin removals by reporting them by their pure weight rather than by their gross weight. Reporting removals by their gross weight can distort removal trends developed from such data.

RECOMMENDATIONS

We recommend that the Attorney General direct the DEA Administrator to

--report all heroin removals from data contained in DEA's STRIDE system and

--report all heroin removals by their pure weight.

CHAPTER 5

NIDA'S HEROIN ADDICT POPULATION ESTIMATE-- METHODOLOGY NEEDS VALIDATION

NIDA's heroin addict estimates are subject to severe limitations in both methodology and data that make their results questionable. To increase the estimate's reliability, the methodology used needs to be validated and the data used made more accurate.

NIDA's 1977 and 1978 estimates are based on estimates that were made in 1974 and 1975. The 1974 and 1975 estimates were both derived using two different methodologies whose results were relatively close. The following schedule shows the estimates that were used since 1974.

Year	Methodologies used		
	A	B	C
1974	558,000	585,000	-
1975	546,000	541,000	-
1976 (note a)	546,000	541,000	-
1977	-	-	456,000
1978	-	-	373,000

a/NIDA assumed the 1976 estimates to be the same as 1975 estimates.

THE CLANDESTINE USE OF HEROIN HURTS ADDICT ESTIMATES

Heroin addict estimates are particularly hurt by drug abuse's clandestine nature. Because heroin use is illegal, users do not readily identify themselves unless they experience a medical trauma, desire rehabilitation, or are arrested. Because being identified as a heroin user subjects one to potential penalties, such as arrest or loss of job, estimates based on general population censuses have severe shortcomings.

Since direct measurements of the problem are not possible, addict estimates are based on events or factors that are somehow related, either directly or indirectly, to heroin abuse. Some of the factors used are more related to heroin use than others, but each has its weaknesses. Because so

much is unknown about the addict population, the methodologies used rely on numerous assumptions.

PRIOR ESTIMATES HAMPERED BY PROBLEMS AND ASSUMPTIONS

The 1974 and 1975 addict estimates were hampered by problems that affect their reliablity and by assumptions that were possible sources of error. These estimates were derived from two independent estimating methodologies that relied on different heroin abuse factors. The results of the two estimates were so close they seemed to confirm each other. However, because of various data problems and assumptions made, the estimates' closeness may have only been coincidental.

Questionable addict register formed basis of one estimate

One of the prior estimates was based on a questionable addict register maintained by DEA. Federal, State, and local enforcement agencies voluntarily submitted reports of all addicts they arrested to DEA. For purposes of the register, DEA did not define what constituted an addict. That determination was made by each officer submitting a report.

A 1974 monograph by the White House's Special Action Office for Drug Abuse Prevention discussed various heroin use methodologies, including their limitations and shortcomings. One technique described was the methodology that relied on DEA's addict register.

The monograph pointed out that while theoretically the methodology was an ideal solution to the problem, it was plagued by a variety of problems. Among the problems noted was that DEA's register was hampered by inconsistent, irregular, and geographically unrepresentative reporting, as well as by its sole reliance on law enforcement sources for its data. The monograph also pointed out that the methodology was based on three assumptions that were potential sources of error. The monograph concluded that the methodology's results can only be regarded as flawed estimates.

A 1976 DEA contracted study by the Institute for Defense Analysis also found severe problems with the register. It found that Federal and local governments no longer appear to

want or try to maintain a register of all addicts. The Institute's findings included the following:

--The criteria for identification of a narcotics user are unknown and undefined.

--The identification of regular narcotics users is unverifiable.

--The local police jurisdictions' participation is limited, incomplete, and erratic. As a result, the register collects very little information.

--The addict register is inherently poor as a base for almost any calculation regarding national heroin use.

The study recommended that the addict register be discontinued.

In December 1977 the addict register was discontinued. The memorandum justifying the system's cessation noted that it had deteriorated to the point of being virtually useless as an abuse indicator.

Because the register was plaqued by numerous problems that undermined its integrity, the addict estimate, which relies on the register as a base, is highly questionable.

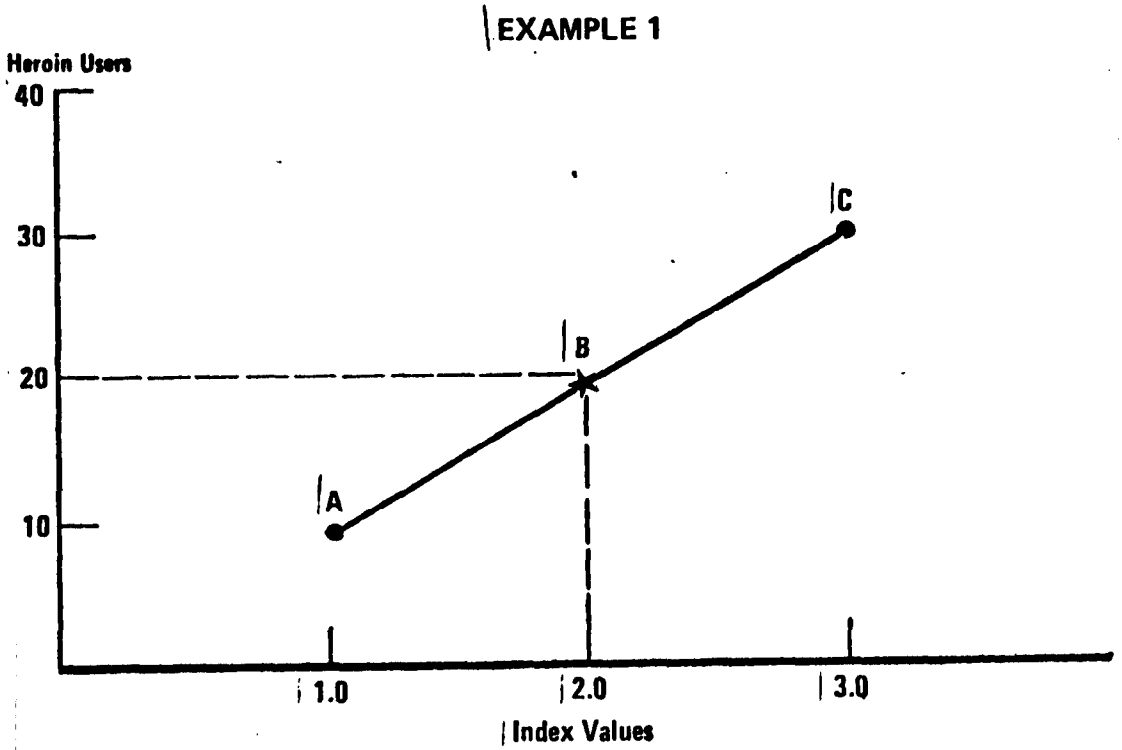
Numerous assumptions and qualifications dominate the second estimate

The second addict estimate for 1974 and 1975 was based on numerous assumptions and qualifications that were possible sources of error. The estimate's methodology used five heroin indicators to develop indexes for 24 metropolitan areas. The indexes were then calibrated to estimate the prevalence of heroin use.

The five indicators used for these estimates were DEA's retail heroin price and retail heroin purity, DAWN's heroin-related deaths and injuries, and admissions to Federally funded drug treatment programs where heroin was the primary drug abuse problem. DEA's retail price and purity indicators and DAWN's injuries and deaths indicators have various problems that affect their reliability and, thus, are a

possible source of error. In addition, in three areas no price and purity data existed because no heroin buys had been made. In those cases, estimates were developed using DEA regional data. These estimates were a possible source of error.

Using these indicators, each of the 24 metropolitan areas was assigned an index value that indicated the areas' relative heroin problem. For example, the index indicated that Denver's heroin problem was more serious than Atlanta's and less serious than New York City's. To convert these indexes into heroin prevalence estimates, estimators assumed that a linear relationship existed between the index values and the rate of heroin use. Thus, if the number of heroin users in two metropolitan areas was known, the number of heroin users in the other areas could be derived by drawing a straight line between the known areas and plotting the index values for unknown areas on that line. The following example illustrates this relationship for areas A, B, and C.

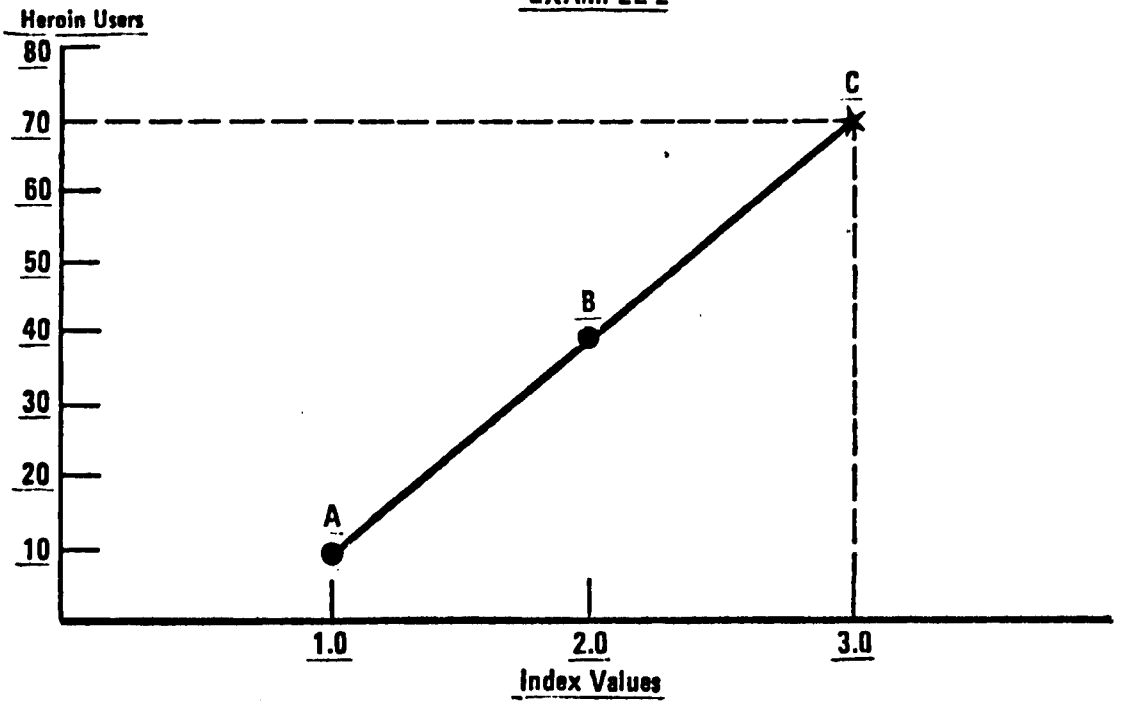


In the example, index values for areas A, B, and C were 1.0, 2.0 and 3.0, respectively and the heroin user population in areas A and C were known to be 10 and 30, respectively. By plotting the values known for A and C on a graph and drawing a straight line between them, the estimated number of heroin users in area B can be derived by locating its index value on the line.

The assumption that the relationship between the index values is a linear one is crucial to the estimate's results. In the example above, if the heroin user population for area B was actually 40 users, a linear relationship would not exist and the methodology could not be applied. The estimate's methodology presents no evidence that the relationship between the index values and prevalence is linear.

The estimate's methodology cautions that once a linear relationship is assumed, the areas selected to define the line (anchor areas) are of critical importance. In the example above, if area B instead of area C had been used to define the line and the number of users in area B had been known to be 40, then the user population of area C would have been estimated to be 70 users rather than its known population of 30. The following example illustrates:

EXAMPLE 2



In example 2, the index values for areas A, B, and C are the same as they were in example 1. The only difference is that in example 2 the population of area B is known and the population of area C is unknown. By plotting the known values of A and B on the graph and drawing a straight line through them, the estimated number of heroin users in area C can be derived by locating its index value on the line. As can be seen in example 2, by using different areas to define the linear relationship, the estimated user populations in the unknown areas will also be different.

Atlanta and Phoenix were selected for the 1974 estimate as the two anchor areas on which the linear relationship was based, and Atlanta and Los Angeles were selected for the 1975 estimate. The user populations for these cities were determined by estimates made by various studies. However, the reliability of these studies is not known. In addition, the estimates often had to be adjusted to meet the needs of the estimating techniques. For example, the anchor heroin population used for Los Angeles in 1975 was based on rough prevalence estimates which ranged between 40,000 and 80,000 that were averaged to yield 60,000. The 1974 estimate used for Phoenix was from a report prepared and submitted in early 1975 for metropolitan Phoenix. For purposes of the anchor area, it was assumed that the data used for the estimate reflected 1974 heroin use. Since the estimate was only for metropolitan Phoenix, it had to be adjusted to represent all of Maricopa County. This was accomplished by assuming that Phoenix comprised 75 percent of the county's population.

Once heroin prevalence for the 24 areas was estimated, these areas had to be projected to reflect a national total. Although the population in the 24 areas was only about one-third of the national population, by using DAWN heroin-related injury data it was estimated that these areas represented about three-fourths of the national heroin-related emergency room cases.

Commenting on the independent estimates used to determine the anchor areas' populations, the methodology cautions that these estimates "are based on possibly different assumptions, different definitions, different estimating techniques, and different data from which to work."

The authors recognized that the 1974 and 1975 estimates were crude applications of the methodology but believed that more precision, better definitions, and better data collection systems would improve the estimates. One of the authors stated that the estimates were actually a best guess. He concluded that it was possibly a mistake to publish the estimates and warned against using them in comparison with other estimates for different time periods.

NIDA'S 1977 AND 1978 ESTIMATES ARE BASED ON QUESTIONABLE METHODOLOGY AND DATA

NIDA's 1977 and 1978 heroin addict estimates use a different methodology than the 1974 and 1975 estimates but absorb all of their problems. In addition, the methodology raises greater doubts about the accuracy of the earlier estimates. Finally, the reliability of the heroin-related factors used to determine the estimates is questionable.

NIDA's methodology employed three heroin indicators in simultaneous equations: (1) DAWN heroin-related injuries, (2) DAWN heroin-related deaths, and (3) DEA's retail heroin purity. NIDA relates the three indicators for 1974 and 1975 to the 1974 and 1975 estimates. Since no estimate was made in 1976, the addict population was assumed to be the same as the 1975 population. The 1976 indicators were then related to the assumed 1976 population. Once these three relationships (equations) were established and the indicator values for 1977 known, then the 1977 addict population could be estimated by solving the equations simultaneously. The 1978 estimate was developed similarly.

Because NIDA's methodology uses the 1974 and 1975 estimates as the basis for determining the addict populations in both 1977 and 1978, it absorbs their problems and assumptions. In addition, the 1974 and 1975 estimates establish the base on which the latter estimates rely. Thus, whatever errors occurred in those estimates were transmitted to the latter estimates. If the 1974 and 1975 estimates were grossly inaccurate, so are the 1977 and 1978 estimates.

The methodology that NIDA uses raises even greater doubts about the accuracy of the earlier estimates. NIDA's methodology assumes that the three heroin indicators used are related in some way to changes in the addict population. That relationship logically is a direct one. For example, if all three indicators increase, the number of addicts

should increase. Between 1974 and 1975 all three indicators increased, however, the estimated number of addicts decreased. The following chart illustrates.

Year	Heroin injuries	Heroin deaths	Heroin purity	User estimates A	User estimates B
1974	8,260	1,461	5.83	558,000	585,000
1975	13,250	1,913	6.11	546,000	541,000
Change	+60 percent	+31 percent	+5 percent	-2 percent	-8 percent

Using NIDA's methodology the addict estimates should have increased; because they decreased, doubts are raised about the estimates' accuracy.

In addition, the three heroin-related factors used in NIDA's estimates have various problems that affect their reliability. To some extent these factors are possible sources of error although how much is not known. Increasing their accuracy will help increase confidence in the estimates' trends.

NIDA's methodology properly warns that its prevalence estimate must be viewed with great caution since it was derived from a statistical projection rather than by direct measurement. However, once the estimate is released, users of it often refer to the estimate in a more precise manner. For example, the Strategy Council on Drug Abuse in its 1979 "Federal Strategy for Drug Abuse and Drug Traffic Prevention" stated that "current data [1977] indicate that the number of heroin addicts has declined since 1975 by 100,000 from 550,000 to 450,000." NIDA's methodology concludes that its estimate was not meant to be precise and in the past has fluctuated by as much as plus or minus 40,000.

NIDA PROJECT INSTITUTED TO DEVELOP A BETTER METHODOLOGY

To increase the estimates' reliability, the methodology used needs to be validated and the data used more accurate. NIDA is aware that the addict estimates have limitations and as a result, has initiated a project to develop a better indicator methodology. In a letter to us dated October 9, 1979, a NIDA official stated that "one of our major objectives * * * is to develop even sounder scientific techniques than we currently have through which drug abuse prevalence

estimates can be made." In this regard NIDA has awarded a contract to develop more scientific estimating methodologies not only for heroin addicts but for some other drug users as well. This effort should be completed toward the end of 1980.

NIDA DOES NOT DEFINE THE POPULATION IT ESTIMATES

One area of some confusion is the definition of what the estimates are measuring. NIDA has not defined the population it estimates and, thus, estimates users need to be cautious when interpreting and using them. The estimates are often referred to as addict estimates, and even NIDA has referred to the estimates as such. But authors of the prior estimates on which NIDA's 1977 and 1978 estimates are based use different terms to describe the populations they estimated. The author of one estimate said that his research showed that about 80 percent of the users reported to DEA's addict register were daily users. One of the authors of the other estimate said that the estimate consisted mainly of hard core chronic users. From the two definitions it is unclear whether the same population was estimated.

The heroin indicators used to develop the index values in the 1974 and 1975 estimates and the simultaneous equations in the 1977 and 1978 estimates do not specifically measure addiction. People who experience medical trauma from using heroin may or may not be addicts. It would certainly be expected that some first time users die or go to hospital emergency rooms and, thus, become part of the heroin indicators. In addition, heroin purity does not measure addiction. Part-time and casual heroin use has some effect on the dilution of available heroin supplies.

What constitutes addiction is a subject upon which disagreement exists. The 1974 Special Action Office for Drug Abuse Prevention monograph said that heroin addiction is an elusive concept, subject to significant definition problems. Are daily heroin users addicts? Are daily heroin users addicts even if the quality of heroin is so poor that no withdrawal occurs when they stop use?

Differences in definitions can be a significant factor in the estimates that are made. NIDA does not define what the addict is that it is estimating. Therefore, the reader needs to use caution when interpreting and using the estimates.

CONCLUSIONS

NIDA's addict estimates are subject to severe limitations in both methodology and data that make their results questionable. NIDA's estimates are statistical attempts using indirect indicators to approximate an unknown population whose identification is hindered by the clandestine nature of heroin use. Because so much is unknown about the addict population, the methodology relies on numerous assumptions.

NIDA's 1977 and 1978 estimates use two 1974 and 1975 estimates as a base. As a result, they absorb the prior estimates' problems and assumptions. Thus, whatever errors occurred in the earlier estimates were transmitted to the latter ones.

One of the earlier estimates was based on a DEA addict register that was hampered by inconsistent, irregular, and geographically unrepresentative reporting. The second addict estimate for 1974 and 1975 was based on numerous assumptions and qualifications that were possible sources of error.

NIDA's 1977 and 1978 methodology also raises questions about the accuracy of the prior estimates. Using NIDA's methodology, the addict estimates should have increased between 1974 and 1975 because each of the indicators used in the methodology increased. However, each of the prior estimates decreased.

Many of the heroin indicators used in both the earlier and latter estimates were noted in other chapters of this report as having various problems which affect their reliability. These indicators could be possible sources of estimating errors. Increasing their accuracy will help increase confidence in the estimates' trends.

NIDA is aware that the estimates have limitations and has initiated a project to develop a better indicator methodology. Whatever methodology results, consideration should be given to the problems identified in this report.

CHAPTER 6

FULLER DISCLOSURE OF INDICATOR LIMITATIONS NEEDED

Given the clandestine nature of drug abuse, the statistically acceptable data gathering and reporting techniques necessary to accurately assess drug availability and abuse with a high degree of precision cannot possibly be applied. However, in congressional testimony, public statements, and Government publications, the heroin indicators are often cited without sufficient qualification. So cited, the indicators give the impression that they are precise measures. When using these indicators, data and methodology limitations should be fully disclosed so that indicator users can make more informed decisions.

DEA COULD DO MORE TO REVEAL DATA BASE LIMITATIONS AND CHANGES

The heroin indicators are often reported with a degree of certainty that is unwarranted. For example, as noted in chapter 1, DEA's Administrator testified before congressional committees that retail heroin purity dropped from 6.6 percent in 1976 to 3.5 percent in mid-1979, while the retail price during that period rose from $1.26 per pure milligram to $2.25. However, beginning in its 1979 Performance Measurement System reports, DEA cautions readers that the price and purity indicators should be used with care and only as a general trend indicator since the available data base is not large enough to produce information reflecting absolute figures.

The data from some regions, however, is so small that meaningful analysis of the System's regional price and purity indicators is impossible. For example:

--DEA reported in its System report for the fourth quarter 1978 that the average retail heroin price in the South was $2.70 per pure milligram. At that time the South region was comprised of 12 States and the District of Columbia. The regional heroin price indicator was based on six purchases.

--DEA reported for the same period the average retail heroin price in the Central region was $2.19 per pure milligram. The Central region

was comprised of 13 States. The regional heroin price indicator was based on seven purchases.

DEA needs to fully reveal the extent that data limitations effect the indicators' reliability.

In addition, DEA needs to alert indicator users to significant changes that affect the indicators' data bases. For example:

--Due to hospital turnover, reporting from the San Francisco metropolitan area dropped from 28 DAWN-affiliated emergency rooms in 1976 to 8 DAWN-affiliated emergency rooms in 1977. Yet the trend statistics published in DEA's System report were not adjusted to reflect the change nor was the reader cautioned that the data base had changed.

--Special intelligence gathering operations in New York City in 1979 added at least 52 additional heroin purchases to the number of samples used to compute the third quarter 1979 national price and purity indicators. The 163 purchases used in that quarter were 69 purchases more than the average number of purchases used in the prior four quarters. Analysis of STRIDE reports indicates that at least 20 additional retail heroin purchases made in New York City qualified for use in the indicators' data base. Thus, out of 163 purchases used that quarter, at least 72 (44 percent) came from New York City. However, DEA did not disclose how its special intelligence gathering affected the indicators.

In some drug reports general disclaimers or extensive caveats are used to caution the users about data limitations. The National Narcotics Intelligence Consumers Committee, a compilation of Federal agencies with enforcement, policy, treatment and research, and intelligence responsibilities, includes a general data disclaimer at the beginning of its reports. The disclaimer cautions readers that few "hard" statistics exist where illegal activities are concerned and that special difficulties occur where quantitative estimates are concerned. In such cases, the Committee states that crude methodologies may have to be resorted to for estimates when nothing better is feasible.

DAWN contractor issued reports not only caution the reader about system limitations but also provide the reader with system terminology, defintions, data collection procedures, and other useful information to aid the users understanding of the data presented. Among the limitations noted is that over a period of time a region may show a change in the number of drug abuse cases reported either because of a genuine change in the level of drug abuse or because of a change in the extent of reporting due to hospital turnover. In this regard, the DAWN contractor sufficiently disclosed the significant reduction in hospital emergency rooms reporting in San Francisco, both in its reports' introductory comments and in the section showing San Francisco's reported data.

CONCLUSIONS

When presenting its drug indicators, DEA should make the data user aware of general and specific indicator limitations and significant changes to indicator data bases. In presenting data from other sources, such as DAWN data, DEA should report significant data base changes and limitations and refer the user to the source documents for more detailed information. Such information will help the user to interpret the indicators appropriately.

RECOMMENDATION

We recommend that the Attorney General direct the DEA Administrator to fully disclose in all public statements and reports the limitations of heroin indicators and significant changes affecting indicator results.

CHAPTER 7

SCOPE OF REVIEW

This review was made because of congressional concern expressed about the reliability of the Government's drug abuse assessment and the statistical data supporting its assessment. Since heroin is the Government's number one drug priority we focused our review on indicators of heroin availability and abuse and the Government's enforcement effectiveness. Our review was conducted between January 1979 and March 1980.

Our assessment of DEA's heroin price and purity indicators was based on an analysis of (1) Performance Measurement System reports, (2) DEA congressional testimony, (3) indicator methodology, (4) DEA data bases, (5) prior internal audit and contracted studies, (6) records of retail heroin samples submitted by local police, and (7) DEA case records. We also discussed the indicators with headquarter's officials, regional agency officials, and local police officials.

Our review of the heroin-related death and injury indicators included an evaluation of data accuracy and collection procedures and the way DEA reports them. We made a detailed analysis of the accuracy of reported heroin deaths and discussed DAWN reporting at four medical examiners offices in Los Angeles County, San Francisco County, and Alemeda County, California, and Washington, D.C. In addition, we discussed DAWN reporting with medical examiners' officials in San Diego County and Orange County, California, and New York City. We also discussed DAWN reporting with DEA and NIDA officials, DAWN contractor officials, and DAWN reporters in hospital emergency rooms. We examined DAWN contractor reports and records and DEA reporting of DAWN information.

We also reviewed DEA's methodology and procedures for compiling and reporting heroin removal statistics. In addition, we reviewed DEA's Performance Measurement System's reporting of removal activity. We examined DEA's and the U.S. Customs Service's computer printouts of their heroin removals and selected DEA case files of removal actions. We discussed removal reporting with DEA and Customs officials.

We examined past and current estimates of the heroin addict population, their methodologies and related studies of them, and some of the data used to compute them. Discussions of the estimates were held with NIDA, DEA, and Drug Policy Office officials.

HOW DOES HEROIN CAUSE DEATHS AND INJURIES?

Heroin abuse causes, both directly and indirectly, many deaths and injuries. The common name of a casualty caused by the direct effects of heroin is "overdose." Indirectly heroin causes deaths and injuries by the way it is administered, or the behavior of those under its influence or in the grips of addiction. The following material describes the course of heroin from the poppy fields to the treatment rooms and autopsy tables of hospitals and county coroners.

HEROIN AND OTHER OPIATES ARE DERIVED FROM THE POPPY PLANT

Raw opium, obtained from the poppy papaver somniferm, is the source of morphine, codeine, and heroin. Morphine and codeine are two naturally occurring compounds of opium. The milky white sap extracted from the poppy pod is processed from raw opium into morphine, codeine, and other products for the licit market. For the illicit market, further chemical processing of morphine yields heroin, a semisynthetic narcotic.

Heroin and other opiates are similar in effect

The opiates all have the same action on the body; i.e., they are pharmacologically similar. However, their effect on the body varies according to the specific drug used and the method of administration.

Heroin and the other opiates are sedatives that depress the central nervous system. This depressant action works as an analgesic (pain reliever) and, for this reason, opiates are used for medical purposes. In some persons the opiates produce a very pleasant euphoria, but for others the opposite, dysphoria, occurs and may be accompanied by such unpleasant effects as nausea and vomiting. A heroin user, suffering these unpleasant effects, might seek medical treatment in the office of a physician or the emergency room of a hospital.

Opiates are addicting

As narcotics, heroin and the other opiates are addictive, producing both psychological and physical dependence.

Psychological dependence comes from the flush of euphoria, elevation of mood, and a feeling of peace, contentment, and safety created by the drug. Physical dependence refers to an alteration in the normal functions of the body that necessitates the continued presence of a drug in order to prevent withdrawal or abstinence syndrome. Symptoms of this syndrome include: watery eyes, runny nose, yawning, perspiration, restlessness, irritability, loss of appetite, insomnia, tremors, nausea, vomiting, stomach cramps, diarrhea, elevated heart rate and blood pressure, chills alternating with flushing and excessive sweating, pains in the bones and muscles of the back and extremities, and muscle spasms and kicking movements.

Opiates are used in many forms

Narcotics come in several forms and can be used in different ways. The opiates are available in powder, pill, and liquid form and they can be

--swallowed;

--snorted (sniffed);

--smoked, in cigarettes for example;

--applied subcutaneously ("skin popping");

--injected intramuscularly; and

--injected intravenously.

Among narcotic addicts intravenous injection is the preferred route because of its direct, quick action. The addict usually obtains the drug in a powder form, mixes it with water, and heats it to a boil. Using a syringe or makeshift hypodermic needle, such as a medicine dropper fitted with a needle, the addict or narcotic abuser injects the drug mixture into the veins of the elbow fold and adjacent parts of the forearm. Other convenient areas on the upper and lower extremities also may be selected as injection sites.

APPENDIX I

Heroin is the preferred drug among narcotic addicts

Heroin has a rapid onset of action and proceeds quickly with its analgesic effect. This is one reason why heroin has the highest addiction potential of all the abused drugs. Its analgesic effect is about three times that of morphine. The following table compares the relative potency of the principal opiates.

Drug	Potency
Morphine	10x opium
Codeine	0.50x opium
Heroin	3x morphine
Methadone (a synthetic drug)	equals morphine

Note: All the above have the same effects. Potency refers to the amount of drug necessary to create the same level of that effect. There are some differences, however, particularly in maximal effect and duration.

Heroin is sold in the form of a powder, either in loose form or encapsulated. It is usually injected either intravenously, intramuscularly, or subcutaneously, but may be smoked, or ingested. Heroin's pharmacological action is that of morphine because it is converted back into morphine in the body, although some animal experiments have indicated that heroin's molecular structure and metabolic process facilitates faster passage through the blood-brain barrier than morphine. Thus the peak effect is reached more quickly for heroin than morphine, and the effect of heroin is greater than that of an equal dose of morphine.

Morphine and codeine are considered substitutes for heroin by addicts. Because it is more potent and more available illegally, heroin is preferred. Morphine and codeine are both marketed in the United States in powder, tablet, and injectable form. Morphine per se is rarely used by addicts in the United States. They will use codeine by ingesting large quantities of pills, pulverizing the pills and injecting the codeine like heroin, or drinking codeine cough medications.

HEROIN DEATH--A MYSTERY

The risk of using narcotics, particularly heroin, is well-documented, but not so well-defined. Although death is a frequent consequence, its cause is not understood. Theories abound but the exact mechanism responsible is not agreed upon. Medical experts cite both acute (short-term) and chronic (long-term) effects of heroin use. They also point to risks only indirectly related to use of the drug, but just as deadly. Some of the theories presented include death due to

--pharmacological overdose;

--shocklike reaction to an injected material due to hypersensitivity and not from a toxic drug overdose;

--combined action of heroin and other drugs, such as alcohol and/or barbiturates;

--infections, diseases, and other complications associated with heroin use but not directly caused by the drug; and

--the dangerous, often violent lifestyle of narcotic abusers.

An acute reaction may occur

The most immediate danger of heroin use is an acute or short-term reaction to a recent dose. It is the most frequently cited cause of death to heroin users and the least understood.

The exact mechanism of an acute reaction is a mystery in most cases. Commonly, and often erroneously, referred to as an overdose, acute reactions actually take several forms, including a true pharmacological overdose of heroin. Other acute reactions are: a shocklike or allergic-type reaction to material (not necessarily the heroin) injected into the bloodstream, or the reaction to heroin and other drugs working in combination.

True heroin overdose is infrequent

Although, many deaths are labeled as due to "heroin overdose," not all (very few according to some researchers) of them are actually due to the pharmacological effect of taking too much heroin. Other mechanisms, not clearly understood, are thought to be responsible.

Overdose is a reaction to heroin, normally a slow process, that occurs when the pharmacologic action of the drug affects vital body functions, such as breathing. It occurs after excessive use of heroin because, in addition to the previously described analgesic effect, heroin also causes respiratory depression by acting on the respiratory center in the brain. Thus, when an addict administers a lethal heroin dose, respiration slows (both in rate and depth); lethargy and stupor ensue, followed by coma. Death, when it occurs, is the result of respiratory failure. However, death can be prevented. The heroin overdose victim, if treated, can be saved by application of one of several antagonists which nullify the action of the heroin.

Acute heroin deaths are characterized by the short interval between administration of the drug and death, and the severity of the symptoms. Acute deaths, including those in the category of pharmacologic overdose, usually occur in a period from immediately after injection to several hours later, although death may occur days later. The physical symptoms associated with overdose (one type of acute heroin death) are shallow breathing, constricted pupils, difficulty maintaining an erect posture, and stupor. Overdose may be also characterized by pulmonary edema (fluid in the lungs) although this is more commonly associated with another type of acute death.

Heroin overdose is infrequent because the lethal dose is high for almost all individuals, higher than the dose available from most purchases intended for injection. The amounts obtained in street purchases are almost invariably below the amount needed to kill even a neophyte heroin user. The amount of heroin needed to kill a nonaddict has been estimated at 50 milligrams. A "bag"--slang for a single dosage unit of heroin--weighs about 100 milligrams, usually containing less than 10 milligrams pure heroin. The "bag" would have to be 50 percent pure--a rare occurrence--to contain a lethal dose for just the beginning heroin user.

Addicts, who develop tolerance to heroin, would require even larger amounts for overdose.

Studies conducted by medical experts confirm the unlikely occurrence of heroin overdose and suggest that death must be due to other mechanisms. Addicts who were receiving daily maintenance doses of 40 to 80 milligrams of methadone were given as much as 200 milligrams of unadulterated heroin in a single intravenous injection without changes in respiration or other vital functions. Analysis of heroin packets and needles found near the bodies of drug victims show no evidence of higher quality heroin than usual. Rarely does more than one person in a group using the same heroin supply die at the same time. These and other facts caused the Chief Medical Examiner of New York City to reach the conclusion that there does not appear to be a quantitative correlation between the lethal effect and the amount of heroin taken: other causes of death are at work.

Other toxic substances or pharmacologic mechanisms may be involved

In those cases where the deceased did not receive a lethal dose, or more than the usual dose, medical experts explain the death as an abnormal, individual susceptibility to heroin (idiosyncrasy) or an allergic reaction to the injected substance. Unlike an overdose, in these cases heroin may not be the lethal agent and the lethal mechanism is not the drug's action on the central nervous system.

These deaths are also classified as acute but are differentiated from overdose by their suddenness and physical symptoms. This type of death may occur so rapidly that the needle is found in the vein of the deceased, clasped in his hand, or lying on the floor near the body. A striking feature of this type of death is a sudden and massive flooding of the lungs with fluid: pulmonary edema. In many cases an abundance of partly dried, frothy white edema fluid is seen oozing from the nostrils or mouth.

Some medical experts theorize acute reactions are caused by quinine or other diluents in the injected heroin preparation. They state that introduction of these substances into the body triggers an allergic reaction, or sudden change in

the size of the blood vessels, which could induce pulmonary edema. Additionally, quinine may cause cardiac irregularities, which could be a mechanism of sudden death in narcotic users. On the West Coast, where quinine is not frequently encountered as a heroin mixing agent, other diluents may be responsible.

Multidrug abuse may increase the likelihood of death

The use of other drugs in conjunction with heroin may cause death even when the individual drugs are taken in sublethal doses. This condition exists particularly when the drugs are pharmacologically similar, as heroin, alcohol, and barbiturates are. They are all central nervous system depressants. When taken in combination these drugs can have one of the following effects:

(1) Additive effect--the summation of the effects of one or more drugs used together that totals their effect when used separately (2 + 2 = 4).

(2) Synergistic effect--joint action of drugs so that their combined effect is greater than the sum of their individual effect (2 + 2 > 4).

Alcohol and barbiturates are known to be synergistic with morphine. Studies show that morphine administered in therapeutic doses resulted in fatalities in individuals with only moderate blood alcohol levels. Thus, even small amounts of heroin may be fatal to those who use barbiturates and/or alcohol at the same time.

Chronic diseases are common

In addition to overdose and other acute reactions, heroin users suffer other medical disorders. As much as 10 to 20 percent of addict deaths are due to chronic, medical complications caused by repeated injections of crudely prepared drug solutions with unsterilized syringes. Use of communal needles is common; this practice promotes the spread of disease among addicts. Some of the common disorders resulting in death among addicts are hepatitis, endocarditis, tetanus, pneumonia, and septicemia. Other disorders afflicting the addict population as a result of heroin use are

malaria, cardiovascular collapse, tuberculosis and other pulmonary infections, and external infections on the body.

Hepatitis--An inflammation of the liver, infectious, or viral hepatitis is transmitted by the communal use of contaminated needles. It has been reported as the most frequent fatal infective complication of drug addiction. Acute hepatitis, which is occasionally lethal, is primarily a disease of the young drug user and is seen far less among those who have been addicted for more than 5 years.

Endocarditis--This inflammation of the lining of the heart is marked by bacterial or fungal infection of the heart valves by formation or large vegetations. Endocarditis is caused by bacteria of fungi contained in the heroin solution and injected directly into the blood.

Tetanus--This infectious disease, which is characterized by muscle spasm and difficultly in opening the mouth (lockjaw) is seen among those injecting heroin subcutaneously. The sores of the arms and legs associated with this route of administration provide an ideal environment for development of tetanus. Almost all deaths from tetanus in New York City occur in addicts. In Chicago, addicts are known to constitute at least half of the fatal cases of tetanus.

Septicemia--Blood poisoning, as this disease is commonly known, also results from the sores and abscesses that develop at injection sites.

Addicts lead a dangerous, often fatal, lifestyle

There is considerable risk involved in narcotic use beside the risk of the drug itself. Violent deaths and injuries occur frequently in the context of the addict's lifestyle as a member of a drug culture, with the attendant risks involved in obtaining a daily supply of drugs. Deaths and injuries may also be related to lowered perceptual abilities, resulting in auto accidents, burns, falls, and fractures. Thus, in addition to deaths directly attributable to the heroin injections, there is a high incidence of homicidal, suicidal, and accidental death among addicts.

APPENDIX I

Studies of mortality associated with heroin use confirm the hazards of the addict's lifestyle. In New York City in 1970 more than 150 addicts died as a result of homicide: shot by storekeepers or police or, more commonly, shot or stabbed during arguments among addicts and pushers. Of 751 homicides that occurred in Detroit in 1973, 43 percent were narcotics users. If one includes pushers and dealers (possible victims of the "drug war"), people killed by addicts, and those cases were a narcotic might not be detected in the biological sample, the percentage of homicide victims associated with narcotics traffic could be as high as 60 to 70 percent.

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