

# **Heroin Addicts in Texas:** **the Nature and Size of a Hidden Population**



Texas Commission on  
Alcohol and Drug Abuse

© January 1998, Texas Commission on Alcohol and Drug Abuse (TCADA), Austin, Texas. TCADA grants full permission to reproduce and distribute any part of this document for non-commercial use. Appropriate credit is appreciated. TCADA is a state agency headed by six commissioners appointed by the governor. TCADA provides educational materials on substance use, develops prevention, intervention, and treatment programs, and conducts studies on the problems of substance use in Texas.



Texas Commission on Alcohol and Drug Abuse  
PO Box 80529 • Austin, Texas 78708-0529  
9001 N. IH 35, Ste. 105 • Austin, Texas 78753-5233  
(512) 349-6600 • (800) 832-9623  
Web site: [www.tcada.state.tx.us](http://www.tcada.state.tx.us)

♻️ This document was printed on recycled paper.

# **Heroin Addicts in Texas: the Nature and Size of a Hidden Population**

by Jane Carlisle Maxwell, Ph.D.





# Table of Contents

<b>EXECUTIVE SUMMARY .....</b>	<b>vii</b>
<b>CHAPTER 1. HEROIN ABUSE AND TREATMENT IN TEXAS .....</b>	<b>1</b>
Introduction .....	1
Heroin Addicts and Treatment .....	1
<i>The Publicly-Funded Treatment System in Texas</i> .....	1
<i>Comparisons to the Privately-Funded Treatment System in Texas</i> .....	4
Heroin Use Trends in Texas .....	5
Career of the Heroin Addict .....	7
Treatment Need .....	9
<i>Differences in Addicts Who Do and Do Not Enter Treatment</i> .....	10
Summary .....	14
<b>CHAPTER 2. CHARACTERISTICS OF HEROIN ADDICTS IN TCADA-FUNDED PROGRAMS .....</b>	<b>17</b>
TCADA-Funded Treatment Data .....	17
Admission Characteristics .....	18
Discharge Characteristics .....	25
Summary .....	28
<b>CHAPTER 3. METHOD FOR ESTIMATING THE POPULATION SIZE .....</b>	<b>29</b>
The Data .....	29
Capture-Recapture Method .....	29
Log-Linear Method .....	31
<b>CHAPTER 4. ESTIMATES OF NEED FOR TREATMENT FOR HEROIN ADDICTS IN TEXAS .....</b>	<b>33</b>
Bexar County .....	33
Dallas County .....	38
El Paso County .....	43
Harris County .....	46
Tarrant County .....	50
Travis County .....	53
Statewide Estimates .....	55
Conclusions .....	56
<b>BIBLIOGRAPHY .....</b>	<b>59</b>



# Executive Summary

This study is an estimate of the number of “hidden” heroin addicts who would be eligible for, and interested in, treatment in TCADA-funded programs if services were available on demand. In making these estimates for the six largest counties and for the state, the study sought to incorporate information on the treatment system in Texas, trends in heroin use, and literature on the behavior of addicts.

TCADA is the state agency which coordinates the state’s prevention, intervention and treatment efforts. It funds local treatment programs for medically indigent adults and youth.<sup>1</sup> As part of its mission, TCADA is charged with estimating the need for prevention and treatment services, but because “hard core” drug addicts are a “hidden” population, various methodologies must be used to try to estimate the number of addicts in need of treatment services.

There are a variety of treatment program types for heroin addicts, including methadone maintenance, detoxification, residential, and outpatient services. As of September 1, 1997, there were 6,171 heroin addicts in methadone maintenance programs; only 24 percent were in programs receiving TCADA funds.

Studies show that the careers of heroin users are progressive, regular, and chronic, as compared to the careers of cocaine users, who cycle in and out of drug use and in and out of the straight and drug-using worlds. Heroin addicts who are in treatment are further along in their addiction careers than those who have not entered treatment, but the lack of available services and information about the availability of such services is an important factor in whether or not addicts seek treatment. If treatment is available, more addicts will seek services, whereas if a program is full with a long waiting list, addicts who might be interested in treatment may not even bother to sign up on the waiting list. Thus, waiting lists cannot be considered a good indication of the demand for treatment.

From the late 1980s to 1996, the “heroin scene” in Texas was fairly stable, with no new epidemic and with low purity heroin, although the price of an ounce of heroin dropped by nearly half between 1987 and 1997. This stability also characterized the heroin addicts who entered TCADA treatment programs between 1987 and 1996. In terms of gender, race/ethnic distribution, and employment, there were few changes in client characteristics. The only important trend was that the addicts were aging.

Analysis of client characteristics based on referral to treatment found that clients who referred themselves to treatment had used heroin longer, were more impaired, and had been in treatment before. Clients who were referred by criminal justice agencies were far less impaired in terms of

*As of September 1, 1997, there were 6,171 heroin addicts in methadone maintenance programs; only 24 percent were in programs receiving TCADA funds.*

physical or social problems, were less likely to be Anglo, and had lower incomes and less schooling.

Clients who successfully completed treatment with no drug use were older, were referred by the criminal justice system, were more likely first admissions, and were less impaired at admission. Addicts referred by family or friends were the least likely to complete treatment successfully.

*This method estimated that there are over 50,000 heroin addicts who would be candidates for treatment in TCADA-funded programs.*

**Estimated Number Heroin Addicts Statewide and in Six Counties Who Would Be Susceptible to Treatment in TCADA-Funded Programs**

	<b>Total</b>
Statewide	50,482
Bexar	8,936
Dallas	14,333
El Paso	5,740
Harris	10,000
Tarrant	6,812
Travis	5,047

The capture-recapture statistical method was used to estimate the number of heroin addicts in the state and in the six largest counties, Bexar, Dallas, El Paso, Harris, Tarrant, and Travis. Treatment admission data from 1987 to 1996 were used to estimate the number of addicts who would be susceptible to entering TCADA-funded treatment if services were available.<sup>2</sup> There are over 50,000 heroin addicts statewide who would be candidates for treatment in TCADA-funded programs.

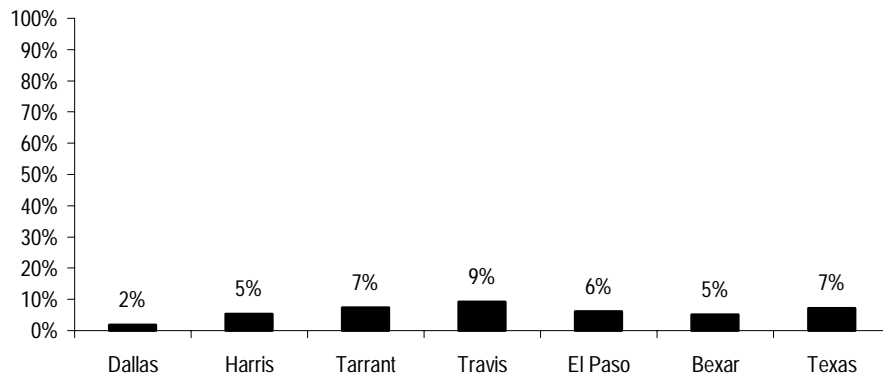
The capture-recapture methodology requires consistency over time and population, both in terms of the stable provision of services and neither changes in drug use patterns nor new drug epidemics. In Bexar, El Paso, Travis, and Tarrant Counties, these conditions were met. In Dallas and Harris Counties, where the crack cocaine epidemic dominated the drug scene, treatment resources were shifted to meet the demand for crack treatment, and the heroin estimates for these counties should be viewed with more caution.

Yet even with these limitations, it is important to note that only a small proportion of those in need of treatment are being served in TCADA-funded facilities.

**Endnotes**

- <sup>1</sup> Medical indigence refers to individuals who have no medical insurance, have a household income of less than \$10,000 per year, or receive public assistance through Medicaid, Aid to Families with Dependent Children, Supplemental Security Income, or other public assistance.
- <sup>2</sup> Because the samples are taken from the Client Oriented Data Acquisition Process (CODAP) treatment dataset, the number estimated is of those unseen addicts who resemble clients in treatment and who would enter treatment if services were available. CODAP collects admission and discharge/followup information on clients treated in programs funded by TCADA.

Percentage of Need for Treatment for Heroin Addicts Currently Being Met by  
TCADA-Funded Programs: 1996





# Chapter 1. Heroin Abuse and Treatment in Texas

## INTRODUCTION

*This paper is an overview of the public and private treatment systems in Texas, heroin use trends, characteristics of heroin addicts, and estimates of those heroin addicts who need treatment in Texas.*

## HEROIN ADDICTS AND TREATMENT

*The Publicly-Funded Treatment System in Texas*

**T**here is currently no good basis upon which to estimate the total number of heroin addicts in Texas because of limitations of surveys and other data in identifying hidden populations such as users of illicit drugs. Federal, state, and local agencies need such estimates to allocate chemical dependency treatment funds equitably and to measure the need for additional treatment services. This publication is a reprint of part of my doctoral dissertation, which sought to overcome some of these limitations by using and improving on one statistical methodology that can estimate the number of heroin addicts who are amenable or susceptible<sup>1</sup> to seeking treatment in publicly-funded facilities.

These estimates have not been developed in a vacuum, but they have been considered within the context of what is known about heroin addicts in Texas, their addiction careers, who does and does not seek treatment, and the treatment system that exists in the state. The time periods in which the Texas data were examined ranged from 1987 to 1996. A paper describing the statistical methodologies used to generate these estimates will be printed separately.

This paper is an overview of the public and private treatment systems in Texas, trends in heroin use in the state, what is known about heroin addicts in terms of their characteristics, and why they do or do not seek treatment. Finally, estimates are made for the number of heroin addicts who would seek treatment in programs funded by the Texas Commission on Alcohol and Drug Abuse (TCADA) in each of the six most populous Texas counties which include the largest metropolitan areas in the state as well as statewide estimates.

Until 1966, the only treatment programs available for heroin addicts in the US were the Public Health Service (PHS) Hospitals in Fort Worth, Texas and Lexington, Kentucky. A client could gain admission by being convicted of being a heroin addict or by voluntarily entering services under a court order.

In the mid 1960s, local non-profit and charitable agencies began providing community-based treatment. In some instances, these agencies had aftercare contracts with the PHS hospitals, while others provided detoxification and group and individual counseling. As the drug scene increased in the late 1960s, therapeutic communities, which were long-term residential programs modeled after Synanon's confrontational approach

(Gerstein and Harwood 1990), began to appear in the major metropolitan areas in Texas.<sup>2</sup> At the same time, the National Institute of Mental Health (NIMH) began awarding federal funds to community mental health centers to provide community-based treatment services. As the concern about heroin addicts returning from Vietnam grew, both NIMH and the Office of Economic Opportunity began providing funds for therapeutic communities and outpatient methadone maintenance treatment for heroin addicts in Texas.

*There are a variety of treatment programs for heroin addicts, including methadone maintenance, detoxification, residential, and outpatient treatment services.*

There are a variety of treatment programs for heroin addicts, including methadone maintenance, detoxification, residential, and outpatient treatment services. Methadone maintenance is designed for those who are dependent on narcotics. Methadone is a synthetic narcotic that is legally prescribed to treat dependence and eliminate withdrawal symptoms. It is closely regulated by both federal and state authorities, including the Texas Department of Health. Methadone is dispensed in an outpatient setting on a daily basis, with individual and group counseling provided to each client on a regular basis. Taken orally once a day, it yields a fairly even effect across a period of 24 hours and does not provide the more dramatic highs and lows of heroin (Gerstein and Harwood 1990). Any heroin addict entering a methadone maintenance program must have a documented history of addiction.

The goals of long-term methadone maintenance are to interrupt the addict's lifestyle of daily heroin use by controlling the physical addiction and to provide rehabilitation to change the lifestyle (Ball et al. 1988). Reducing the use of illicit drugs should also reduce the commission of crimes to support this illegal habit. Ending licit dependence on methadone is not a primary goal in many programs; successful treatment outcomes are based on the assumption that addicts will enter treatment and stay for longer periods of time than if they were receiving drug-free services. Maintenance on methadone is often for ten years or more (McLellan 1997). Dole (1988) and others theorized that long-term use of opiates may alter the brain neurotransmitter/receptor system to the point that the individual has a permanent craving for opiates. The addict will remain dependent on methadone, which is an endorphin replacement medication, just as a diabetic will remain dependent on insulin, which is also a lifelong replacement medication.

For fiscal year 1996, TCADA's Client Oriented Acquisition Process (CODAP) admission and discharge records were matched to determine the average length of stay, which was 236 days in methadone programs funded by TCADA. A nationally representative sample of almost 2,200 drug abuse clients found that the average length of stay in methadone maintenance was 320 days (NIDA 1992).

With the passage of Public Law 92-255, the Special Action Office and Drug Abuse Treatment Act in 1972, substantial federal funds became available for drug treatment. The models for treatment were carefully prescribed by the Special Action Office for Drug Abuse Prevention, which channeled the funds through Single State Agencies<sup>3</sup> to administer, and these models continue in use today.

In addition to methadone maintenance, another model for treatment is detoxification, which is a period of planned withdrawal from alcohol or drug dependency, usually in a residential setting. Detoxification involves the use of different procedures to alleviate short-term symptoms of withdrawal from drug dependence. Comfort, the avoidance of seizures, screening and treatment of infections and other medical problems, and the achievement of a condition in which withdrawal distress is not evident are the primary goals of detoxification (Gerstein and Harwood 1990). The average length of stay in TCADA-funded detoxification programs in fiscal year 1996 was 6.8 days.

Residential treatment (not including detoxification) can be intensive residential programs, a halfway house, or a long-term care facility for persons who have become so debilitated that they cannot function independently. Many residential programs follow the Minnesota or Hazelden model, which features 28 days in residence and an emphasis on Alcoholics Anonymous or Twelve Step programs. The goal of these programs is abstinence from alcohol and drugs, and as the clients move through services, they develop and implement an aftercare program with outpatient counseling and involvement in a Twelve Step Program.

Programs funded by TCADA offer different levels of services depending on the needs of the client. Level I is medically supervised detoxification or residential services. Level II treatment, intensive residential, is for clients who are medically stable and able to participate in treatment but need close supervision and individualized treatment. Level II treatment includes 20 hours of structured activities per week, including chemical dependency counseling and education, rehabilitation activities, and social and recreational activities. Average length of stay for Level II intensive residential treatment was 42 days in fiscal year 1996.

Level III treatment in halfway houses is for clients who are not only medically stable but also able to function with limited supervision and support. They receive an average of ten hours of structured activities per week, including five hours of chemical dependency education and counseling. Average length of stay in 1996 was 35 days.

Level IV treatment is for clients who are able to function with minimal structure and support, which means the least restrictive environment that promotes independent living skills. Level IV clients receive two hours of

***Programs funded by TCADA offer different levels of services depending on the needs of the client.***

structured activities per week to help them establish a healthy, independent lifestyle. Average length of stay was 79 days in 1996.

Outpatient services are provided when the client resides outside the clinic and attends individual and group counseling according to a predetermined schedule of services. Many of these programs see clients once or twice a week, and in addition to counseling, they can provide case management, vocational training, and social services for the client and his or her family. Depending on the intensity of the service, patients enrolled in group counseling were active in treatment between 47 and 79 days.

Between 1987 and 1996, 53 percent of the heroin addicts admitted to treatment in TCADA-funded programs entered outpatient services and 35 percent entered residential services; 8 percent entered hospital-based services and 4 percent were in prison or jail treatment programs. Within these different physical settings, 27 percent entered detoxification, 31 percent entered methadone maintenance, and 36 percent entered drug-free programs.

**Comparisons to the Privately-Funded Treatment System in Texas**

National studies<sup>4</sup> have found that, in comparison to private programs, clients in public programs have longer histories of drug use, have taken more types of drugs, are less likely to be employed, have less education, and are more likely to have been involved in the criminal justice system. Public clients have poorer general health, poorer education, and family breakdowns which may be due to their drug use or which may have predated yet exacerbated the drug use. Public providers thus need to provide a variety of services and their staffing requirements may be higher than those of private providers (Gerstein and Harwood 1990).

As of September 1, 1997 in Texas, there were ten TCADA-funded methadone maintenance programs with 1,467 active clients and 45 private methadone maintenance programs with 4,704 clients across the state. Table

**Table 1.1: Distribution of TCADA-Funded and Privately-Funded Clients in Methadone Maintenance Programs in Texas: 1997**

	No. of TCADA Clients	No. of Private Clients	% TCADA Clients of Total Clients
<b>Statewide</b>	1,467	4,704	24%
<b>Metro Area*</b>			
San Antonio	254	892	22%
Dallas	167	616	21%
El Paso	102	72	59%
Houston	192	1,556	11%
Austin	212	228	48%
Ft. Worth	192	497	28%

\*There are also methadone programs in other areas of the state, but this study was limited to those in the six largest metropolitan areas.

*The biggest difference between the TCADA-funded and the private programs in terms of services provided is continuing care.*

1.1 shows the proportion of clients in TCADA-funded and privately-funded programs among the six metropolitan areas analyzed.

Private programs do not report individual client data to TCADA, but aggregated data voluntarily submitted by Texas methadone programs to the annual national Uniform Facility Data Set Survey show that for the years 1992-1995, the proportion of Anglo clients in private methadone maintenance programs averaged 66 percent as compared to 38 percent in TCADA-funded methadone programs. Likewise, Hispanics comprised 26 percent of the admissions to private programs and 46 percent of the admissions to TCADA-funded programs. African Americans comprised 6 percent of private clients and 16 percent of TCADA clients (Maxwell 1996).

The 1988, 1994, and 1995 annual surveys collected information on services provided by the programs. While TCADA-funded programs have always been required to provide counseling, this service was not a requirement for private programs, but over time, the proportion providing such services has continued to increase. In 1988, 58 percent of the private programs provided individual counseling and 42 percent provided group counseling; in 1995, 90 percent provided individual counseling and 55 percent provided group counseling.

The biggest difference between the TCADA-funded and the private programs in terms of services provided is continuing care: since TCADA requires that its programs contact clients 60 days after discharge, the rate of follow-up contact for these programs was much higher. In addition, the TCADA-funded programs provided more services in terms of case management, HIV/AIDS counseling, parenting, self-help, and transportation. However, the private programs were much more likely to provide detoxification services.

The staffing patterns in the TCADA-funded and privately-funded programs are similar: all had licensed chemical dependency counselors. The TCADA-funded programs were more likely to have master's level social workers and they also were more likely to have physicians who are psychiatrists, which is partially due to the fact that some TCADA-funded programs are community mental health centers where psychiatrists are already on staff.

In 1994, the weekly fees to participate in a private methadone program ranged between \$21 and \$60, with the average being \$43 per week. Clients in private programs were far more likely to be employed (56 percent) as compared to 19 percent full-time employment for those in publicly-funded methadone programs (Maxwell 1994).

## **HEROIN USE TRENDS IN TEXAS**

Heroin in Texas comes primarily from Mexico. As of April, 1997, only about 15 percent of the heroin in Texas was from Asia and little, if any,

**Table 1.2: Dallas, Texas DAWN Emergency Room Mentions of Opiates per 100,000 Population by Gender, Race/Ethnicity, and Age: 1988-1996**

	1988	1989	1990	1991	1992	1993	1994	1995	1996
No. of Mentions/100K	13.2	14.1	14.0	10.2	11.9	12.7	10.1	12.7	15.9
% Male	59%	67%	66%	59%	75%	65%	71%	67%	66%
% Anglo	60%	59%	63%	57%	53%	58%	59%	59%	59%
% African American	30%	28%	28%	31%	34%	42%	28%	29%	26%
% Hispanic	10%	14%	9%	12%	12%	0%	13%	12%	15%
% Age 35+	26%	37%	42%	47%	46%	59%	54%	56%	46%

**Table 1.3: Percent of DUF Arrestees Testing Positive for Opiates in Dallas, Houston, and San Antonio, Texas: 1991-1997**

	1991	1992	1993	1994	1995	1996	1997
Dallas Males	4%	4%	5%	3%	5%	5%	4%
Houston Males	3%	3%	2%	3%	5%	8%	10%
San Antonio Males	15%	14%	14%	13%	10%	10%	10%
San Antonio Male Juveniles			1%	1%	0%	4%	3%
Dallas Females	9%	9%	11%	8%	5%	10%	4%
Houston Females	4%	4%	5%	6%	3%	4%	5%
San Antonio Females	20%	13%	15%	14%	13%	13%	9%
San Antonio Female Juveniles			0%	1%	1%	2%	1%

**Table 1.4: Range of Prices for An Ounce of Mexican Black Tar Heroin in Texas: 1987-1997**

Date	Highest Price	Lowest Price
1987	\$8,000	\$4,000
1988	\$6,000	\$3,500
1989	\$8,000	\$3,500
1990	\$6,500	\$4,500
1991	\$7,500	\$3,700
1992	\$6,000	\$2,900
Jun-93	\$7,000	\$1,700
Dec-93	\$7,000	\$1,700
Jun-94	\$7,000	\$2,300
Dec-94	\$5,000	\$2,300
Jun-95	\$6,000	\$3,500
Dec-95	\$6,000	\$2,300
Jun-96	\$6,300	\$2,300
Dec-96	\$6,000	\$2,300
Jun-97	\$5,300	\$2,300
Dec-97	\$4,500	\$1,900

Colombian or South American heroin can be found in Texas (Maxwell 1997). The Drug Abuse Warning Network (DAWN) provides information on emergency room episodes in the Dallas metropolitan area involving mentions of drugs from 1988 through 1996 (Table 1.2). DAWN shows that mentions of heroin have ranged between 10.1 and 15.9 per 100,000 persons between 1988 and 1996, with no important changes in patterns or

**Table 1.5: Characteristics of Persons Who Died of Opiate Overdoses in Texas, 1992-1996**

	1992	1993	1994	1995	1996
No. of Deaths	167	169	220	287	309
Avg. Age	36.9	38.7	38.4	38.1	37.6
Male	81%	85%	82%	81%	77%
Female	19%	15%	18%	19%	23%
Anglo	38%	52%	53%	56%	58%
Hispanic	40%	38%	35%	31%	30%
African American	23%	10%	12%	13%	11%

*Between 1992 and 1996, the number of overdose deaths in which heroin, narcotics, or opiates were mentioned as a cause increased.*

characteristics other than the aging of these patients. There is no way to tell from the DAWN data whether the same persons returned to the emergency rooms in later years or whether different persons were seen in later years.

According to the Drug Use Forecasting (DUF) reports, the proportion of arrestees testing positive for opiates since 1991 has remained fairly level, although the percent positive is consistently higher in San Antonio than in Dallas or Houston (Table 1.3).

The quality of heroin has been low in Texas, averaging 9 to 16 percent per milligram pure (Maxwell 1994, 1995, 1996, 1997). However, on the East Coast of the US, Colombian heroin up to 70 percent per milligram pure has resulted in a heroin epidemic as documented by data from emergency rooms, treatment programs, overdose deaths, law enforcement statistics, and reports of a new cohort of new young users (Frank 1996; Bencivengo 1996; Clark 1996). Although purity has remained low, the price of an ounce of Mexican Black Tar heroin in Texas has decreased, as Table 1.4 shows.

Between 1992 and 1996, the number of overdose deaths in which heroin, narcotics, or opiates were mentioned as a cause increased. Table 1.5 shows the characteristics of persons who died from such overdoses in this period. Average age throughout this time period was about 38 years. The most noticeable changes in the characteristics of the decedents was the increasing proportion who were Anglo. Over this period of time, 19 percent were female, 53 percent were Anglo, 34 percent were Hispanic, and 13 percent were African American.

As these data sources show, there has not been a new epidemic of users through 1994; the “heroin scene” in Texas had remained fairly stable, with aging addicts and somewhat lower prices. Beginning in 1997, this picture has changed, with reports of new younger users and more potent heroin.<sup>5</sup>

## **CAREER OF THE HEROIN ADDICT**

The career of a drug addict is sequential, starting with experimentation and moving from “getting high” in the early stage of use to heavier abuse and drug-seeking behavior to meet psychological and physical dependence in later stages.

Among African American male heroin users in four cities of the north-east (Hanson 1985), all reported that in the period before they began to use heroin, they were familiar with it: many learned about it from the persons who subsequently presided over their initiation. They were curious about heroin, but feared using it, especially using it intravenously. They recognized the aura of status given heroin use by many ghetto youth (Beschner and Bovelie 1985). Yet the first shot of heroin was one of the most significant experiences in their lives: they continued using heroin and continued to search for that “first shot” feeling (Beschner and Bovelie 1985; Maddux and Desmond 1981). The experience of using heroin is reported as being suspended in time and insulated from the outside world.

A study of 108 Hispanic heroin addicts in San Antonio (Ramos 1995) found that all of them started injecting with a friend, spouse, or relative. Motivating factors included a recent tragedy, a need to feel good, the desire to imitate friends who appeared happy, or the need to be part of a group, as well as the availability of drugs. Some 60 percent of the female addicts said their primary reason for starting to use heroin was to be loved by their partner.

The novice heroin user begins to learn the requirements and methods of becoming a successful drug consumer (Geer et al. 1968) by spending a significant amount of time and energy learning how to ensure a continuing supply of heroin. Novices usually have a significant other who functions as a mentor (Ramos 1995). Less time is spent with non-drug-using friends; new friends are chosen because of their involvement with drugs.

***The addict subculture is not only a source of both the heroin and the knowledge of how to administer it, but also the source of knowledge of how to obtain the drug and the money to buy it.***

(The heroin user) turns to drugs, not as a result of anomie, but rather to capitalize on a new mode of enhancing status and prestige within a social system where the highest prizes go to persons who demonstrate attributes of toughness, daring, and adventure. Within the lifestyle of the Stand-Up Cat, movement into heroin use is one route to becoming a “somebody” in the eyes of the important people who comprise the slum social network.<sup>6</sup>

The addict subculture is not only a source of both the heroin and the knowledge of how to administer it, but also the source of knowledge of how to obtain the drug and the money to buy it. Other members of the subculture not only teach the addict criminal skills and act as partners in such enterprises, but they provide a set of values and norms that gives respect to those who follow these behavioral patterns. The subculture provides the addict with a way of life (Stephens and Levine 1971).

Active users inject two or more times per day; the number of times depends on the amount of money available to buy heroin (Ramos 1995). Maddux and Desmond (1981) found that all of the 248 subjects in their

*Studies indicate that career heroin use patterns were progressive, regular, and chronic. The only interruptions in their routines were unanticipated events of street life.*

San Antonio study became daily users: they first used heroin at a mean age of 18 and began regular use at a mean age of 20. With the onset of daily use, all developed physical dependence and in their opioid careers, when heroin was not available, they repeatedly suffered withdrawal symptoms.

Injecting heroin users were compared to injecting cocaine and amphetamine users in Houston (Johnson and Williams 1989). Cocaine and amphetamine users moved between periods of use and non-use, or in and out of the straight and drug-using worlds, and they did this easily, quickly, and frequently. Their drug use was characterized by a cyclical pattern of entering and leaving lives of injecting drug use.

The patterns of drug-use and subculture involvement by heroin users found in the Houston study replicated earlier research (Lindsmith 1947; Hanson et al. 1985) in that career heroin use patterns were progressive, regular, and chronic. The only interruptions in their routines were unanticipated events of street life such as a shortage of heroin or an arrest, and even when the heroin addicts were caught in such circumstances, they still viewed themselves as part of the injecting drug-use culture on the streets. They stayed close to their drug sources and established long-term relationships with significant others based on mutually supporting each other's habits. Heroin use was found to continue in jail or prison and heroin use typically resumed on the day the addict was released from incarceration. Jail was not a way to enter a straight world that did not use drugs; it was a routine and normal part of life. The career of the heroin addict is more or less stable, systematic, constant, and linear, according to this study.

An ethnographic study of heroin addicts in Honolulu in 1973 (Carlson 1976) found that addicts enter treatment because of the problems that they are experiencing in terms of legal status, expensive habits, lack of funds, etc. Yet many of the addicts interviewed said that after they left treatment, they intended to resume heroin use; some intended to resume use immediately. A study of 102 inmates in six New South Wales prisons in Australia in 1994 found that 69 percent used drugs while in prison, over a third injected drugs, and 50 percent of the injectors were using heroin (Dolan 1996).

## **TREATMENT NEED**

TCADA used the criteria in the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders: Third Edition Revised* (DSM-III-R) (1987) to determine substance abuse and dependence. There are nine symptoms that measure several different dimensions of impairment, including undesired excessive use; development of tolerance and withdrawal symptoms; problems in a person's life and functioning that have resulted from excessive use; and failed attempts to control substance use personally. An individual is considered to be an abuser if he or she reports one or two of the nine DSM-III-R criteria and to be dependent if he

*In comparison to Texas adults in the general population, Texans in the criminal justice system were far more likely to be substance abusers or substance dependent.*

or she exhibits three or more of the nine symptoms in the past year. Based on the DSM-III-R criteria, 2 percent of adults interviewed in the 1993 Texas Adult Survey were drug abusers while another 1 percent were dependent on drugs (Wallisch 1994).<sup>7</sup>

In comparison, Texans in the criminal justice system were far more likely to be substance abusers or substance dependent. Among inmates entering the Texas Department of Criminal Justice—Institutional Division in 1993 and 1994, 45 percent of female inmates and 32 percent of male inmates were drug dependent and in need of treatment and 9 percent of female inmates and 11 percent of male inmates were drug abusers who were in need of intervention services to prevent their progression to needing treatment (Farabee 1994, 1995). Among probationers in 1994 and 1995, 20 percent of females and 27 percent of males were drug dependent and 10 percent of females and 12 percent of males were drug abusers (Maxwell and Wallisch 1998).

The above surveys found that 3 percent of the adult general population had participated in a substance abuse treatment program at some time in their lives, as had 41 percent of entering male prison inmates, 56 percent of entering female prison inmates, and 22 percent of adult probationers. While persons in the criminal justice system were more likely to have drug problems and to have been in treatment, data were not presented in any of these studies on the differences in those persons who had and had not received treatment.

In estimating the number who would be amenable to treatment in publicly-funded programs, there is a need to understand the differences between those addicts who have entered or would enter treatment and those who have not or would not.

***Differences in Addicts Who Do and Do Not Enter Treatment***

Estimates of the number of injecting drug users who have received treatment varies. Maddux and Desmond (1981) followed 248 heroin addicts in San Antonio over a 20-year period and found that during this time, between 9 and 38 percent were in jail, a hospital, or other institution, while another 14 to 18 percent were abstinent; another 12 percent had been in methadone maintenance.

Of the 26,356 injecting drug users in 38 different cities who participated in the National AIDS Demonstration Research (NADR) project sponsored by NIDA, 60 percent reported prior drug treatment (Brown and Beschner 1993). NADR was a multisite program to reduce the spread of AIDS among illicit drug injectors. NADR projects were conducted in Dallas, Houston, and San Antonio from 1988 to 1992. Persons were eligible for the project if they had injected an illicit drug at least once in the six months prior to enrollment in the NADR and had not participated in a treatment program during the month prior to enrollment. Of 2,188

persons enrolled in San Antonio, 57 percent had been in treatment at least once. Of 2,075 persons enrolled in Dallas, 67 percent had been in treatment, and of 2,674 enrolled in Houston, only 26 percent had been in treatment (Maddux et al. 1994).

Data collected in Houston as part of NIDA’s Cooperative Agreement to Monitor Community-Based Drug Abuse and HIV Risk Behaviors found that during 1991-1992, 34 percent of the 431 individuals reported having been in drug treatment at some time. Most had been enrolled in residential treatment (11 percent) and outpatient drug-free programs (7 percent). Four percent each had been in methadone detoxification, methadone maintenance programs, or prison or jail treatment programs (Williams 1992).

Zule (1996) in a study of needle users in San Antonio found that 57 percent of 1,098 needle users interviewed as part of a federally-funded AIDS community outreach demonstration project had ever been in treatment, while his ethnographic interviews of another 163 heroin addicts found 59 percent had ever been in treatment.

Table 1.6 summarizes the findings of these various studies in terms of the percent of injecting drug users who reported ever having been in treatment. The San Antonio studies found between 57 and 59 percent of injecting drug users had previously been in treatment, while in Dallas, 67 percent had been in treatment. In Houston, both studies found the number reporting previous treatment was lower, at 26 to 34 percent.

A study of dependent heroin users in the San Francisco Bay area (Graeven and Graeven 1983) found that addicts who had been in treatment had used heroin for a longer period of time, had larger habits, had less positive life experiences with family, less positive feelings about themselves, and more involvement in the criminal justice system.

Rounsaville and Kleber (1985) compared 204 heroin addicts seeking treatment to 105 untreated addicts in New Haven, Connecticut. Both groups were comparable in the length and severity of their opiate use and in their current involvement in risky and illegal activities to procure drugs. Addicts not seeking treatment reported more adequate social functioning, fewer drug-related legal problems, and lower rates of depressive disorders.

*Between 57 and 67 percent of injecting drug users in San Antonio and Dallas had previously been in treatment, while Houston had much lower numbers reporting previous treatment at only 26 to 34 percent.*

**Table 1.6: Summary of Studies Conducted on Injecting Drug Users Who Had or Had Not Been in Treatment, by Percentage Treated**

Author	Year	Location	No. in Survey	Percent Treated
Brown and Beschner	1993	38 cities	26,356	60%
Maddux	1994	San Antonio	2,188	57%
Maddux	1994	Dallas	2,075	67%
Maddux	1994	Houston	2,674	26%
Williams	1992	Houston	431	34%
Zule	1996	San Antonio	1,098	57%
Zule	1996	San Antonio	163	59%

***Because heroin was the center of their lifestyles, in order for treatment to be effective, it “must focus less on preventing regular heroin users from getting high and more on helping them build a new life.”***

Despite the fact that their problems were less severe, addicts not seeking treatment were a substantially impaired group whose failure to seek treatment seemed more related to misunderstanding the severity of their drug use and an ignorance of the availability of treatment opportunities than to the lack of need for help.

A study of 124 inner-city African American men who were regular heroin users who neither wanted nor received treatment (Hanson et al. 1985) found the addicts perceived methadone as just another habit, as unhealthy, as not preventing additional heroin use, and as not meeting the needs of the clients; it was viewed as an avenue of last resort. Because heroin was the center of their lifestyles, in order for treatment to be effective, it “must focus less on preventing regular heroin users from getting high and more on helping them build a new life.”<sup>8</sup>

Some 368 current methadone maintenance clients and 142 heroin addicts who were not in treatment in the New York, New Jersey, and Connecticut areas were interviewed about the image of methadone treatment among the drug-using population and the effect of that image on the recruitment of addicts into treatment (Hunt 1986). Addicts in treatment were more likely to be Anglo, older, and to score lower on scales measuring sociopathy and desire to get “high.” Users not in treatment were significantly more involved in criminal activity.

Kleyn and Lake (1990) examined the factors associated with willingness to enter drug treatment among injecting drug users in Seattle, Washington. They interviewed 78 out-of-treatment injecting drug users and found that 55 percent were willing to enter drug treatment immediately if space were available. Persons of color were significantly more willing to enter treatment than Anglos. There was a negative association between employment and willingness to enter treatment. Only 39 percent of those willing to enter treatment reported any income from employment in the past six months, while 67 percent of those unwilling to enter treatment had earned income.

Klingemann (1991) found that among heroin abusers who recovered without seeking treatment in England, 30 percent stated that the lack of information about treatment and its availability was a barrier to seeking treatment.

A study of 875 heterosexual heroin addicts in San Francisco (Watters and Cheng 1991) found that there were no differences in terms of sex, age, sexually transmitted disease history, use of condoms, or frequency of injection of cocaine among addicts who had not been in treatment during the past five years, those who had been in treatment more than a year, or those who had been in treatment for less than a year. However, African Americans were less likely than Anglos to have been in treatment during the past five years, and more addicts who had been in treatment less than 12 months in the past five years were more likely to report multiple sex

partners, more frequent injections, more needle-sharing partners, less safe needle hygiene, and more frequent injection of cocaine.

Carroll and Rounsaville (1992) compared 89 cocaine users seeking treatment with 89 cocaine users who were not seeking treatment in New Haven, and they found similarities in severity and chronicity of cocaine use, use of self-regulation strategies for moderating cocaine use, and rates of current and lifetime psychiatric disorders. Those not seeking treatment had higher rates of polydrug use, but fewer negative consequences of cocaine use. They also had greater past involvement with the legal system, and more current participation in illegal activities. No differences were found for severity of cocaine use and psychiatric comorbidity, and treated cocaine users were more likely to have been married or in a stable interpersonal relationship.

Power et al. (1992) compared 120 treatment-seeking drug users to 120 who were out of treatment in London and found that although the two groups were similar in terms of demographic characteristics and drug use, those seeking treatment were more concerned with their drug use, their finances and supporting their habits, their psychological and physical health, and their relationships with their partners than those not seeking treatment. The higher degree of “concern” and “need for help” in all life areas showed that help is sought when the life becomes “unmanageable.”

Ross et al. (1993) compared over 1,200 injecting drug users in Sydney and found those injectors currently in treatment and those who had been treated previously were similar in terms of demographic characteristics, drug use patterns, and HIV risk behaviors. Injectors who had never been in treatment, however, were younger, used fewer drugs and used these drugs less frequently, reported fewer legal problems, and had lower HIV risk behaviors related to drug use. They were either earlier in their drug-using careers or were more likely to be recreational drug users. They appeared to be less dysfunctional and less involved in drug-using careers. Injecting drug users seem to turn to treatment at times of crisis, including periods when there was a shortage of street drugs.

Factors that lead to treatment differ for injecting drug users who enter detoxification as compared to those who enter methadone maintenance. A study of 2,879 injecting drug users in the Baltimore area (Schutz et al. 1994) found that a recent drug overdose, relatively higher frequency of injecting drugs, and a history of prior arrest or treatment were independent predictors of entry into detoxification. Being married or living with a partner, being female, having a lengthy duration of drug use (over ten years), and having a history of prior treatment were independent predictors of entry into methadone maintenance.

Zule’s 1996 San Antonio study also compared the characteristics of those who wanted and did not want treatment. In terms of socio-demo-

*The higher degree of “concern” and “need for help” in all life areas showed that help is sought when the life becomes “unmanageable.”*

*Differences in treated and untreated addicts may be due as much to lack of services as to differences in the characteristics of the addicts.*

graphic variables, women and Hispanics were significantly more likely to want treatment. There were no significant differences in age, employment status, educational level, nor living arrangements between those wanting and not wanting treatment. The proportion wanting treatment increased as the number of previous treatment admissions increased, and injecting drug users who wanted treatment had significantly higher HIV injection risk scores than those who did not want treatment.

NADR collected data on 20,048 injecting drug users in 24 cities in all regions of the country. Analysis of these data found that 58 percent of injecting drug users who were not currently in treatment had previously participated in treatment; 27 percent had been in treatment four or more times (Liebman et al. 1993). Many of these drug users appeared to cycle in and out of treatment repeatedly. The likelihood of participating in treatment increased with the length of time the individuals had used drugs. Males and females were equally likely to have previously been in treatment, while Anglo subjects were significantly more likely to have been in treatment than other subjects.

In summary, there are mixed findings from these studies in terms of differences between addicts who are in or out of treatment. Addicts in treatment or wanting treatment had larger heroin habits, were more advanced in their heroin careers, were older, had more criminal justice experience, and were less likely to be persons of color. But they also had better interpersonal relationships that encouraged them to enter treatment.

An important theme in these studies is that many who were not in treatment were in that category not because they chose to remain untreated but because of lack of information about treatment and the unavailability of treatment services. Thus, differences in treated and untreated addicts may be due as much to lack of services as to differences in the characteristics of the addicts.

## **SUMMARY**

There are a variety of treatment services for heroin addicts, ranging from inpatient detoxification to residential facilities to outpatient services. The outpatient service most likely to be used by heroin addicts is methadone maintenance. Seventy-six percent of the heroin addicts in methadone programs are in private programs, and these clients are more likely to be Anglo and to be employed. Trends in heroin use in the state have been remarkably stable; the epidemic of potent heroin documented on the East Coast had not yet hit Texas at the time of this study. Texas addicts continue to follow the traditional pattern of injecting Mexican heroin.

Literature on the careers of heroin addicts has shown the process of initiation into a lifestyle of chronic and constant heroin use. Differences in characteristics of addicts in and out of treatment were compared. Those in treatment were further along in their addiction careers, but the lack of

available services and information on such services was an important factor in whether or not addicts were in treatment.

## **Endnotes**

- <sup>1</sup> The terms “susceptible” or “amenable” are used throughout this paper. The capture-recapture methodology draws samples from one dataset, the Client Oriented Data Acquisition Process (CODAP), which collects admission and discharge/followup information on clients treated in programs funded by TCADA. It estimates the number of other heroin addicts who are in the same pool (would be seen in treatment if resources were available) but who are “unseen” because they have not entered treatment.
- <sup>2</sup> By 1980, most of these programs had ceased operation in Texas or had changed to a less confrontational approach and adopted a shorter length of stay.
- <sup>3</sup> In Texas, the Texas Department of Community Affairs, Drug Abuse Prevention Division, was the Single State Agency prior to the merger of that agency and the Texas Commission on Alcoholism into the Texas Commission on Alcohol and Drug Abuse in 1986.
- <sup>4</sup> These differences are found in all of the major studies of public clients, including the Drug Abuse Reporting Program (Sells 1974), CODAP, and the Treatment Outcome Prospective Study (Hubbard et al. 1989), when contrasted with multi-program studies of private clients such as the Chemical Abuse/Addiction Treatment Outcome Registry (Hoffman and Harrison 1988; Comprehensive Care Corporation 1988).
- <sup>5</sup> See J. C. Maxwell, *Substance Abuse Trends in Texas: June 1998*, Austin: TCADA, 1998.
- <sup>6</sup> H. W. Feldman, “Ideological Supports to Becoming and Remaining a Heroin Addict.” *Journal of Health and Social Behavior* 9 (1968), 138.
- <sup>7</sup> The 1996 Texas adult household survey found there were about 190,000 Texas adults, 1.4 percent of the adult population who needed, wanted, and were eligible for publicly-funded treatment (Wallisch 1997).
- <sup>8</sup> G. M. Beschner and J. M. Walters, “Just Another Habit? The Heroin Users’ Perspective on Treatment,” in *Life With Heroin: Voices from the Inner City*, edited by Bill Hanson et al. (Lexington, MA: Lexington Books, 1985), 170.



# Chapter 2. Characteristics of Heroin Addicts in TCADA-Funded Programs

## TCADA-FUNDED TREATMENT DATA

*Treatment programs are not located in every county; residential programs are primarily located in the metropolitan areas, and there are only ten TCADA-funded methadone programs in Texas.*

**S**ince 1973, admission, discharge, and follow-up information has been collected on each individual entering TCADA-funded drug treatment programs in Texas. CODAP contains over 500,000 individual client records in a SAS dataset with information at both admission and 60-day follow-up on patterns of drug use, lag between first use and first treatment admission, drugs of choice, route of administration, severity of physical and social problems due to substance abuse, extent of support structures such as family and jobs, and involvement in the criminal justice system.

Any treatment program that receives funds from TCADA is required to fill out forms on each client entering and leaving the program. An Admission Report is completed for every client who has completed the intake process and has been formally admitted to a clinic for alcohol or drug treatment. If a returning client has previously been admitted to a program and has received services within the past 60 days, no new Admission Report is submitted. A Discharge/Follow-up Report is completed for every client who is no longer “active,” which means a client has not received services for 60 days. The Discharge/Follow-up Report provides information on client characteristics and the reason for discharge at the time the client leaves services. Information on substance use, arrests, problems, and attendance at Twelve Step programs is submitted 60 days after the client has been discharged.

The data are collected based on where the program is located; residence of clients was not collected on CODAP prior to 1996, so addicts in residential treatment in Bexar County, for example, could have come from many different counties, while those receiving outpatient methadone services would have had to be within daily commuting distance. While not being able to estimate the number of Bexar County residents who are heroin addicts is a shortcoming of the data reporting system prior to 1996, CODAP does allow estimates of the number of heroin addicts who would enter services in Bexar County. Treatment programs are not located in every county; residential programs are primarily located in the metropolitan areas, and there are only ten TCADA-funded methadone programs in Texas.

Estimates of the size of an addict population can be affected by significant changes in funding for a program. If TCADA contracted with a program, then all clients served in the facility had to be reported on the

*If treatment is available, more persons will seek it, whereas if a program is at capacity, addicts who might be interested will not even bother to sign up on the waiting list.*

data system, so information is available on all addicts in that program, not just those funded by one source. In many instances, when one funding source declined, the local program would seek other revenues to compensate, so the level of services could be fairly stable over time. Conversely, the loss of one funding source would mean, in an extreme case, a program would be forced to shut down. This possibility of fluctuation in numbers treated due to shifts in funds can mean that reliable estimates cannot be made for some areas using the capture-recapture methodology which is explained in greater detail later in this report. In addition, if treatment services are available, more persons will seek them, whereas if a program is at capacity with a long waiting list, addicts who might be interested in treatment will not even bother to sign up on the waiting list, so they will miss the opportunity to be treated if space should become available.

## ADMISSION CHARACTERISTICS

For the period between January 1, 1987 to June 30, 1996, 41,925 admissions of persons aged 18 and over<sup>1</sup> with a primary, secondary, or tertiary drug problem of heroin or illegal methadone were reported on CODAP.<sup>2</sup> These 41,925 admissions include persons admitted more than once over the span of years. As Table 2.1 shows, the number varies by year. This fluctuation is due to changes in levels of funding, since federal and state legislative mandates over time have caused different groups such as women and needle users to receive priority in being admitted to publicly-funded treatment.

Secondary drugs of abuse for heroin addicts admitted to treatment were powder cocaine, 33 percent; alcohol, 13 percent; marijuana, 6 percent; and crack cocaine, 2 percent. Forty percent reported no second drug of abuse. Tertiary drugs of abuse included alcohol, 11 percent, and marijuana, 8 percent. Seventy-three percent reported no third drug of abuse.

Of these admissions, 14 percent were African American, 36 percent were Anglo, and 49 percent were Hispanic. In comparison, in 1990, the

Table 2.1: Number and Characteristics of Heroin Addicts Admitted to TCADA-Funded Treatment by Year: 1987-1996

Year	No. of Admissions	Ethnicity			Percent		
		Anglo	African American	Hispanic	Male	Employed	CJ Referred
1987	1,321	37%	10%	53%	67%	35%	37%
1988	2,543	35%	10%	54%	71%	25%	29%
1989	3,996	31%	15%	54%	73%	23%	25%
1990	4,988	34%	14%	51%	71%	24%	25%
1991	5,241	38%	13%	48%	70%	24%	29%
1992	5,463	35%	15%	49%	71%	24%	37%
1993	5,375	36%	16%	48%	71%	22%	40%
1994	5,853	35%	16%	48%	71%	20%	49%
1995	4,937	35%	14%	50%	69%	19%	41%
1996	3,580	47%	16%	36%	60%	24%	22%

overall race/ethnic composition of the Texas population was 12 percent African American, 61 percent Anglo, and 26 percent Hispanic. The race/ethnic distribution among heroin clients entering treatment stayed fairly consistent until 1996 when significant funding shifts caused a redistribution in the race/ethnic composition of the clients entering treatment.

Overall, 70 percent of the addicts admitted were male, and this percentage differed by only a few percentage points between 1987 and 1995 (see Table 2.1). The increase in the proportion of females in 1996 reflects shifts in federal priorities that increased funding for programs that served females. The funding for programs targeted specifically to women remained stable, but the overall result was an increase in the proportion of women served.

TCADA-funded services target clients who are medically indigent. Overall, only 16 percent were employed full-time and 7 percent were employed part-time. Of those who were unemployed, 60 percent were not working because of a substance abuse problem. Some 94 percent had no insurance, and only 3.5 percent had Medicaid. Average annual income was \$4,255,<sup>3</sup> and 5.5 percent were homeless.

Most clients were referred to treatment by persons or agencies outside the criminal justice system. Some 34 percent of the heroin addicts entering treatment were referred by the criminal justice system; this proportion ranged between 25 and 37 percent between 1987 and 1992. In 1993, it rose to 40 percent and reached its highest point at 49 percent in 1994, when all prisoners entering the State's Criminal Justice Treatment Initiative were reported on CODAP. After that period, the percentage dropped off because CODAP reporting was discontinued for these clients when responsibility for this Initiative was shifted from TCADA.

Heroin addicts in Texas are primarily injectors. While sniffing or snorting of heroin is common on the East Coast where very fine and very pure heroin is available, the heroin in Texas is primarily the less potent

*Overall, 70 percent of the addicts admitted were male, and this percentage differed by only a few percentage points between 1987 and 1995.*

**Table 2.2: Characteristics of Heroin Addicts Admitted to TCADA-Funded Treatment by Route of Administration: 1996**

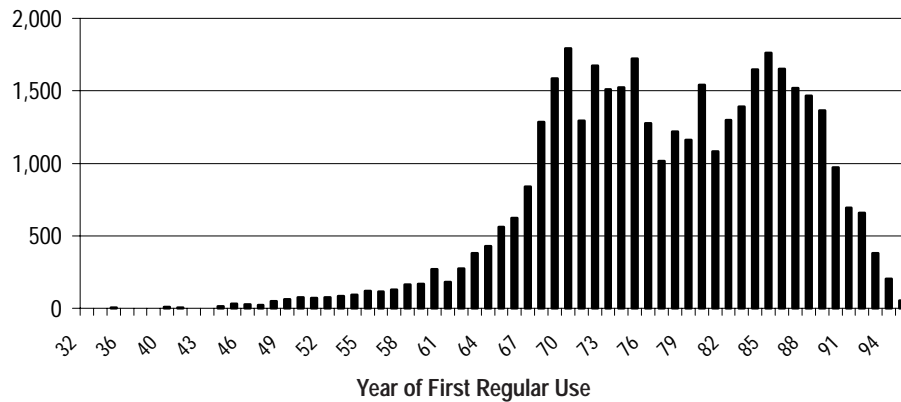
	<b>Inject</b>	<b>Inhale</b>	<b>Oral</b>	<b>Smoke</b>
# Admissions	2,020	82	58	13
% of Heroin Admits	93%	4%	3%	0.60%
Average Age	37.3	29.9	37.6	35.2
Avg. Age at First Use	22.8	23.5	21.1	23.7
Lag-1st Use to Trmt-yrs	15	7	17	12
% Male	61%	50%	45%	62%
% African American	14%	45%	12%	23%
% Anglo	47%	30%	72%	54%
% Hispanic	37%	24%	16%	23%
% CJ/Legal Involved	22%	20%	31%	46%
% Employed	22%	37%	28%	38%
% Homeless	7%	7%	7%	0%
Average Income	\$4,440	\$6,417	\$7,449	\$8,615

Mexican heroin, which is injected. There are some interesting differences in the characteristics of addicts who inject, inhale, smoke, or orally consume heroin (Maxwell 1997), as Table 2.2 shows.

*The “heroin scene” has been fairly stable over the years, without substantial peaks or valleys in terms of year of first use.*

Data are also collected on the year of first use, which is the year the client began using the primary drug of abuse on a consistent or regular basis, not just experimental use. According to Figure 2.1, for heroin addicts admitted between January 1, 1987 and December 31, 1995, the distribution pattern shows that no more than 4.5 percent of these addicts entering treatment began heavy use in any one year. This highlights the fact that there has been no heroin epidemic where a large proportion of addicts reported first regular use during one specific period of time. Rather, the “heroin scene” has been fairly stable over the years, without substantial peaks or valleys in terms of year of first use. The sparsity of admissions in the early years reflects an aging of former addicts out of a heroin-using lifestyle, while the decrease in admissions of addicts who began regular use after 1990 reflects the fact that most addicts average 14 or 15 years of use before seeking admission.

**Figure 2.1: Year of First Regular Use of Heroin for Addicts Entering TCADA-Funded Treatment During the Period from 1987-1995**



**Table 2.3: Age of Heroin Addicts at Admission to TCADA-Funded Treatment: 1987-1996**

	Under 20	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60+	Avg. Age
1987	1%	11%	20%	30%	22%	10%	4%	1%	1%	0%	32.98
1988	2%	8%	21%	30%	19%	11%	5%	2%	1%	0%	33.36
1989	2%	8%	18%	27%	24%	13%	5%	2%	1%	1%	34.23
1990	1%	7%	17%	27%	25%	13%	5%	3%	1%	0%	34.61
1991	1%	6%	16%	24%	26%	15%	6%	3%	1%	1%	35.43
1992	1%	7%	15%	23%	26%	16%	7%	3%	2%	1%	35.61
1993	1%	6%	13%	21%	27%	19%	7%	3%	2%	1%	36.39
1994	1%	6%	13%	19%	25%	20%	10%	4%	2%	1%	36.84
1995	1%	7%	12%	17%	23%	22%	10%	4%	2%	1%	37.23
1996	3%	9%	11%	16%	20%	22%	11%	5%	3%	1%	37.12

Except for variations caused by shifts in funding, the only significant change in client characteristics over the years is that the clients have aged. The proportion of clients under age 30 has dropped, while the proportion aged 40 and older has increased, as Table 2.3 shows.

Table 2.4 shows that between 1987 and 1996, 35 percent of the clients entered treatment for the first time with no prior treatment experience while 65 percent reported prior treatment experiences. This pattern is consistent with findings by Allison et al. (1985) and Hubbard et al. (1989) that two-thirds of clients in long-standing methadone maintenance programs are repeat admissions. The proportion of Texas clients reporting no prior

**Table 2.4: Prior Number of Treatment Experiences Reported by Heroin Addicts Entering TCADA-Funded Treatment: 1987-1996**

Year	Number of Treatment Experiences						
	0	1	2	3	4	5-9	10+
1987	31%	29%	18%	10%	6%	5%	1%
1988	37%	27%	15%	9%	5%	6%	1%
1989	40%	29%	14%	8%	4%	5%	1%
1990	39%	27%	15%	9%	5%	5%	1%
1991	36%	28%	16%	9%	5%	6%	1%
1992	35%	29%	16%	9%	5%	6%	1%
1993	34%	28%	16%	10%	5%	7%	1%
1994	31%	29%	17%	10%	5%	7%	1%
1995	29%	28%	19%	11%	6%	7%	1%
1996	34%	22%	17%	11%	5%	9%	3%
Overall	35%	28%	16%	9%	5%	6%	1%

**Table 2.5: Characteristics of Heroin Addicts at Admission to TCADA-Funded Treatment by Treatment Experience: 1987-1996**

	First Treatment Admission	Prior Treatment Experience
Number of Admissions	14,501	27,429
Age	35.5	35.7
Impairment Level	8	8.3
Lag-1st Use to Trtmt-Yrs	14 *	14.5
Years of Schooling	10.9	10.9
Age of First Use	22 *	21.7
Income at Admission	\$4,376	\$4,249
% Prior Arrests-120 Days	15.7	15.4
Male	70%	70%
Anglo	34% *	37%
African American	16% *	14%
Hispanic	50%	49%
Employed at Admission	23%	23%
Criminal Justice Referral	37% *	32%
Years of Schooling	10.9	10.9
Age of First Use	22 *	21.7
Live with Family	68%	69%

\*Difference in means for first and prior treatment characteristics p=.0001

**Table 2.6: Source of Referral of Heroin Addicts to TCADA-Funded Treatment: 1987-1996**

Self referral	37.00%
Family or friend	10.20%
Employer (Health)	0.10%
Treatment Alternatives to Street Crimes (CJ)	0.30%
Physician (Health)	0.40%
Council on Alcoholism or Drug Abuse (Health)	0.90%
Texas Rehabilitation Commission (Health)	0.10%
Civil Court Commitment (Health)	1.40%
Dept. Human Services (Health)	0.40%
State Hospital Outpatient (Health)	0.20%
NA, CA, Alanon (Health)	0.30%
Community MHMR Center (Health)	2.80%
Outpatient or day treatment (Health)	2.30%
State Hospital Inpatient (Health)	0.70%
Other hospital (Health)	2.10%
Halfway house/or Inpatient (Health)	0.20%
Non-hospital detoxification (Health)	0.50%
Other Residential Program (Health)	1.20%
Police (CJ)	0.20%
Probation (non-DWI) (CJ)	8.30%
Probation (DWI) (CJ)	0.70%
Parole (CJ)	16.00%
Other law enforcement (CJ)	0.50%
Correctional program (CJ)	1.80%
TAIP Probation(CJ)	2.40%
City/county jail (CJ)	1.80%
Other individual referral (Health)	1.10%
Other community program (Health)	2.50%
Intensive Therapeutic Community (CJ)	1.90%
SAFP Therapeutic Community (CJ)	1.40%

treatment has decreased over time, which means some of the same addicts have been treated more than once during this period. This trend is also supported by the finding that the average age at admission increased over time.

Table 2.5 shows that those in treatment for the first time were significantly less likely to be Anglo than those who had prior treatment experiences and more likely to be referred from the criminal justice system.

The impairment level is the impairment index scale variable that measures the frequency of problems experienced by the clients. It includes physical problems such as memory lapse or blackout after a period of intoxication; shakes or tremors or other withdrawal symptoms; alcohol or other drug use before noon; and sickness or health problems related to alcohol or drug use. It also includes social problems such as missing a meal or other planned activity due to use of alcohol or other drugs; being intoxicated while at work or at school; and fighting or quarrelling due to alcohol or other drugs.

Of those clients who were not referred by the criminal justice system, 37 percent referred themselves to treatment, while 17 percent were referred by health and social service agencies, and 10 percent were referred by family or friends.

Table 2.6 shows the detailed sources of referral to treatment. “CJ” is a variable that denotes referral sources that have been combined into a Criminal Justice referral source and “Health” is a variable that reflects agencies that have been combined into a Health and Social Service referral source for analysis in Table 2.7.

Table 2.7 shows characteristics of clients by referral source as compared to those referred by all other sources. According to this table, the clients who referred themselves to treatment (Column B) were older, had used heroin longer prior to admission, were more impaired, and were more likely to have been treated before than those who were not self-referred (Column C). They were less likely to have been arrested in the 120 days prior to entering treatment, and were less likely to be African American. However, self-referred clients were more likely to be Hispanic, to be employed, to have a higher income, and to live with their families.

Clients who were referred by family or friends (Column D) differed significantly on all variables as compared to those who were not referred by family or friends (Column E). They were younger, and they were more likely to be Anglo or Hispanic, and less likely to have been in treatment before. They were far more impaired, started drug use at an older age, but had used drugs for a shorter period of time prior to seeking treatment than all other clients. They were more likely to be employed, to have higher incomes, to have more education, and to live with their families. They also were less likely to have been arrested in the 120 days prior to admission to treatment than all other clients.

Clients who were referred by health or social service agencies (Column F) were younger and were more impaired than those clients who were not referred by health or social service agencies (Column G). They were less likely to be males or to be Hispanic, and more likely to be Anglo. They had more schooling, but were less likely to be employed, although they reported higher incomes than those who were referred by sources that were not health or social service agencies (Column H). They were less likely to live with their families.

Clients who were referred by criminal justice agencies were far less impaired in terms of physical or social problems of any group. They were less likely to be Anglo, to have had fewer prior treatment experiences, to have lower incomes, less schooling, and less likely to live with their families than clients who were not referred by criminal justice agencies (Column I). They were more likely to be male and to have been arrested in the 120 days prior to admission to treatment.

*Clients who were referred by criminal justice agencies were far less impaired in terms of physical or social problems of any group.*

Table 2.7: Characteristics of Clients at Admission to TCADA-Funded Treatment by Referral Source: 1987-1996

	Total <i>A</i>	Self <i>B</i>	Not Self- Referred <i>C</i>	Family or Friends <i>D</i>	Not Family or Friends <i>E</i>	Health Agency <i>F</i>	Not Health Agency <i>G</i>	CJ Agency <i>H</i>	Not CJ Agency <i>I</i>
No. of Clients	43,235	16,183	27,054	4,373	38,840	7,965	35,248	12,216	28,735
Age	35.6	36.2 *	35.3	34.9 *	35.7	34.9 *	35.8	35.5	35.7
Impairment Level Lag-1st Use to Admit	8.2	10.3 *	7	11.7 *	7.9	9.3 *	8	4.6 *	9.7
Yrs of Schooling	14.3	14.8 *	14	12.9 *	14.5	13.5 *	14.5	14.5	14.3
Age at 1st Use	10.9	10.9	10.9	11.2 *	10.9	11.2 *	10.9	10.7 *	11
Avg. Yearly Income	21.8	21.9	21.8	22.5 *	21.7	21.9	21.8	21.5 *	21.9
% Arrested**	\$4,283	\$4,592 *	\$4,101	\$6,317 *	\$4,059	\$4,837 *	\$4,158	\$3,198 *	\$4,710
% Male	16%	12% *	18%	12% *	16%	15%	16%	21% *	13%
% Anglo	71%	71%	69%	66% *	70%	62% *	71%	75% *	68%
% African American	38%	36%	36%	44% *	35%	47% *	34%	27% *	40%
% Hispanic	15%	11% *	16%	21% *	14%	15%	14%	15%	14%
% Employed at Admit	47%	53% *	47%	35% *	51%	38% *	52%	58% *	46%
% 1st Admit	23%	26% *	22%	27% *	23%	17% *	25%	23%	23%
% Live with Family	2%	2% *	2%	1% *	2%	2%	2%	1% *	2%
	69%	77% *	63%	74% *	68%	64% *	70%	65% **	70%

\*\*%Arrested in the 120 days prior to admission to treatment.

## DISCHARGE CHARACTERISTICS

*Between 1987 and 1995, favorable outcomes of chemical dependency treatment improved.*

CODAP also collects information on clients at discharge. The average length of stay in treatment for heroin addicts was 149 days, which reflects lengthy periods of stay for some clients on methadone. The longest period in treatment was 4,021 days, although 50 percent of the clients stayed 51 days or less; 75 percent stayed 174 days or less, and 88 percent stayed 360 days or less. Length of stay for those who completed treatment with no substance use was 177 days, as compared to 152 days for those completing treatment with some use and 143 days for those who transferred to another facility. The average length of stay for those who were discharged by the program for non-compliance with program rules was 107 days, as compared to 182 days for those who left the program against medical advice and 184 days for those discharged to jail.

Between 1987 and 1995,<sup>4</sup> a total of 36,993 clients were discharged. Table 2.8 shows the reasons for discharge by year. Overall, some 18 percent of the clients completed treatment with no substance use, while another 2 percent completed treatment but reported some substance use. Twenty-two percent were transferred from the unit into which they were first admitted to another facility for continued treatment, while 9 percent were terminated from treatment by the program, 39 percent left treatment against medical advice (AMA), and 6 percent were discharged from treatment because they were placed in jail or prison. Two hundred clients died while in treatment; their records were excluded from this analysis of discharge data, as were 2,031 discharge records of clients from programs that lost TCADA funding; information on these clients at the time of discharge and follow-up was not submitted on the discharge forms.

Between 1987 and 1995, favorable outcomes improved. The proportion of clients who completed treatment with no use and the proportion who transferred to another treatment facility increased, while the proportion who left against medical advice or were terminated by the program or were sent to jail decreased.

Table 2.8: Reasons for Discharge of Heroin Addicts from TCADA-Funded Treatment in Texas: 1987-1995

	Completed-No Use	Completed- Some Use	Transferred	Program Decision	Left AMA*	Incarcerated
1987	17%	3%	11%	11%	47%	10%
1988	18%	3%	14%	12%	47%	6%
1989	14%	2%	19%	10%	51%	5%
1990	15%	2%	20%	10%	47%	6%
1991	16%	2%	23%	11%	43%	6%
1992	17%	2%	25%	10%	40%	6%
1993	22%	1%	26%	9%	35%	6%
1994	29%	2%	26%	9%	32%	4%
1995	23%	3%	30%	6%	35%	4%

\*Against Medical Advice

**Table 2.9: Referral Source to TCADA-Funded Treatment by Reasons for Discharge: 1987-1995**

Referral Source	Discharge Reason						Total
	Complete Tmt- No Use	Complete Tmt- Some Use	Transfer	Program Decision	Left AMA*	Jail or Prison	
CJ System	27%	2%	22%	12%	30%	7%	100%
Family or Friends	11%	2%	17%	6%	60%	4%	100%
Health or Soc. Svs. Agency	20%	2%	25%	8%	42%	3%	100%
Self Referral	14%	2%	24%	8%	46%	6%	100%
Total	19%	2%	23%	10%	41%	6%	100%

\*Against Medical Advice

**Table 2.10: Reasons for Discharge from TCADA-Funded Treatment by Referral Source: 1987-1995**

Referral Source	Discharge Reason						Total
	Complete Tmt- No Use	Complete Tmt- Some Use	Transfer	Program Decision	Left AMA*	Jail or Prison	
CJ System	50%	30%	34%	45%	25%	43%	35%
Family or Friends	6%	13%	8%	7%	16%	8%	11%
Health or Soc. Svs. Agency	18%	20%	18%	15%	17%	9%	17%
Self Referral	26%	38%	40%	33%	42%	40%	37%
Total	100%	100%	100%	100%	100%	100%	100%

\*Against Medical Advice

*In terms of predicting a successful discharge from treatment, no single characteristic stands out other than being referred by a criminal justice agency.*

Table 2.9 looks at reasons for discharge by referral source. It shows that regardless of referral source at admission, most clients left treatment against medical advice (AMA). Sixty percent of those referred by family or friends left AMA, as compared to 30 percent of those referred by the criminal justice system.

Table 2.10 shows that criminal justice clients were the most likely group to complete treatment with no substance use reported at discharge (50 percent), while addicts referred by family and friends were the least likely to complete treatment successfully (6 percent). Addicts who were self-referred were the most likely to leave against medical advice (42 percent).

Table 2.11 shows the characteristics of heroin addicts by reason for discharge as compared to the characteristics of those discharged for all other reasons. It shows that those who successfully completed treatment with no use and those who were discharged from treatment because they were placed in jail or prison were the most different. Those who completed treatment were older, were referred by the criminal justice system, were more likely first admissions, were less likely to be Hispanic, and were less impaired at admission. Those who were remanded to jail or prison were more likely to be male, to be Hispanic, to have been arrested more times in the past 120 days, and to have a lower income. They were the least impaired in terms of social and physical problems.

In terms of predicting a successful discharge from treatment, no single characteristic stands out other than being referred by a criminal justice agency. Criminal justice referrals had significantly lower levels of impair-

Table 2.11: Characteristics of Heroin Addicts Admitted to TCADA-Funded Treatment in Texas by Discharge Reason: 1987-1995

	Total	Complete Trt-No Use	Not Complete Trt, No Use	Complete Trt Some Use	Not Complete Trt-Some Use	Transfer	Not Transferred	Program Decision	Not Program Decision	Left AMA	No Leave AMA	Jail or Prison	No Jail or Prison
	A	B	C	D	E	F	G	H	I	J	K	L	M
No. of Clients	39,697	6,967	32,730	700	38,997	8,321	31,376	3,451	36,246	14,836	24,861	2,039	37,658
Percent	100%	19%		2%		23%		10%		41%		6%	
Length of stay (days)	149	177		152		143		107		182		182	
Admit Age	35.4	36 *	35.5	35.6	35.6	35.7	35.6	35 *	35.6	34.8	36	35.9	35.6
Impairment Level	8.8	8 *	8.8	8.4	8.5	9.5 *	8.3	7.2 *	8.7	9.6 *	7.9	6.6 *	8.6
Lag-1st Use to Admit	14.1	14.7	14.3	13.7	14.3	14.4	14.3	14.2	14.3	13.5 *	14.8	15.6 *	14.3
Yrs of Schooling	10.9	11 *	10.9	11.1	10.9	11	10.9	10.9	10.9	10.8 *	11	10.6 *	10.9
Age at 1st Use	21.7	22	21.7	22.4	21.7	21.7	21.8	21.3 *	21.8	21.9	21.7	20.8 *	21.8
Avg. Yearly Income	\$4,251	\$4,070	\$4,267	\$4,847	\$4,220	\$3,921	\$4,316	\$4,032	\$4,250	\$4,741	\$3,940	\$2,921	\$4,300
% Arrested	16%	15%	15%	16%	15%	18% *	15%	16%	15%	14% *	16%	22% *	15%
% Male	71%	72%	70%	70%	71%	70%	71%	70%	71%	71%	70%	75% *	70%
% Anglo	35%	37%	35%	35%	35%	38% *	34%	32%	35%	34% *	36%	27% *	36%
% African American	14%	15%	14%	13%	14%	11% *	15%	14%	14%	15% *	14%	12% *	15%
% Hispanic	51%	47% *	51%	51%	50%	50%	50%	53%	50%	50%	50%	61% *	49%
% Employed at Admit	23%	20% *	24%	25%	23%	21% *	24%	25%	23%	24% *	22%	25%	23%
% 1st Admit	35%	39% *	34%	35%	35%	30% *	36%	31% *	35%	38% *	33%	27% *	35%
% CJ Referral	35%	50% *	32%	30%	36%	34%	36%	45% *	35%	25% *	42%	43% *	35%
% Live with Family	2%	60% *	71%	71%	69%	67%	69%	70%	68%	74% *	66%	77% *	68%

\* Differences in means for reasons for discharge p=.0001

ment, which would positively impact treatment outcomes, as would being under supervision as a probationer or parolee by the criminal justice system.

## **SUMMARY**

This chapter has analyzed the CODAP data collected on heroin addicts entering and leaving treatment in TCADA-funded programs. It has shown that the characteristics of heroin addicts entering treatment have remained fairly consistent over time on a statewide basis, with most variations due to shifts in funding and priority populations. The major demographic change is that the population is aging. In terms of treatment outcomes, the major finding is that addicts referred to treatment by the criminal justice system are more likely to be reported as having completed treatment than other addicts. This completion rate is due to the fact that criminal justice referrals are less impaired at admission, and the oversight of the criminal justice system is an additional factor in their completing their program of treatment.

## ***Endnotes***

- <sup>1</sup> A different data collection instrument is used to obtain information on adolescent clients entering treatment. Over the years, less than 1 percent of the adolescent clients entering treatment had a primary diagnosis of heroin abuse. Because of the small number of clients and the differences in the variables reported, these client records were not included in this study.
- <sup>2</sup> Because some clients will report a less serious drug, such as marijuana, as the primary drug of abuse at admission, a decision was made to include all clients who reported a primary, secondary, or tertiary problem with heroin or illegal methadone in the dataset.
- <sup>3</sup> Only legal income is reported on CODAP.
- <sup>4</sup> The codes for discharge reasons changed in 1996, and since they are not compatible with earlier codes, analysis of discharge records did not include clients discharged in 1996 or later.

# Chapter 3. Method for Estimating the Population Size

## THE DATA

*The complete CODAP data file used in this study consists of a confidential record for each individual who appeared for treatment at any time between 1987 and 1996 with problems with heroin or methadone.*

**T**he complete CODAP data file used in this study consists of a confidential record for each individual who appeared for treatment at any time between 1987 and 1996 with a primary, secondary, or tertiary problem with heroin or methadone. An algorithm based on the last four digits of the social security number, month and year of birth, gender, and race/ethnicity was used to create a unique client identifier. An unduplicated set of records was then created. If the individual appeared more than once, the dates of the additional treatments were included on the same record. Then, for each case, the sequence of one or more dates was compressed to a sequence of 19 codes of 0 or 1, corresponding to nineteen consecutive six-month time intervals from 1987 to 1996. A code of 1 means that the individual was admitted to treatment within a specific six-month interval; a code of 0 means that he or she was not admitted to treatment at any time within the interval. A person who was admitted in an earlier period and was still in treatment in the next interval would be shown as 0 for the next interval. Each case had at least one code of 1 (at least one admission).

Figure 3.1: Example of Client ID and Treatment Record

Client ID	Treatment Sequence
89160542201	1100010000110000000

The objective is to estimate the number of individuals in the population who were “susceptible” to publicly-funded treatment but never actually received treatment within the sequence of nineteen six-month intervals. These unseen cases, of course, do not appear in the treatment dataset, but are extrapolated from it by use of capture-recapture techniques.

## CAPTURE-RECAPTURE METHOD

Capture-recapture methods require that data be drawn from identifiable individuals in a system of successive surveys or censuses. A count is performed by “capturing” and marking clients in treatment at a certain time. This tallies some of the members of the population but misses others. To get at the missing substance abusers, a second sample, or recapture, is taken at a different time. Some of the individuals in the second sample are also part of the first sample, but new individuals are observed and not all of the old ones reappear in the second sample.

The simplest form of such a model will include only two time intervals. Let  $n_{10}$  be the number of persons admitted to treatment in 1990 but not in 1994 (20),  $n_{01}$  be the number admitted in 1994 but not in 1990 (42), and  $n_{11}$  would be the number of persons admitted in both 1990 and 1994 (18). The data can be summarized with counts in a 2x2 table in which  $n_{00}$  is not known but is to be estimated (the number in need of treatment in 1990 or 1994 but not admitted).

Figure 3.2: Example of Data from Two Overlapping Samples Taken in 1990 and 1994

		Second Sample (1994)		
		Unseen	Seen	
First Sample (1990)	Unseen	$(n_{00})$	42 ( $n_{01}$ )	-
	Seen	20 ( $n_{10}$ )	18 ( $n_{11}$ )	38
		-	60	

Since this equation has only one unknown quantity, solving for cell  $n_{00}$  gives an estimate of the population size for that cell.

$$n_{00} = \frac{n_{01} * n_{10}}{n_{11}} = \frac{42 * 20}{18} = 46.7$$

The total population size is  $20 + 42 + 18 + 47 = 127$

The earliest use of capture-recapture was for tagging fish in 1896. Later studies involved other wildlife populations and the estimation of birth and death rates. Recent literature has expanded the use of this technique in public health to report on infectious diseases, injuries, cancer, birth defects, and insulin-dependent diabetes mellitus. The method has also been used to estimate hidden populations such as drunk drivers, and the size of the criminal population, homeless, and street youth. Starting in 1971, capture-recapture has been used to estimate the extent of substance abuse.<sup>1</sup>

*Starting in 1971, capture-recapture has been used to estimate the extent of substance abuse.*

Capture-recapture studies assume a closed, defined population and involve random sampling. A basic premise is that the population which is estimated looks like those which are seen in the samples. If the samples are taken from the CODAP dataset, then the number estimated is those addicts who resemble clients who have been treated. Likewise, if the sample is taken from heroin addicts who have been arrested, then the estimated or unseen number is of those addicts who resemble the pool of arrestees but have not been arrested. The term “amenable or susceptible to treatment” is used to remind readers of the pool of addicts for whom estimates are being made.

In estimating the size of a single population, one of the problems is that these efforts are subject to sampling bias because some individuals are not available throughout the entire sequence of time, such as when an addict is in jail or is still in treatment and thus is not available for “capture” in the next time period.

If the individuals who are observed are “trap happy,” then there will be an overestimation of the number of matches because the samples will pick up the individuals most likely to be seen, with a consequent underestimation of the complete population size. And, to the contrary, “trap shy” individuals will be missed, which will cause an overestimate of the complete population size. By not using a database such as arrests, where individuals are more likely to either be “trap happy” or “trap shy,” this problem can be minimized.

*Capture-recapture models must meet the assumptions of independence, unique marking of subjects, and consistency across time and population.*

Another problem with the capture-recapture method is that the “marks” may not be indelible and tracking drug users from one sample to another is difficult if incorrect or incomplete information is provided by the captured individual. Use of unique identifiers such as birthdates, race/ethnicity, gender, and social security numbers can decrease the error rate.

The method also assumes that the samples are independent of one another, but in the case of heroin addicts, this assumption will be unlikely if the samples are drawn from a limited dataset (only one treatment program, for instance) rather than from all of the treatment programs in a geographic area. Sudman (1988) recommends using four samples with the log linear model, which is the statistical method used when the number of samples exceeds two. As more samples are drawn, there are more chances for different addicts to be included in the samples. The greater the number of independent samples, the more accurate the estimate becomes. The observed histories are represented in log-linear models and are fitted by standard incomplete-table fitting procedures.<sup>2</sup>

Capture-recapture models must meet the assumptions of independence, unique marking of subjects, and consistency across time and population. The assumption of consistency can break down if a new cohort of users appears; if a new drug epidemic, such as crack cocaine or the purer quality Colombian heroin, occurs; if the heroin addicts change from heroin to crack; or if there is a major shift in the availability of treatment either through the closing or opening of major treatment programs. Analysis of treatment data in combination with information on changes in program funding and shifts in drug use patterns in the various metropolitan areas will show at what point the basic assumptions have been violated and the impact of a violation of the assumptions on the estimates.

## **LOG-LINEAR METHOD**

The Poisson regression in a log-linear model is used when the number of captures exceeds two since it can estimate the number in a missing cell (the

population in need but never treated) by using several partial samples of the population. This study had 19 captures. Using a Poisson regression in a log-linear model in SAS GENMOD, the population of the entire population of heroin addicts in the state, including those in the missing cell, was estimated, as well as the number of addicts in the six most populous Texas counties.<sup>3</sup>

## **Endnotes**

- <sup>1</sup> Greenwood 1971; Hunt 1977; Frank et al. 1978; Doscher and Woodward 1983; Bonett 1983; Woodward et al. 1984; Woodward et al. 1985; Hartnoll et al. 1985; Spencer 1989; Newmeyer 1988; Kehoe et al. 1992; Hser 1993; Wickens 1993; Brecht and Wickens 1993; Korf et al. 1994; Mastro et al. 1994; Larson et al. 1994; Barnes et al. 1995; Illinois 1997; Maxwell 1997; Bonett 1998.
- <sup>2</sup> Bishop et al. 1975; Wickens 1989.
- <sup>3</sup> For full details on the methodology, see J. C. Maxwell, *The Nature and Extent of Heroin Addiction in Texas: A Quantitative and Qualitative Study*. Ph.D. diss., The University of Texas at Austin, 1997.

# Chapter 4. Estimates of Need for Treatment for Heroin Addicts in Texas

**I**n this chapter, estimates of the number of addicts susceptible to TCADA-funded treatment are produced for the six largest counties in Texas, as well as statewide. This chapter describes the drugs that are abused in each area, the characteristics of heroin addicts admitted to treatment, and other data sources or studies that provide additional information on heroin addicts in these areas. By testing the model under different circumstances, it is possible to see the impact on the estimates if the assumptions of unique marking of subjects, independence, and consistency over time and population were met or unmet.

## BEXAR COUNTY

Bexar County is the largest county in the San Antonio metropolitan area, which in 1990 had a population of 1,302,099, of whom 44 percent were Anglo, 48 percent were Hispanic, 7 percent were African American, and 1 percent were other.<sup>1</sup>

The 1996 Adult Survey (Wallisch 1997) found that 12.1 percent of the adult population in Bexar County had ever used powder cocaine, 0.9 percent had used it in the past month, 1.2 percent had used it in the past year, and 10 percent had ever used it but not in the past year. Some 2.6 percent had ever used crack cocaine, 0.1 percent had used in the past

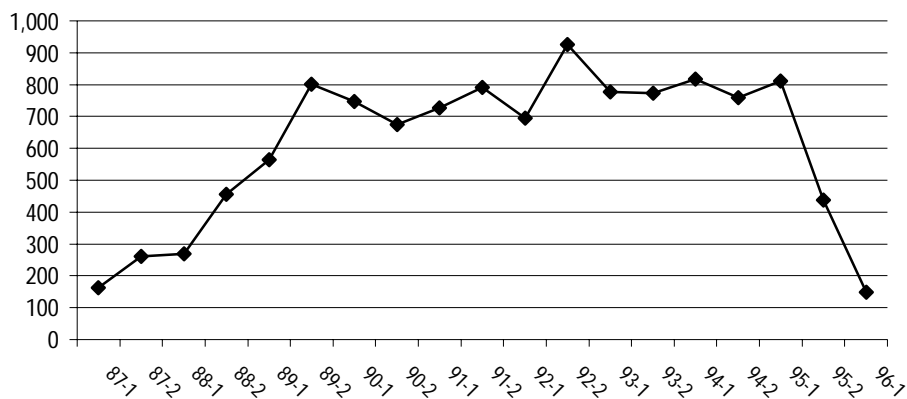
**Table 4.1: Percent of Bexar County DUF Arrestees Testing Positive for Drugs: 1991-1996**

	1991	1992	1993	1994	1995	1996
<b>COCAINE</b>						
Adult Males	29%	31%	31%	31%	24%	28%
Juvenile Males			6%	9%	6%	9%
Adult Females	24%	25%	24%	23%	23%	23%
Juvenile Females			5%	6%	4%	11%
<b>OPIATES</b>						
Adult Males	15%	14%	14%	13%	10%	10%
Juvenile Males			1%	1%	0%	4%
Adult Females	20%	13%	15%	14%	13%	13%
Juvenile Females			0%	1%	1%	2%
<b>MARIJUANA</b>						
Adult Males	19%	28%	32%	30%	34%	38%
Juvenile Males			24%	35%	42%	45%
Adult Females	8%	16%	17%	15%	16%	18%
Juvenile Females			10%	4%	12%	18%

**Table 4.2: Prevalence of Use of Powder Cocaine, Crack, and Heroin by Bexar County Probationers and Prisoners: 1993-1995**

	Ever Used	Past-Month	Past-Year	Not Past-Year
Cocaine-Probation	60%	15%	18%	28%
Cocaine-Prison	70%	20%	17%	33%
Crack-Probation	24%	6%	6%	12%
Crack-Prison	27%	4%	8%	14%
Heroin-Probation	17%	4%	3%	11%
Heroin-Prison	44%	26%	6%	12%

**Figure 4.1: Number of Clients Admitted to TCADA-Funded Treatment in Bexar County with a Primary, Secondary, or Tertiary Problems with Heroin by 6-Month Periods: 1987-1996**



month or past year, and 2.5 percent had ever used it but not in the past year. Some 1.9 percent had ever used heroin, 0.3 percent had used it in the past month, 0.0 percent had used it in the past year, and 1.5 percent had ever used it but not in the past year.

***Bexar County prisoners and probationers were more likely to report heroin or powder cocaine use than were their peers from Dallas or Harris Counties.***

Table 4.1 shows the results of urinalysis tests on arrestees in Bexar County. For adults, use of cocaine and opiates has been fairly level, with increases shown for juvenile arrestees. The increase in proportion of arrestees, both adult and juvenile, testing positive for marijuana is the one important trend shown in this table.

Prisoners and probationers in Bexar County who participated in the 1993-1994 prison surveys and the 1994-1995 probation survey were more likely to report use of heroin and powder cocaine than were their peers from Dallas or Harris Counties (Table 4.2). Bexar County prison inmates were much more likely than probationers to report lifetime and past-month use of heroin and powder cocaine. Use of crack cocaine, on the other hand, was similar for both groups.

Figure 4.1 shows that from the second half of 1989 to the first half of 1995, the number of heroin addicts entering treatment was fairly consistent. The decrease beginning in the latter half of 1995 is due to the shifting of funds for services for persons in the criminal justice system from

TCADA to the Texas Department of Criminal Justice and to the regional reallocation of funds by TCADA. A total of 11,746 CODAP records of heroin addicts are available and these, when combined, totaled 5,780 unduplicated records.

*As of September 1, 1997, there were 1,146 heroin addicts in methadone maintenance programs in Bexar County; 254 of these were in the TCADA-funded program.*

Since the mid-1960s, there have been two large TCADA-funded drug treatment programs in Bexar County. One has provided outpatient methadone maintenance treatment for heroin addicts, detoxification services for alcohol and drug abusers, and outpatient drug-free counseling services for both alcohol and drug abusers, while the other has provided residential and outpatient treatment services primarily for drug abusers. Both of these programs are large. In 1989, they admitted a total of 1,293 clients; in 1994, they admitted 1,034. In addition, another three to eight smaller programs were funded during each year of this study and the CODAP records from each of these programs are included in the dataset. As of September 1, 1997, there were 1,146 heroin addicts in methadone maintenance programs in Bexar County; 254 of these were in the TCADA-funded program.

Crack use was first documented in Texas in 1986 (Spence 1986), and it has been a drug whose users are most likely to be African American. Since the African American population in San Antonio is small, changes in patterns of drug use were less likely to be affected by the crack epidemic. The NADR study found that only 36 percent of the San Antonio injectors who were not in treatment reported ever having used crack, while 66 percent of the Houston and 60 percent of the Dallas NADR subjects reported lifetime use of crack (Maddux et al. 1994). Figure 4.2 shows that the majority of drug clients entering treatment had a primary problem with heroin. Between 1987 and 1996, 55 percent of the drug admissions were for heroin, 19 percent for powder cocaine, 14 percent for crack cocaine, and

**Figure 4.2: Primary Drug of Abuse for Clients Entering TCADA-Funded Treatment Programs in Bexar County: 1987-1996**

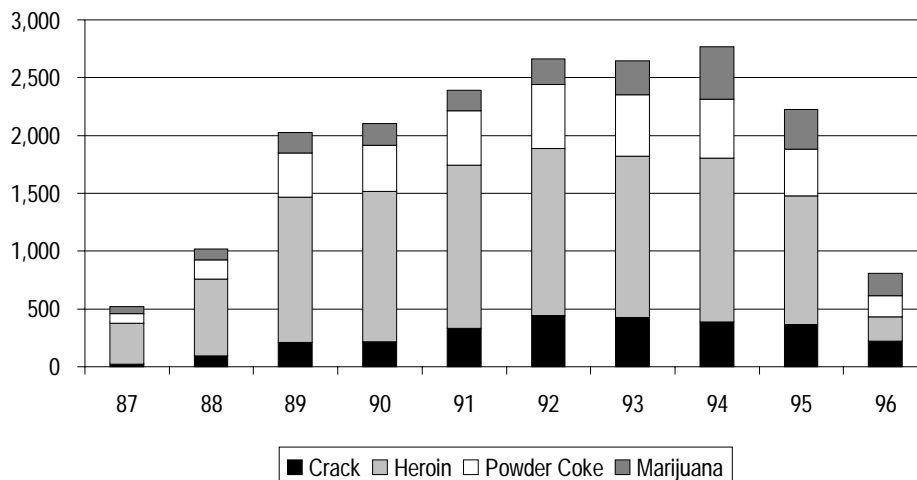
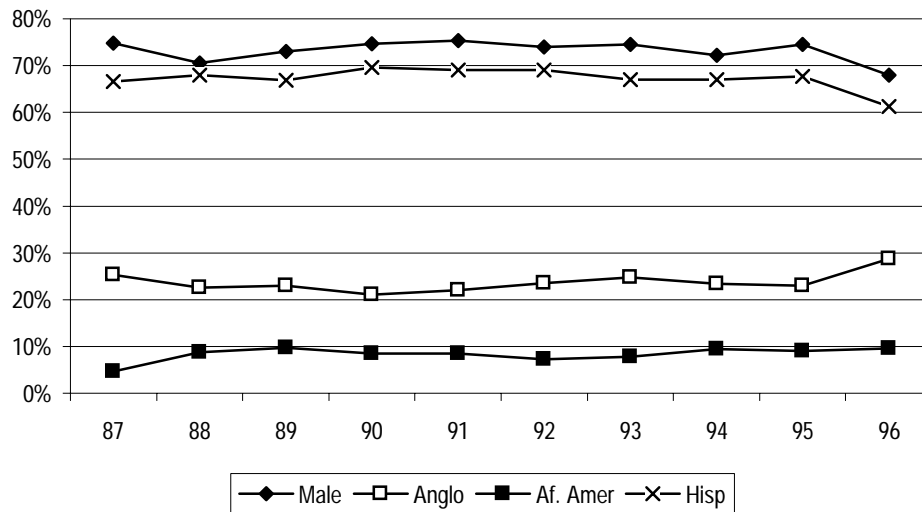


Figure 4.3: Characteristics of Heroin Addicts at Admission to TCADA-Funded Programs in Bexar County: 1987-1996



*As compared to clients served in publicly-funded programs or addicts who were not in treatment, clients in the private program were more likely to be Anglo and to be older than the other groups of clients.*

12 percent for marijuana.

Lastly, the heroin addicts in San Antonio are a group who have used treatment resources. Two studies have reported that between 57 and 59 percent of injecting drug users in San Antonio who were interviewed had ever been in treatment (Maddux et al. 1994; Zule 1996).

Figure 4.3 shows the gender and race/ethnic characteristics of clients admitted to publicly-funded programs in Bexar County between 1987 and 1996. The average age was 34.9 years. Thirty-one percent were referred from the criminal justice system, 23 percent were employed and the average annual legal income was \$2,843. These clients reported an average of 1.3 prior treatment experiences.

Individual records were also obtained on all clients treated in a private methadone program in Bexar County. Drug Dependence Associates began services in 1972. Of the clients treated in this program, the average age was 35.8 years.<sup>2</sup> Table 4.3 compares the characteristics of the 2,843 clients admitted to this private treatment program with the 5,780 clients admitted to TCADA-funded public treatment programs in San Antonio, and the 2,188 San Antonio drug injectors who were not currently in treatment in the NADR study. The clients in treatment were heroin addicts, while the injecting drug users who were not in treatment included injectors of cocaine, amphetamines, and other drugs.

As compared to clients served in TCADA-funded programs or addicts who were not in treatment, clients in the private program were more likely to be Anglo and to be older than the other groups of clients. Although income and employment information was not available, one can assume that since the private program charges a weekly fee, its clients have a higher

**Table 4.3: Comparison of Heroin Addicts in TCADA-Funded and Private Treatment Programs and Injecting Drug Users Not in Treatment in Bexar County**

	Heroin Addicts in TCADA Trmt	Injectors Not in Trtmt	Heroin Addicts in Private Trtmt
Number	5,780	2,188	2,843
% Male	68%	78%	72%
% Anglo	23%	17%	40%
% Hispanic	68%	60%	55%
% Af. American	9%	23%	5%
Under 20 Years	2%	2%	0.7%
20-29 Years	27%	27%	23%
30-39 Years	43%	41%	46%
40-49 Years	21%	22%	24%
50 and over	6%	7%	7%
Not High School Grad	54%	70%	*
High School Grad	33%	13%	*
Some college	14%	17%	*
Living alone	7%	12%	*
Full-time employed	16%	10%	*
Part-time employed	7%	24%	*
Homemaker	3%	3%	*

\*Not reported

income. Those needle-users not in treatment were the least likely to be Anglo, had a higher proportion of African Americans, were less educated, and were less likely to have full-time employment.

There are an estimated 8,936 heroin addicts who need treatment in TCADA-funded programs in Bexar County. Table 4.4 also shows the confidence intervals, which means we can state with approximately 95 percent confidence that the number of unseen addicts is between 2,966 and 3,357.

*There are an estimated 8,936 heroin addicts who need treatment in TCADA-funded programs in Bexar County.*

**Table 4.4: Estimated Number of Heroin Addicts Susceptible to Treatment in TCADA-Funded Programs in Bexar County**

	Unseen Estimate	Lower 95% Confidence Level	Upper 95% Confidence Level	Standard Error
<b>Total</b>	<b>8,936</b>	2,966	3,357	0.0316

In comparison, Woodward et al. (1984) used the 1977 CODAP data for a capture-recapture study that estimated between 11,084 and 16,986 heroin addicts in Bexar County, as compared to 8,936 in this paper.

Zule (1990) used three different methodological approaches to estimate the number of injecting drug users in Bexar County. The first approach, the Population Projection Method, applied the age, race/ethnic, and gender rates

*In 1996, a total of 459 heroin addicts were treated in TCADA-funded programs in Bexar County. If the more conservative number of heroin addicts is used, it means that only 5 percent of the estimated need is currently being met.*

in the 1988 national household survey of substance use to the 1987 age/race specific population estimates for Bexar County. This method yielded an adjusted estimate of 15,231.

A second approach used the back-calculation formula of the Centers for Disease Control to calculate the number of infected individuals necessary to produce the observed number of AIDS cases in a population given the specified rate of progression from HIV infection to AIDS diagnosis. This approach yielded an estimate of 18,759 injecting drug users.

The third approach used inmate surveys, DUF arrest data, and reports from local drug treatment programs to estimate the number of injecting drug users who were incarcerated or were in treatment at a given time. This method produced an estimate of 18,634 persons who had ever injected drugs and 10,640 who had injected in the past month.

From these three approaches, Zule concluded that there were between 15,000 and 20,000 injecting drug users in Bexar County and that the majority were Hispanic heroin users who also inject cocaine intermittently.

Regardless of which approach is used, what is important is that in 1996, a total of 459 heroin addicts were treated in TCADA-funded programs in Bexar County. If the more conservative number produced by this paper is used, it means that only 5 percent of the estimated need is currently being met.

## DALLAS COUNTY

*The primary problem drug in the Dallas metropolitan area is cocaine.*

Dallas County is the largest county in the Dallas metropolitan area, which had a population of 2,676,248 in 1990. The racial/ethnic makeup is 67 percent Anglo, 16 percent African American, 14 percent Hispanic, and 3 percent other, according to the 1990 US Census.

The primary problem drug in the Dallas metropolitan area is cocaine, as Table 4.5 shows. DAWN collects information on number of mentions of various drugs by patients entering emergency departments in the metropolitan area; cocaine is the illicit drug most frequently mentioned in these emergency room episodes.

The 1996 adult survey of substance use conducted by TCADA (Wallisch 1997) found that 15.3 percent of the adults in Dallas County reported ever having used powder cocaine, with 0.5 percent reporting past-month use, 2.1 percent reporting past-year (not past-month) use, and 12.7 percent reporting ever having used but not in the past year. For crack

**Table 4.5: Dallas DAWN Emergency Room Mentions per 100,000 Population: 1992-1996**

	Jan-Jun 1992	Jul-Dec 1992	Jan-Jun 1993	Jul-Dec 1993	Jan-Jun 1994	Jul-Dec 1994	Jan-Jun 1995	Jul-Dec 1995	Jan-Jun 1996
Cocaine	25.5	27.4	29.1	28.5	29.6	31.2	31.9	29.7	28.9
Heroin	5.9	6.1	6.2	6.5	4.6	5.4	6.3	5.4	6.8
Marijuana	7.7	7.0	8.3	7.4	10.4	10.0	10.5	13.0	12.3

cocaine, 2.3 percent reported lifetime use, 0.0 percent reported past-month use, 0.4 percent reported past-year use, and 1.9 percent reported ever having used but not in the past year. In comparison, 1.5 percent of the population reported ever having used heroin, 0.0 percent reported past-month use, 0.0 percent reported past-year use, and 1.5 percent reported having used but not in the past year.

Table 4.6 shows the results of urinalysis tests conducted on arrestees in Dallas County. Until 1995, cocaine was the drug for which arrestees were most likely to test positive. Now, marijuana is the drug for which male arrestees are most likely to test positive. Arrestees testing positive for heroin comprise a small proportion of those tested.

*Prisoners were more likely to have ever used powder cocaine, crack, or heroin in their lifetimes, although past-month use of crack was the same for both prisoners and probationers.*

**Table 4.6: Percent of Dallas County DUF Arrestees Testing Positive for Drugs: 1991-1996**

	1991	1992	1993	1994	1995	1996
<b>COCAINE</b>						
Males	43%	41%	45%	35%	31%	32%
Females	46%	48%	43%	46%	44%	36%
<b>OPIATES</b>						
Males	4%	4%	5%	3%	5%	5%
Females	9%	9%	11%	8%	5%	10%
<b>MARIJUANA</b>						
Males	19%	28%	27%	33%	39%	43%
Females	11%	24%	20%	23%	23%	26%

The results of the TCADA surveys of probationers and prisoners (Maxwell and Wallisch 1998; Farabee 1994, 1995) provide another picture of drug prevalence in Dallas County. Table 4.7 shows that prisoners were more likely to have ever used powder cocaine, crack, or heroin in their lifetimes, although past-month use of crack was the same for both groups.

**Table 4.7: Prevalence of Use of Powder Cocaine, Crack and Heroin by Dallas County Probationers and Prisoners: 1993-1995**

	Ever Used	Past-Month	Past-Year	Not Past-Year
Cocaine-Probation	40%	8%	8%	24%
Cocaine-Prison	50%	21%	5%	24%
Crack-Probation	27%	9%	5%	12%
Crack-Prison	35%	10%	8%	17%
Heroin-Probation	11%	1%	2%	8%
Heroin-Prison	28%	11%	4%	13%

Over the years in Dallas County, there have been five to six private methadone programs and a methadone program operated by the Veterans Administration. At the same time, TCADA has always funded a methadone

*As of September 1, 1997, there were 783 addicts in treatment in methadone maintenance programs, with 167 of these clients in a TCADA-funded program.*

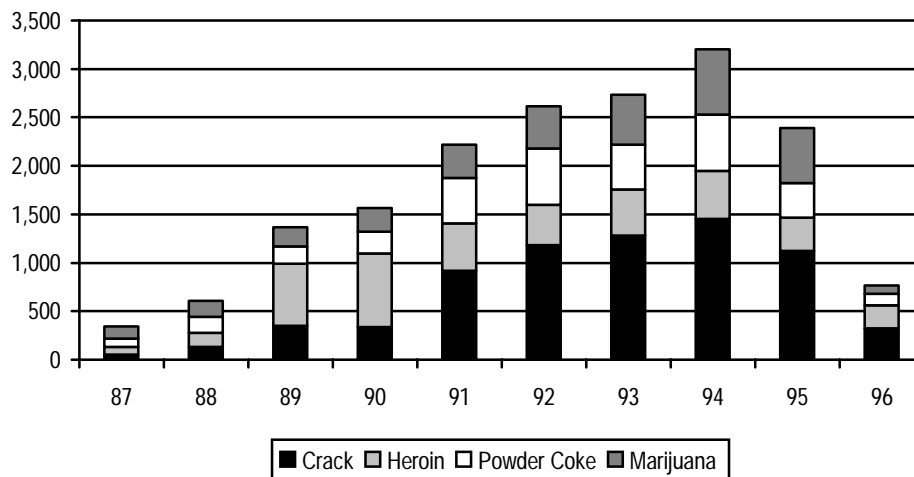
maintenance program in Dallas, but this funding has been allocated to a succession of different facilities, and as one facility closed and another opened, not all clients were likely to transfer to the new services since the programs were located in different sections of Dallas. As of September 1, 1997, there were 783 addicts in treatment in methadone maintenance programs,<sup>3</sup> with 167 of these clients in a TCADA-funded program. In addition, there are a number of TCADA-funded drug-free programs treating heroin addicts, including both residential and outpatient services, in the Dallas area.

As Figure 4.4 shows, the crack cocaine epidemic resulted in a large increase in admissions to adult treatment programs beginning in 1991. At the same time, there was a concurrent decrease in heroin admissions. Between 1987 and 1996, 40 percent of the drug admissions were for crack cocaine, 23 percent were for heroin, 19 percent were for marijuana, and 18 percent were for powder cocaine.

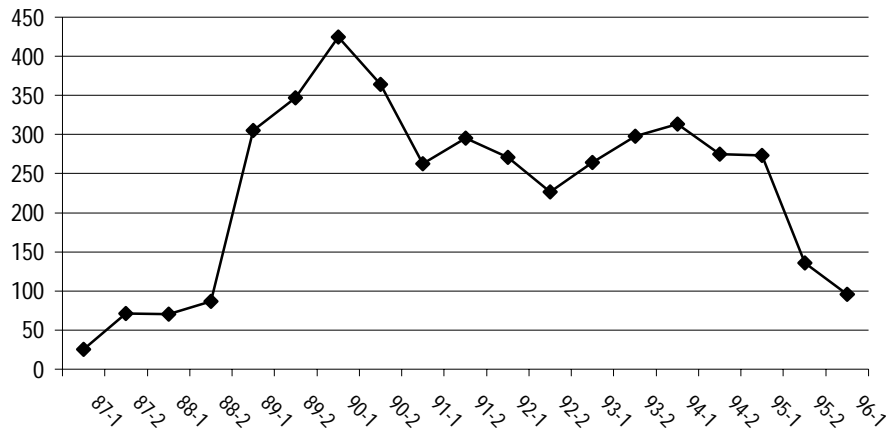
Figure 4.5 shows the number of heroin addicts admitted to treatment with a primary, secondary, or tertiary problem with heroin. Some 4,128 unduplicated client records were available for analysis.

The characteristics of heroin addicts at admission are displayed in Figure 4.6, which shows that the proportion of males has stayed fairly level; overall 63 percent of the heroin addicts entering treatment were male. The proportion of Anglo and African American clients has varied inversely by year, although overall, 50 percent of the clients have been Anglo and 40 percent have been African American. A stable 10 percent of the clients have been Hispanic. The overall average age of these clients was 35.9 years, but the age has increased over the years, rising from 31.6 years in 1987 to 36.5

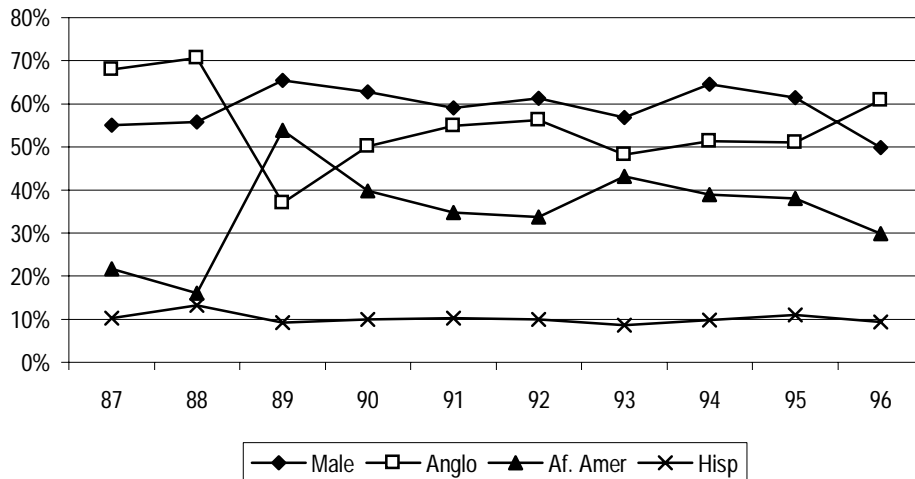
**Figure 4.4: Primary Drug of Abuse for Clients Entering TCADA-Funded Treatment Programs in Dallas County: 1987-1996**



**Figure 4.5: Number of Clients Admitted to TCADA-Funded Treatment in Dallas County with a Primary, Secondary, or Tertiary Problem with Heroin by 6-Month Periods: 1987-1996**



**Figure 4.6: Characteristics of Heroin Addicts at Admission to TCADA-Funded Treatment Programs in Dallas County: 1987-1996**



years in 1996. Some 19 percent of these clients were referred by the criminal justice system, 30 percent were employed, and average annual income at admission was \$7,567.

The characteristics of heroin addicts admitted to TCADA-funded treatment programs in Dallas are shown in Table 4.8, along with the characteristics of injecting drug users who were not in treatment but who participated in the NADR project between 1989 and 1991 (Maddux et al. 1994). As this table shows, clients in treatment were less likely to be male and were more likely to be Anglo. They were also better educated and more likely to have full-time employment. The NADR study (Maddux et al. 1994) found that 67 percent of the injecting drug users in Dallas interviewed had ever been in treatment.

**Table 4.8: Comparison of Heroin Addicts in TCADA-Funded Treatment and Injecting Drug Users Not in Treatment in Dallas County**

	Heroin Addicts in TCADA Trtmt	Injecting Drug Users Not in Trtmt
Number	3,929	2,075
% Male	62%	68%
% Anglo	50%	34%
% Hispanic	10%	8%
% Af. American	40%	57%
Under 20 Years	2%	1%
20-29 Years	22%	20%
30-39 Years	49%	54%
40-49 Years	23%	21%
50 and over	4%	3%
Not High School Grad	38%	50%
High School Grad	38%	26%
Some college	24%	24%
Living alone	15%	11%
Full-time employed	21%	17%
Part-time employed	8%	21%
Homemaker	3%	1%

*In 1996, a total of 263 heroin addicts were treated in TCADA-funded programs, which would mean only 1.8 percent of the need was being met.*

It was estimated that an overall total of 14,333 heroin addicts who would seek treatment in TCADA-funded facilities in Dallas County (Table 4.9). In 1996, a total of 263 heroin addicts were treated in TCADA-funded programs, which would mean only 1.8 percent of the need was being met.

**Table 4.9: Estimated Number of Heroin Addicts Susceptible to Treatment in TCADA-Funded Programs in Dallas County**

Total	Missing Estimate	Lower 95% Confidence Level	Upper 95% Confidence Level	Standard Error
14,333	10,205	9,207	11,313	0.0525

However, before accepting this estimate of unmet need, the reader is advised to revisit the drug situation in Dallas County. As the DAWN, DUF, CODAP, and survey data showed, crack cocaine has been the predominant drug in the area, which influences the assumption of a closed heroin population. In addition, there has been a fluctuation in the number of admissions and openings and closings of TCADA-funded methadone programs. Currently, only 21 percent of the heroin addicts in methadone maintenance programs in Dallas County are in the TCADA-funded program.

All of these factors, when considered in combination, indicate that the assumptions of independence and consistency across time and population have not been met and the estimates for Dallas County using this model may not be as good as in other areas since the model has overcompensated for unseen cases. Refer to the Conclusions at the end of this chapter for a

comparison of the estimates of the different metropolitan areas and the impact of the violation of assumptions.

## EL PASO COUNTY

El Paso has a population of 591,610 in 1990, but when its population is combined with that of its sister city, Juarez, which has a population of 1.2 million, the El Paso area becomes a major metropolitan area. El Paso County is 70 percent Hispanic, 26 percent Anglo, 3 percent African American, and 1 percent other. The Rio Grande River border is one of the busiest in the world. Because of its remote location and constant surge of population back and forth, the El Paso-Juarez area is a well-known and direct path for illicit drugs into the United States. It is considered a transition point for heroin enroute to Chicago and Denver, not an end destination.

*Because of its remote location and constant surge of population back and forth, the El Paso-Juarez area is a well-known and direct path for illicit drugs into the United States.*

The 1996 Texas Adult Survey of Substance Use (Wallisch 1997), a telephone household survey, found that 8.1 percent of adults in El Paso County had ever used powder cocaine, 0.6 percent had used in the past month, 0.4 percent in the past year, and 7.1 percent had used, but not in the past year. In comparison, only 1.3 percent had ever used crack cocaine. None reported past month use, 0.2 percent report past year use, and 1 percent had used prior to the past year. Only 0.2 percent reported ever having used heroin. None had used in the past month or the past year and 0.2 percent had ever used heroin in their lifetime.

In 1996, TCADA also conducted a face-to-face survey of persons living along the Texas-Mexico border (Wallisch 1998). This survey was conducted not only to gain information on drug use patterns on the border, but also to reach those person who did not have telephones and those persons who might be more likely to be “hard-core” drug users. This study found that 14 person of the adults in El Paso had ever used cocaine, 1.3 percent had used in the past month, 1.8 percent had used in the past year, and 10.9 percent had ever used cocaine, but not in the past year. Some 5.3 percent had ever used crack, 2.7 percent had used in the past month, 0.6 percent in the had used in the past year, and 2.0 percent had used crack, but not in the past year. For heroin, 3.8 percent had ever used heroin, 0.4 percent had used in the past month, 0.3 had used in the past year, and 3.0 percent had ever used heroin, but not in the past year.

In El Paso, heroin addicts (“tecatos”) stratify themselves into four basic groups: tecatos buenos, tecatos medianos, tecatos cucarachos, and tecatos chafas (Ramos 1998). A tecato bueno is a high status drug addict who is a heavy user and who is able to experience withdrawal “without a whimper.” This type of user usually carries a substantial amount of drugs. A tecato mediano is considered neither high nor low status; these individuals are considered weak because they do not have the strength of a tecato bueno and they are a followers, not leaders. The tecato cucaracho is a low status addict

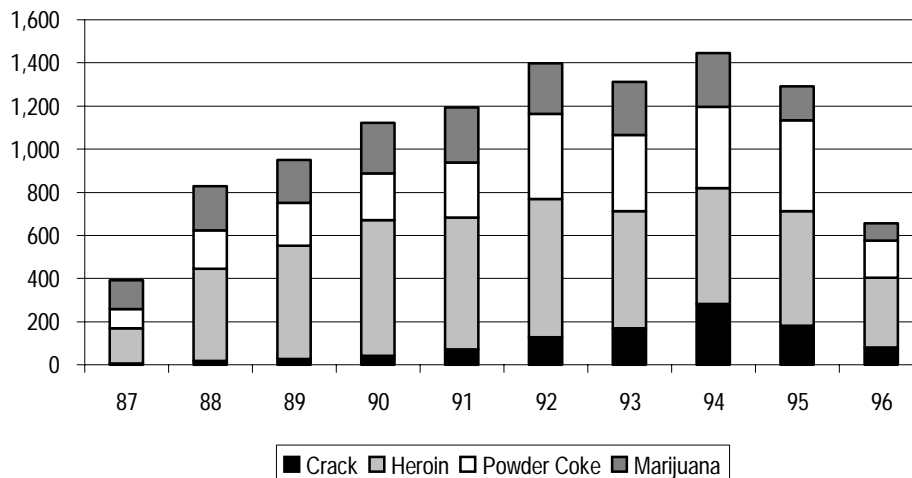
(cockroach) who hangs around drug connections, does not buy drugs but asks for handouts and food, and has an unkempt appearance. Many are considered by their peers as intelligent but devious. They get a “taste” of heroin by doing favors or odd jobs for the users. The tecato chafa is the occasional heroin addict who uses heroin infrequently. Many addicts are called chafas at the beginning of their careers.

*As Figure 4.7 shows, heroin is the primary drug of abuse among clients entering drug treatment at 46 percent of all admissions between 1987 and 1996.*

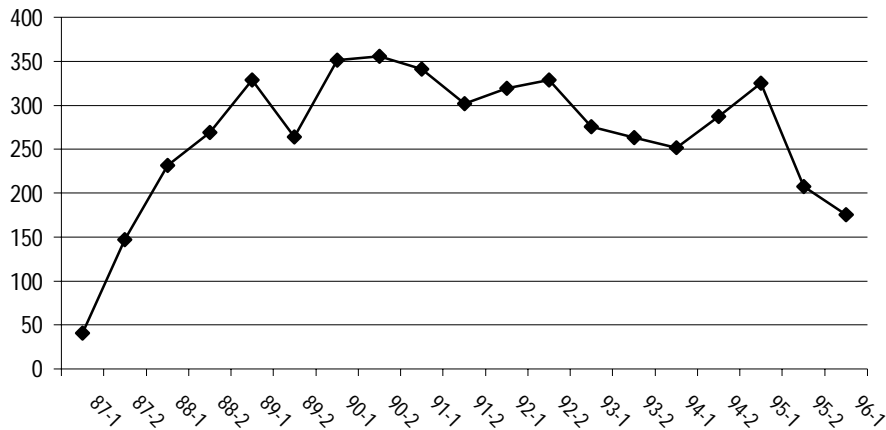
Over the years covered in this study, El Paso has had two methadone programs, one private and one publicly-funded. TCADA did not fund the public program during the period 1987 to 1996, so CODAP data were not collected on addicts entering methadone maintenance treatment. Since that time, TCADA has provided funding for the public program. This means the estimates will exclude those addicts amenable to entering methadone treatment, and there will be an underestimate of the number of heroin addicts who would enter publicly-funded programs rather than private programs. As of September 1, 1997, there were a total of 172 addicts in treatment in the two methadone programs in El Paso, and 102 of them were in the TCADA-funded program. The area also has several large drug-free programs with a variety of locations providing residential and outpatient services to heroin addicts. The operation of these programs, which are funded by TCADA, has remained stable over the years.

As Figure 4.7 shows, heroin is the primary drug of abuse among clients entering drug treatment at 46 percent of all admissions between 1987 and 1996. Powder cocaine was the second drug of abuse, at 25 percent of all admissions followed by marijuana at 19 percent, and crack cocaine at 10 percent. In 1994, crack cocaine surpassed marijuana as the number three drug of abuse.

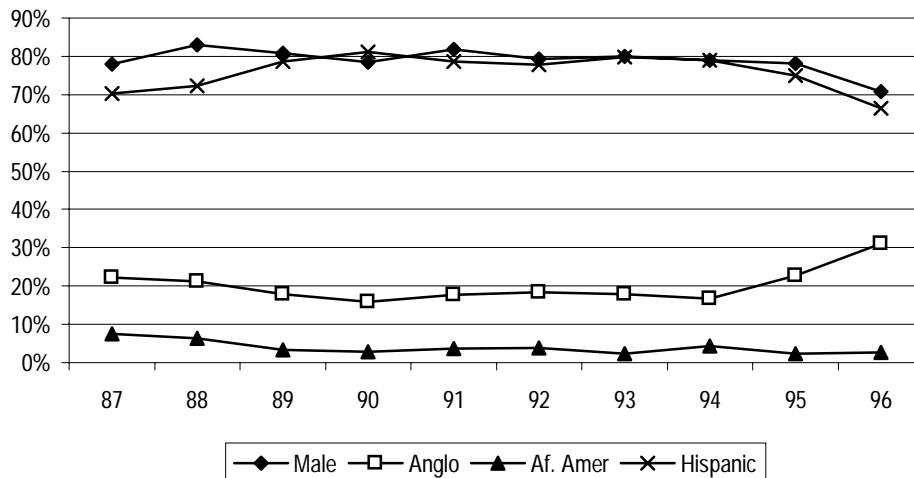
**Figure 4.7: Primary Drug of Abuse for Clients Entering TCADA-Funded Treatment Programs in El Paso County: 1987-1996**



**Figure 4.8: Number of Clients Admitted to TCADA-Funded Treatment in El Paso County with a Primary, Secondary, or Tertiary Problem with Heroin by 6-Month Periods: 1987-1996**



**Figure 4.9: Characteristics of Heroin Addicts at Admission to TCADA-Funded Treatment Programs in El Paso County: 1987-1996**



In El Paso, heroin is primarily Mexican Black Tar and the number of admissions has stayed fairly stable between 1988 and 1995, as Figure 4.8 shows. The decrease in 1996 reflects funding reallocations by TCADA. A total of 3,322 unduplicated records were available for analysis.

Of the heroin addicts entering drug-free treatment programs in El Paso between 1987 and 1996, 76 percent were Hispanic, 20 percent were Anglo, and 4 percent were African American; 81 percent were male. The race/ethnic and gender distributions have remained stable until 1994, as Figure 4.9 shows. After that time, the proportion of females and Anglos increased due to funding shifts. Some 53 percent of all heroin admissions were referred from the criminal justice system, 17 percent were employed, and annual average income at admission was \$2,560. Average age is 34.9 years,

but over time, the average age has increased from 32.5 years in 1987 to 36.4 in 1996.

There are an estimated 5,740 heroin addicts who would be candidates for non-methadone treatment in TCADA-funded programs in El Paso County (Table 4.10). If records on the clients in methadone maintenance had been included, the estimate would have been higher. Nevertheless, only a small percentage of the need is being met. In 1996, 340 heroin addicts received services in TCADA-funded programs, which means only 5.9 percent of the estimated need is currently being met.

**Table 4.10: Estimated Number of Heroin Addicts Susceptible to Treatment in TCADA-Funded Programs in El Paso County**

	Missing Estimate	Lower 95% Confidence Level	Upper 95% Confidence Level	Standard Error
<b>Total</b>	<b>5,740</b>	<b>2,641</b>	<b>2,419</b>	<b>2,883</b>
				<b>0.0448</b>

## HARRIS COUNTY

The largest county in the Houston metropolitan area is Harris County. The metropolitan area had a population in 1990 of 3,322,025. The population was 56 percent Anglo, 18 percent African American, 21 percent Hispanic, and 4 percent other.

The 1996 adult survey (Wallisch 1997) found that 8.7 percent of the Harris County population had ever used powder cocaine, 0.2 percent had used in the past month, 0.6 percent had used in the past year, and 7.8 percent had used but not in the past year. Some 2.7 percent had ever used crack cocaine, 0.0 percent had used in the past month, 0.1 percent had used in the past year, and 2.7 percent had used but not in the past year. Only 1.4 percent had ever used heroin, 0.0 percent had used in the past month or the past year, and 1.4 percent had ever used but not in the past year.

Table 4.11 shows that cocaine is the drug for which most arrestees test

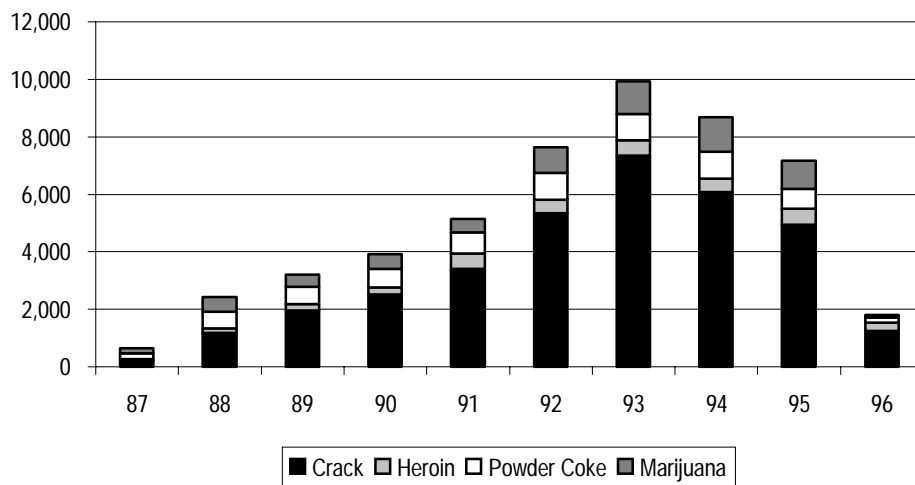
**Table 4.11: Percent of Harris County DUF Arrestees Testing Positive for Drugs: 1991-1996**

	1991	1992	1993	1994	1995	1996
<b>COCAINE</b>						
Males	56%	41%	41%	28%	40%	39%
Females	51%	44%	43%	36%	32%	34%
<b>OPIATES</b>						
Males	3%	3%	2%	3%	5%	8%
Females	4%	4%	5%	6%	3%	4%
<b>MARIJUANA</b>						
Males	17%	24%	24%	23%	30%	28%
Females	8%	12%	15%	13%	20%	24%

**Table 4.12: Prevalence of Use of Powder Cocaine, Crack, and Heroin by Harris County Probationers and Prisoners: 1993-1995**

	Ever Used	Past-Month	Past-Year	Not Past-Year
Cocaine-Probation	27%	6%	5%	17%
Cocaine-Prison	50%	11%	8%	31%
Crack-Probation	16%	7%	4%	6%
Crack-Prison	35%	11%	5%	20%
Heroin-Probation	5%	0%	0%	4%
Heroin-Prison	20%	5%	1%	14%

**Figure 4.10: Primary Drug of Abuse for Clients Entering TCADA-Funded Treatment Programs in Harris County: 1987-1996**



positive in the DUF program and that the percent testing positive for opiates is much lower.

Table 4.12 presents the prevalence rates from the TCADA surveys of probationers and prison inmates from Harris County (Maxwell and Wallisch 1998; Farabee 1994, 1995). Lifetime and past-month use of powder cocaine, crack, and heroin was higher among prisoners than probationers.

Estimating the number of heroin addicts in the Houston area poses significant problems; for, as services have shifted to meet the demand for treating cocaine abusers, there has been a shift away from funding methadone maintenance programs. In 1975, there were three publicly-funded methadone programs; by 1991 there was only one. As the publicly-funded methadone programs ceased operation, the number of private methadone programs increased. In 1997, there were 17 private methadone programs in operation in Harris County.

A total of 1,748 addicts were in treatment in methadone programs in Harris County as of September 1, 1997; 192 (11 percent) were in a program funded by TCADA.

*Among admissions to TCADA-funded programs, cocaine, especially crack cocaine, has been the primary drug of abuse since 1986 in Harris County.*

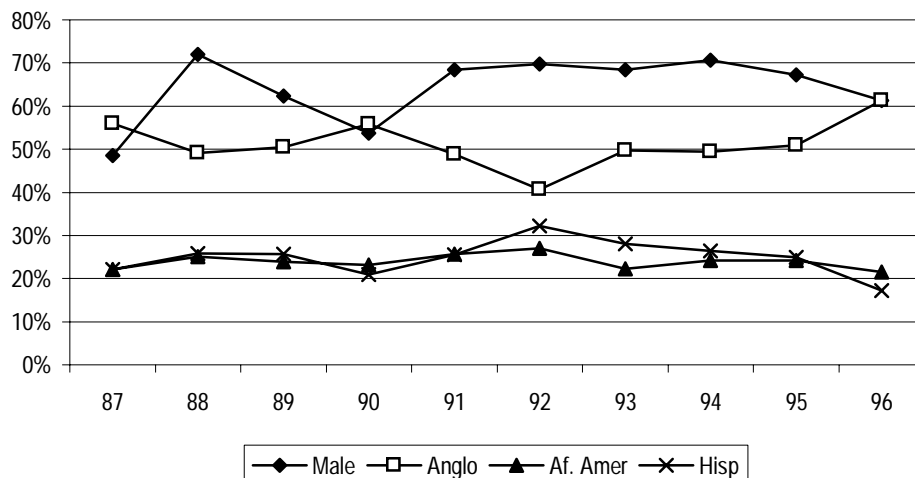
Among admissions to TCADA-funded programs, cocaine, especially crack cocaine, has been the primary drug of abuse since 1986, as Figure 4.10 shows. During this period, 68 percent of all drug admissions have been for crack, while 7 percent have been for heroin, 13 percent for powder cocaine, and 13 percent for marijuana. In 1997, there were 17 TCADA-funded programs in Harris County, and 82 percent of the clients in these programs had a primary diagnosis of cocaine abuse.

Of the heroin addicts admitted to treatment in TCADA-funded programs between 1987 and 1996, 67 percent were male, 50 percent were Anglo, 23 percent were Hispanic, and 27 percent were African American (Figure 4.11). Some 31 percent were involved in the criminal justice system, 21 percent were employed, and average annual income was \$2,538. Average age was 37.9 years, and over time, the addicts have aged; age at admission has increased from 34.4 years in 1987 to 38.7 years in 1996.

A total of 3,740 unduplicated records of TCADA clients are available for analysis, but the CODAP data are not representative of the number of heroin addicts actually in treatment. CODAP only reports the small proportion who entered publicly-funded programs. In addition, the number of injecting drug users who had ever been in treatment in Houston is low, ranging from between 26 and 34 percent (Williams 1992; Maddux et al. 1994).

Table 4.13 compares the characteristics of heroin addicts in TCADA-funded treatment programs with data gathered on injecting drug users who were not in treatment in Houston (Maddux et al. 1994). It shows that injecting drug users who were not in treatment were much more likely to be male, to be African American, and to be younger than addicts in TCADA-

**Figure 4.11: Characteristics of Heroin Addicts at Admission to TCADA-Funded Programs in Harris County: 1987-1996**



**Table 4.13: Comparison of Heroin Addicts in TCADA-Funded Treatment Programs and Injecting Drug Users Not in Treatment in Harris County**

	Heroin Addicts in TCADA Trtmt	Injecting Drug Users Not in Trtmt
Number	3,604	2,674
% Male	67%	85%
% Anglo	50%	25%
% Hispanic	23%	18%
% Af. American	27%	56%
Under 20 Years	1%	5%
20-29 Years	18%	33%
30-39 Years	46%	43%
40-49 Years	28%	16%
50 and over	7%	3%
Not High School Grad	46%	54%
High School Grad	34%	27%
Some college	20%	18%
Living alone	11%	27%
Full-time employed	16%	12%
Part-time employed	5%	37%
Homemaker	2%	1%

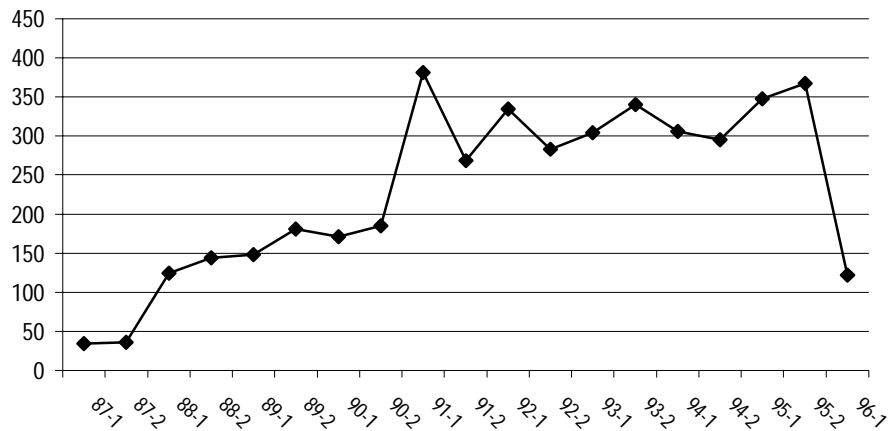
funded programs. They were less likely to be educated but more likely to have part-time jobs. Missing from this comparison are those addicts in private methadone treatment who comprise 89 percent of the methadone clients in the area.

*CODAP only reports those who enter publicly-funded programs. It does not include the 89 percent of addicts in private methadone treatment.*

Adding to the complexity of the heroin scene in Houston have been anecdotal reports over the years of new groups of heroin users.<sup>4</sup> While these new trends do not yet appear in the CODAP data, a 1992 ethnographic study (Kotarba 1992) found three subcultures of new heroin users in Houston. One group consisted of new Hispanic users who participate in “a very intricate, supportive and exclusive heroin subculture...this subculture fosters the concurrent use of heroin with regular, gainful employment.”<sup>5</sup> A second group of new heroin users were African American, with two drug subcultures among these new addicts. One subgroup began heroin use through the traditional heroin subculture in that new members organized their lives around heroin, often as a result of converting from cocaine or crack-cocaine use. A second subgroup existed primarily for the use of cocaine and crack, and they learned to mix heroin with cocaine use to provide variety. The study found that most of the new African American heroin users followed this latter pattern of use. A third group were new Anglo heroin users, and they reflected “the traditional history of heroin use among artists and musicians and seek a nostalgic retrieval of the romantic aspects of heroin use.” The study found this group was less committed to heroin and they were more likely to snort or smoke heroin, rather than to inject it.

Figure 4.12 shows that the number of heroin addicts admitted to treatment increased in 1991 and has remained stable since then.

**Figure 4.12: Number of Clients Admitted to TCADA-Funded Treatment in Harris County with a Primary, Secondary, or Tertiary Problem with Heroin by 6-Month Periods: 1987-1996**



There are an estimated 10,000 heroin addicts who are susceptible or amenable to treatment in TCADA-funded programs in Harris County (Table 4.14). In 1996, 541 heroin addicts received services from these programs, which means that 5 percent of the estimated need is being met.

*In 1996, 541 heroin addicts received services from TCADA-funded programs, which means that 5 percent of the estimated need in Harris County is being met.*

**Table 4.14: Estimated Number of Heroin Addicts Susceptible to Treatment in TCADA-Funded Programs in Harris County**

Total	Missing Estimate	Lower 95% Confidence Level	Upper 95% Confidence Level	Standard Error
10,000	6,260	5,684	6,894	0.0492

However, the reader is cautioned that, unlike the other metropolitan areas discussed in this chapter, a very large proportion of injecting drug users has never been in treatment and most of the heroin addicts in treatment were not reported on CODAP. One is reminded that the basic assumptions of independence and consistency across time and population have not been met with these estimates and the actual number of heroin addicts may well be higher. Thus, the estimate for Houston should be used with caution.

## TARRANT COUNTY

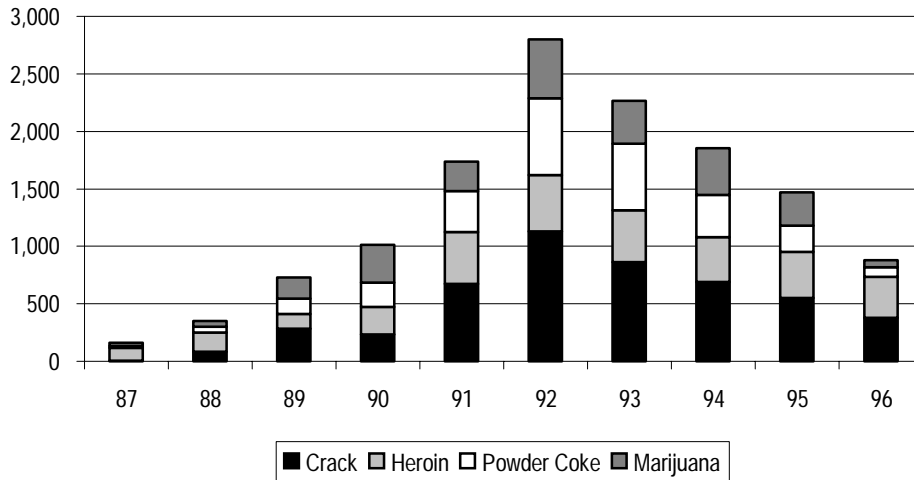
Tarrant County is the largest county in the Fort Worth metropolitan area, which had a population in 1990 of 1,361,034. Some 76 percent of the residents were Anglo, 11 percent were Hispanic, 10 percent were African American, and 3 percent were other.

As Figure 4.13 shows, cocaine has been the primary drug at admission since 1991. Between 1987 and 1996, 37 percent of the drug admissions were for crack cocaine, 24 percent for heroin, 20 percent for powder cocaine, and 19 percent for marijuana.

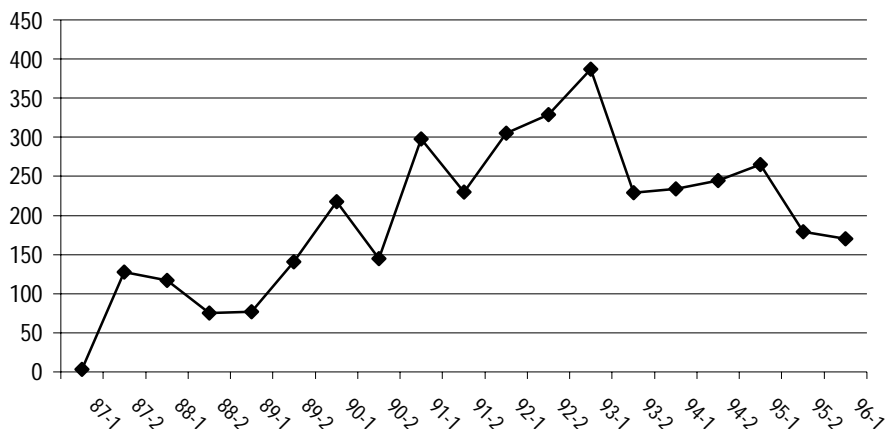
The 1996 Texas Adult Survey of Substance Use (Wallisch 1997) found that 10.5 percent of the adult population in Tarrant County had ever used powder cocaine, 0.6 percent had used it in the past month, 2.0 percent had used it in the past year, and 7.9 percent had ever used it but not in the past year. Some 2.0 percent had ever used crack cocaine, 0.7 percent had used in the past month, 0.2 percent had used in the past year, and 0.9 percent had ever used it but not in the past year. Some 2.2 percent had ever used heroin, 0.0 percent had used it in the past month or past year, and 2.2 percent had ever used it but not in the past year.

The Fort Worth area has had one TCADA-funded methadone program as well as private methadone programs. As of September 1, 1997, there

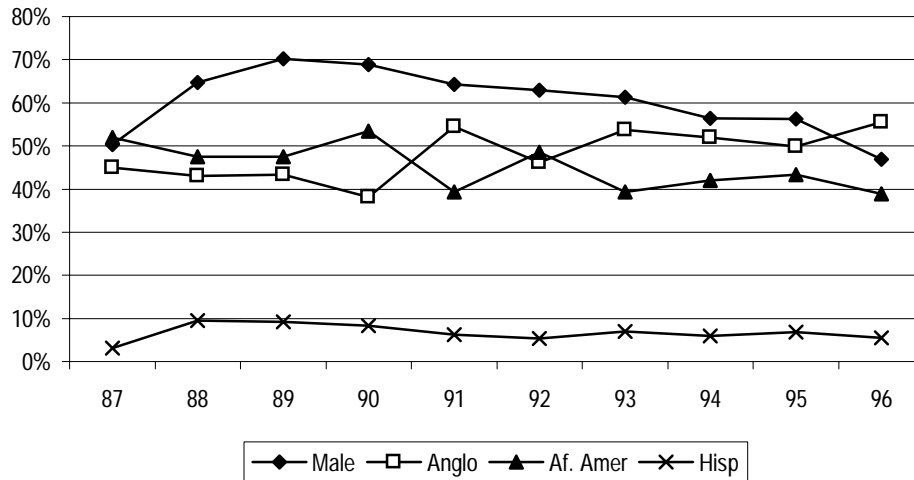
**Figure 4.13: Primary Drug of Abuse for Clients Entering TCADA-Funded Treatment Programs in Tarrant County: 1987-1996**



**Figure 4.14: Number of Clients Admitted to TCADA-Funded Treatment in Tarrant County with a Primary, Secondary, or Tertiary Problem with Heroin by 6-Month Periods: 1987-1996**



**Figure 4.15: Characteristics of Heroin Addicts at Admission to TCADA-Funded Treatment Programs in Tarrant County: 1987-1996**



were a total of 689 addicts on methadone; 192 were in the TCADA-funded program.

Figure 4.14 shows that the number of heroin addicts admitted to TCADA-funded treatment peaked in the first half of 1993.

As Figure 4.15 shows, during the 1987 to 1996 time period, 62 percent of the addicts were male; 49 percent were Anglo, 44 percent were African American, and 7 percent were Hispanic. Some 32 percent were employed, average annual income was \$5,900, and 34 percent were referred from the criminal justice system. Average age was 34.9 years, and the age has increased from 33.5 years in 1987 to 36.3 years in 1996.

There are an estimated 6,812 heroin addicts in the Fort Worth area who are susceptible or amenable to treatment in TCADA-funded programs (Table 4.15). In comparison, in 1996, 500 heroin addicts received services from TCADA-funded programs, which means only 7.3 percent of the unmet need is being met.

**Table 4.15: Estimated Number of Heroin Addicts Susceptible to Treatment in TCADA-Funded Programs in Tarrant County**

	Missing Estimate	Lower 95% Confidence Level	Upper 95% Confidence Level	Standard Error
<b>Total</b>	<b>6,812</b>	<b>3,521</b>	<b>4,335</b>	<b>0.053</b>

## TRAVIS COUNTY

Travis County is the largest county in the Austin metropolitan area, which had a population of 846,227 in 1990. The population is 68 percent Anglo, 20 percent Hispanic, 9 percent African American, and 3 percent other. The Austin area is characterized by a large population of college and university students.

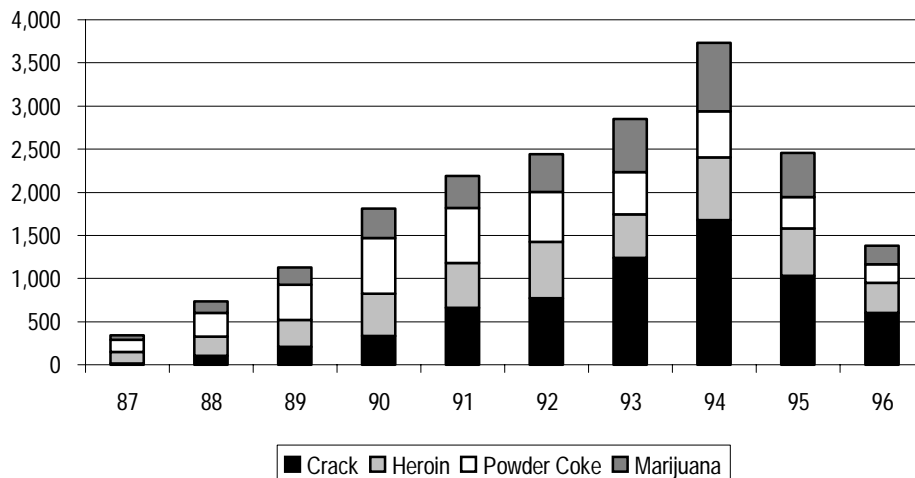
The 1996 Texas Adult Survey of Substance Use (Wallisch 1997) found that 20.3 percent of the adult population in the Travis County had ever used powder cocaine, 1.0 percent had used it in the past month, 2.3 percent had used it in the past year, and 17.0 percent had ever used it but not in the past year. Some 4.0 percent had ever used crack cocaine, 0.0 percent had used in the past month, 0.3 percent had used in the past year, and 3.8 percent had ever used it but not in the past year. Some 3.8 percent had ever used heroin, 0.0 percent had used it in the past month or past year, and 3.8 percent had ever used it but not in the past year.

As Figure 4.16 shows, the major change in primary drug of abuse has been the increase over the years in admissions for crack cocaine. Between 1987 and 1996, 35 percent of the drug admissions were for crack cocaine, 23 percent were for heroin, 23 percent were for powder cocaine, and 19 percent were for marijuana.

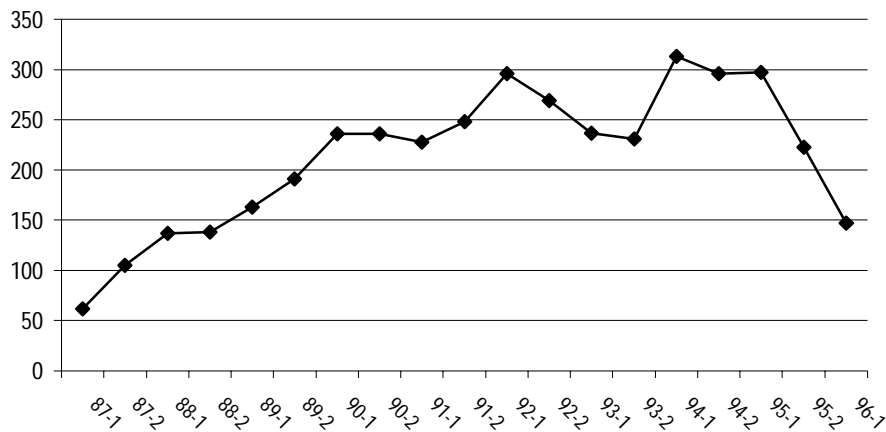
Over the years, there have been two methadone maintenance programs in Travis County. One is TCADA-funded and one is private. As of September 1, 1997, there were 440 addicts in methadone treatment, with 212 in the public program. Unlike the other metropolitan areas discussed in this chapter, approximately 48 percent of the heroin addicts in methadone maintenance were in the public program.

Treatment in Travis County can be characterized as stable in the sense that there have been two large programs offering residential and outpatient

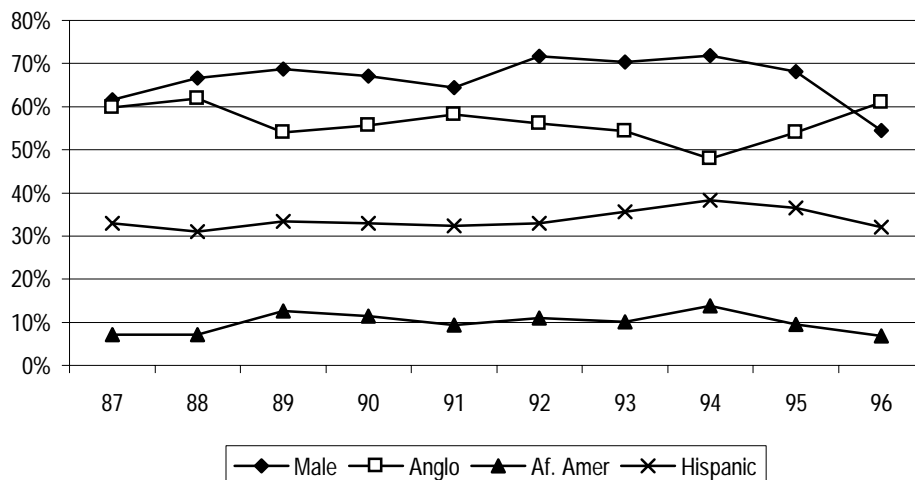
**Figure 4.16: Primary Drug of Abuse for Clients Entering TCADA-Funded Treatment Programs in Travis County: 1987-1996**



**Figure 4.17: Number of Clients Admitted to TCADA-Funded Programs in Travis County with a Primary, Secondary, or Tertiary Problem with Heroin by 6-Month Period: 1987-1996**



**Figure 4.18: Characteristics of Heroin Addicts at Admission to TCADA-Funded Treatment Programs in Travis County: 1987-1996**



***In 1996, 465 heroin addicts received services from public programs, which means 9 percent of the need is being met in Travis County.***

services in operation for a number of years with no major program openings or closings, although the number of heroin addicts admitted to TCADA-funded treatment increased until 1995 (Figure 4.17), when funding re-allocations and program issues forced changes in the availability of services.

Of the heroin addicts admitted to TCADA-funded services in Travis County, 68 percent were male; 55 percent were Anglo, 34 percent were Hispanic, and 11 percent were African American. As Figure 4.18 shows, the characteristics have not changed over time. Some 22 percent were employed, average annual income was \$5,597, and 29 percent were referred from the criminal justice system. The average age was 35.8 years.

There are an estimated 5,047 heroin addicts in Travis County who are amenable or susceptible to treatment in TCADA-funded programs (Table

4.16). In 1996, 465 heroin addicts received services from these programs, which means 9 percent of the need is being met.

**Table 4.16: Estimated Number of Heroin Addicts Susceptible to Treatment in TCADA-Funded Programs in Travis County**

	Missing Estimate	Lower 95% Confidence Level	Upper 95% Confidence Level	Standard Error
<b>Total</b>	<b>5,047</b>	<b>2,043</b>	<b>2,494</b>	<b>0.051</b>

## STATEWIDE ESTIMATES AND CONCLUSIONS

*There could be up to 50,482 addicts for whom TCADA should be planning treatment services.*

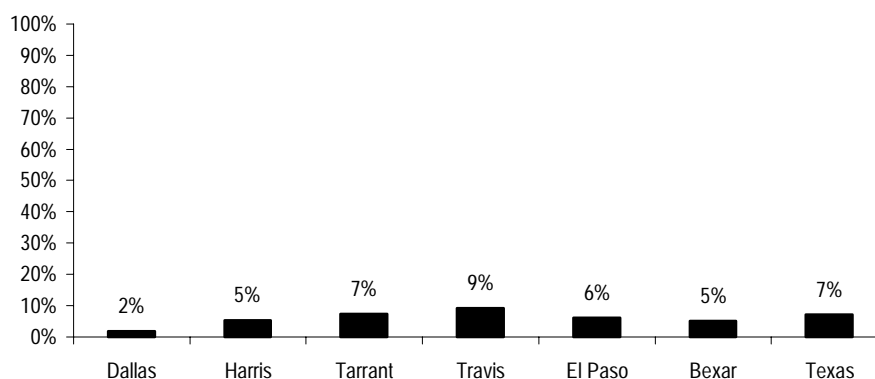
A total of 27,610 unduplicated records were analyzed resulting in an estimate of 22,872 unseen heroin addicts in Texas who are susceptible to treatment in TCADA-funded programs (Table 4.17). This means there could be up to 50,482 addicts for whom TCADA should be planning treatment services.

Figure 4.19 shows the percent of need being met in each of the metropolitan areas and statewide by dividing the number of clients treated in 1996 in TCADA-funded programs by the estimated number of heroin addicts who would enter treatment in such programs if services were available.

**Table 4.17: Estimated Number of Heroin Addicts Statewide and in Six Counties Susceptible to Treatment in TCADA-Funded Programs**

	Total	Missing Estimate	Lower 95% Confidence Level	Upper 95% Confidence Level	Standard Error
Statewide	50,482	22,872	22,213	23,551	0.015
Bexar	8,936	3,156	2,966	3,357	0.0316
Dallas	14,333	10,205	9,207	11,313	0.0525
El Paso	5,740	2,641	2,419	2,883	0.0448
Harris	10,000	6,260	5,684	6,894	0.0492
Tarrant	6,812	3,907	3,521	4,335	0.053
Travis	5,047	2,257	2,043	2,494	0.051

**Figure 4.19. Percentage of Need for Treatment for Heroin Addicts Currently Being Met by TCADA-Funded Programs: 1996**



## METHODOLOGICAL CONCLUSIONS

*Where the programs had been stable and provided services to most of the indigent heroin addicts in an area, the estimates were better than in areas where addicts were unserved or were primarily served in private programs.*

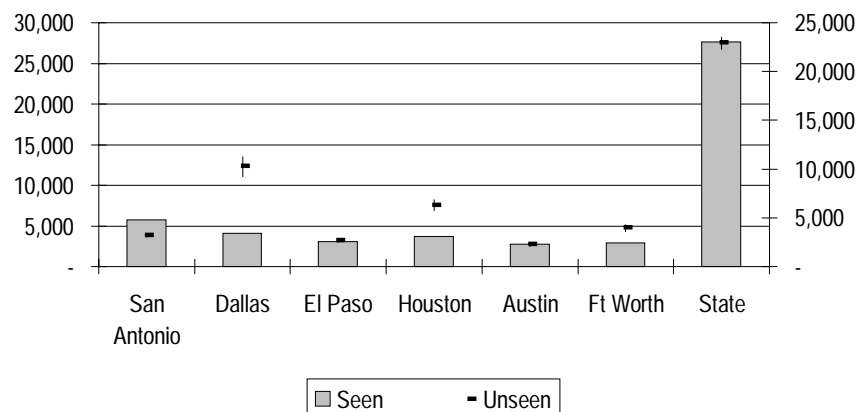
This report has made a contribution to the goal of improving the methodologies for estimating the size of a hidden population. However, this estimation method has limitations, and using datasets from different metropolitan areas has shown the strengths and weaknesses of the technique. The most important finding is that the analyst must understand the nature of heroin addiction and the drug use patterns in each area. Ethnographic and epidemiological studies helped explain patterns of use, and descriptive statistics on clients entering treatment showed demographic changes.

Another factor was the extent of coverage by TCADA-funded programs. Where the programs had been stable and provided services to most of the indigent heroin addicts in an area, the assumption of independence was met and the estimates were better than in areas where addicts were unserved or were primarily served in private programs.

The largest problem arose in meeting the assumption of consistency over time and population. In areas such as San Antonio and El Paso, where most drug abusers are heroin addicts, there was consistency. This condition was not met in areas where the crack epidemic dominated the drug scene, especially in Dallas and Houston. In Austin, although crack was the predominant illicit drug, the fact that the TCADA-funded program served nearly half of the addicts in methadone treatment provided more consistency, and hence, a better estimate.

To demonstrate the impact of the violation of these assumptions, the number of “seen” heroin addicts in the CODAP dataset was compared to the estimated number of “unseen” addicts. Figure 4.20 displays the number seen in a column format, and the estimated number of unseen addicts and the upper and lower estimates of the number of unseen addicts on a “High-Low” chart. As Figure 4.20 shows, in those areas where the assumptions were met, the number “seen” was greater than the number “unseen.” This also occurred at the state level, where the overall size of the population provided stability.

Figure 4.20: Comparison of Number of Seen Addicts in CODAP and Estimated Number of Unseen Addicts



One of the criteria which can be used in judging the practicality of an estimate can be how close are the “seen” and “unseen” numbers. In those instances where there is a large difference, questions should be raised about violation of the assumptions, especially consistency across time and population.

In summary, the techniques and data used in this dissertation have provided Texas with estimates which have not been previously available. However, caution should be exercised in making policy decisions based on these numbers if the basic assumptions have not been met, particularly if the difference between treatment capacity and unmet need is small. With the large gap between currently available resources and need in Texas, the lack of precision in some of the local estimates is not as critical. The capture-recapture methodology should be repeated as resources become available to provide additional treatment sources so that the number of “seen” clients increases and better estimates can be made of the number of “unseen” clients.

## **Endnotes**

- <sup>1</sup> The 1990 Census is used because it is the mid-point of the time period analyzed in this study.
- <sup>2</sup> Five percent of the clients in the private program had also been in the TCADA-funded programs in Bexar County at some point in their treatment careers.
- <sup>3</sup> Information on the VA clinic is not included because this clinic does not report to the State.
- <sup>4</sup> See TCADA’s annual *Current Trends in Substance Use* for reports on drug trends in the Houston area.
- <sup>5</sup> J. A. Kotarba, *The Houston New Heroin Users Project: A First Report*. (Houston, TX: unpublished report for the Office of National Drug Control Policy, 1992).



# Bibliography

- Allison, M. et al. *Treatment Process in Methadone, Residential and Outpatient Drug Free Programs*. Rockville, MD: National Institute on Drug Abuse, 1985.
- American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders: DSM-III-R*. Washington, DC: American Psychiatric Association, 1987.
- Ball, J. C. et al. "Reducing the Risk of AIDS through Methadone Maintenance Treatment." *Journal of Health and Social Behavior* 29 (1988): 214-226.
- Barnes, S. et al. *Michigan Heroin Prevalence Study, 1994*. Detroit, MI: Wayne State University, 1995.
- Bencivengo, M. "Substance Abuse Trends in Philadelphia." *Epidemiologic Trends in Drug Abuse, Proceedings of the Community Epidemiology Work Group June 1996*. Rockville, MD: National Institute on Drug Abuse, 1996.
- Beschner, G. M. and E. I. Bovellev. "Life with Heroin: Voices of Experience." In *Life with Heroin: Voices from the Inner City*, edited by B. Hanson et al. Lexington, MA: Lexington, 1985.
- Beschner, G. M. and J. M. Walters. "Just Another Habit? The Heroin Users; Perspective." In *Life with Heroin: Voices from the Inner City*, edited by B. Hanson et al. Lexington, MA: Lexington, 1985.
- Bishop, Y. M. M. et al. *Discrete Multivariate Analysis: Theory and Practice*. Cambridge, MA: MIT Press, 1975.
- Bonett, D. G. *A Linear Model for Estimating the Size of a Closed Population*. Ph.D. diss., University of California, Los Angeles, 1983.
- Brecht, M. L. and T. D. Wickens. "Application of Multiple-Capture Methods for Estimating Drug Use Prevalence." *Journal of Drug Issues* 23 (1993): 229-250.
- Brown, B. S. and G. M. Beschner. *Handbook on Risk of AIDS: Injection Drug Users and Sexual Partners*. Westport, CT: Greenwood Press, 1993.
- Carlson, K. "Heroin, Hassle, and Treatment: The Importance of Perceptual Differences." *Addictive Diseases* 2, 4 (1976): 569-584.
- Carroll, K. M. and B. J. Rounsaville. "Contrast of Treatment-Seeking and Untreated Cocaine Abusers." *Archives of General Psychiatry* 49 (1992): 464-471.
- Clark, T. "Substance Abuse Trends in Boston," In *Epidemiologic Trends in Drug Abuse, Proceedings of the Community Epidemiology Work Group June 1996*. Rockville, MD: National Institute on Drug Abuse, 1996.

- Comprehensive Care Corporation. *Evaluation of Treatment Outcome*. Irvine, CA: Comprehensive Care Corp., 1988.
- Cunningham, J. A. et al. "Barriers to Treatment: Why Alcohol and Drug Abusers Delay or Never Seek Treatment." *Addictive Behaviors* 18 (1993): 347-353.
- Dolan, Kate et al. *Bleach is Easier to Obtain but Inmates are Still at Risk of Infection in New South Wales Prisons*. Sydney: National Drug and Alcohol Research Centre, 1996.
- Dole, V. P. "Implications of Methadone Maintenance for Theories of Narcotic Addiction." *Journal of the American Medical Association* 215, 7 (1988):1131-1134.
- Doscher, M. L. and J. A. Woodward. "Estimating the Size of Subpopulations of Heroin Users: Applications of Log-Linear Models to Capture/Recapture Sampling." *International Journal of the Addictions* 18, 2 (1983): 167-182.
- Farabee, David. *Substance Use Among Male Inmates Entering the Texas Department of Criminal Justice-Institutional Division, 1993*. Austin, TX: Texas Commission on Alcohol and Drug Abuse, 1994.
- Farabee, David. *Substance Use Among Female Inmates Entering the Texas Department of Criminal Justice-Institutional Division, 1994*. Austin, TX: Texas Commission on Alcohol and Drug Abuse, 1995.
- Feldman, H. W. "Ideological Supports to Becoming and Remaining a Heroin Addict." *Journal of Health and Social Behavior* 9 (1968): 131-139.
- Frank, B. et al. "Seeking Truth in Heroin Indicators: The Case of New York City." *Drug and Alcohol Dependence* 3 (1978): 345-358.
- Frank, B. "Substance Abuse Trends in New York City." In *Epidemiologic Trends in Drug Abuse, Proceedings of the Community Epidemiology Work Group June 1996*. Rockville, MD: National Institute on Drug Abuse, 1996.
- Geer, Blanche et al. "Learning the Ropes: Situational Learning in Four Occupational Training Programs." In *Among the Poor: Studies of the Urban Poor*, edited by I. Deutscher and E. Thompson. New York, NY: Basic Books, 1968.
- Gerstein, D. R. et al. *Evaluating Recovery Services: The California Drug and Alcohol Treatment Assessment (CALDATA)*. Sacramento, CA: California Department of Alcohol and Drug Programs, 1994.
- Gerstein, D. R. and H. J. Harwood. *Treating Drug Problems-Volume 1*. Washington, DC: National Academy Press, 1990.

- Graeven, D. B. and K. A. Graeven. "Treated and Untreated Addicts: Factors Associated with Participating in Treatment and Cessation of Heroin Use." *Journal of Drug Issues* 13 (1983): 207-218.
- Greenwood, J. A. *Estimating the Number of Narcotics Addicts. Report SCID-TR-3, Bureau of Narcotics and Dangerous Drugs*. Washington, DC: Government Printing Office, October 1971.
- Hanson, B. et al. *Life with Heroin: Voices from the Inner City*. Lexington, MA: Lexington Books, 1985.
- Hartnoll, R. et al. "Estimating the Prevalence of Opioid Dependence." *Lancet* i (1985): 203-205.
- Hoffman, N. G. and P. A. Harrison. *Treatment Outcome: Adult Inpatients Two Years Later*. CATOR Report. St. Paul, MN: Chemical Abuse/Addiction Treatment Outcome Registry, Ramsey Clinic, 1988.
- Hser, Y. "Data Sources: Problems and Issues." *Journal of Drug Issues* 23, 2 (1993): 217-228.
- Hser, Y. "Population Estimates of Intravenous Drug Users and HIV Infection in Los Angeles County." *International Journal of the Addictions* 28, 8 (1993): 695-709.
- Hser, Y. "Prevalence Estimation: Summary of Common Problems and Practical Solutions." *Journal of Drug Issues* 23, 3 (1993): 335-343.
- Hser, Y. et al. "Techniques for the Estimation of Illicit Drug-Use Prevalence: An Overview of Relevant Issues." *National Institute of Justice Research Report*, NCJ 133786. Washington, DC, 1992.
- Hubbard, R. L. et al. *Drug Abuse Treatment: A National Study of Effectiveness*. Chapel Hill, NC: University of North Carolina Press, 1989.
- Hunt, D. E. et al. "'It Takes Your Heart': The Image of Methadone Maintenance in the Addict World and Its Effect on Recruitment into Treatment." *International Journal of the Addictions* 20, 11 & 12 (1985-1986): 1751-1771.
- Hunt, L. G. "Prevalence of Active Heroin Use in the United States." In *The Epidemiology of Heroin and Other Narcotics*, edited by J. D. Rittenhouse. Rockville, MD: National Institute on Drug Abuse, 1977.
- Illinois Department of Alcoholism and Substance Abuse. *Illinois Drug Abuse Prevalence Estimation Study: Heroin, Cocaine, Injecting Drug Users, 1996*. Chicago, IL: Illinois Department of Alcoholism and Substance Abuse, Needs Assessment Office, 1997.
- Johnson, J. and M. Williams. "Frequency Modulation as an Explanation of Common Patterns of Intravenous Cocaine-Amphetamine Use." In *Community-Based AIDS Prevention-Studies of Intravenous Drug Users and Their Sexual Partners: Proceedings of the First Annual NADR Meeting*. Rockville, MD: National Institute on Drug Abuse, 1989.

- Kehoe, L. et al. "Estimates of the Number of Injecting Drug Users in a Defined Area." *Australian Journal of Public Health* 16, 3 (1992): 232-7.
- Kleyn, J. and E. S. Lake. "Factors Associated with Willingness to Enter Drug Treatment: Some Implications for Policy." *AIDS and Public Policy Journal* 5 (1990): 112-116.
- Klingemann, H. K. "The Motivation for Change from Problem Alcohol and Heroin Users." *Journal of Addiction* 86 (1991): 727-744.
- Korf, D. J. et al. "Estimating the Number of Heroin Users: A Review of Methods and Empirical Findings from the Netherlands." *International Journal of the Addictions* 29, 11 (1994): 1393-1417.
- Kotarba, J. *The Houston New Heroin Users Project: A First Report*. Houston, TX: Unpublished report for the Office of National Drug Control Policy, 1992.
- Larson, A. et al. "Indirect Estimates of Hidden Populations." *Social Science and Medicine* 39, 6 (Sept. 15, 1994): 823-831.
- Liebman, J. et al. "Injection Drug Users, Drug Treatment, and HIV Risk Behavior." *Handbook on Risk of AIDS: Injection Drug Users and Sexual Partners*, edited by B. S. Brown and G. M. Beschner. Westport, CT: Greenwood Press, 1993.
- Lindesmith, A. *Opiate Addiction*. Bloomington, IN: Principia Press, 1947.
- Maddux, J. F. and D. P. Desmond. *Careers of Opioid Users*. New York, NY: Praeger, 1981.
- Maddux, J. F. et al. "Illicit Drug Injectors in Three Texas Cities." *International Journal of the Addictions* 29, 2 (1994): 179-194.
- Mastro, T. D. et al. "Estimating the Number of HIV-Infected Injection Drug Users in Bangkok: A Capture-Recapture Method." *American Journal of Public Health* 84, 7 (1994): 1074-1099.
- Maxwell, J. C. *Current Trends in Drug Abuse: June 1997*. Austin, TX: Texas Commission on Alcohol and Drug Abuse, 1997.
- Maxwell, J. C. *Heroin Abuse Trends in Texas and Results of the 1994 Survey of Methadone Programs*. Austin, TX: Texas Commission on Alcohol and Drug Abuse, 1994.
- Maxwell, J. C. *Methadone in Texas: Analysis of Treatment, Arrest, and Overdose Data*. Austin, TX: Texas Commission on Alcohol and Drug Abuse, 1996.
- Maxwell, J. C. et al. *Substance Abuse Treatment in Texas, 1975-1991*. Austin, TX: Texas Commission on Alcohol and Drug Abuse, 1992.

Heroin Addicts in Texas: the Nature and Size of a Hidden Population

- Maxwell, J. C. "Substance Abuse Trends in Texas." *Epidemiologic Trends in Drug Abuse, Proceedings of the Community Epidemiology Work Group December 1994*, Rockville, MD: National Institute on Drug Abuse, 1994.
- Maxwell, J. C. "Substance Abuse Trends in Texas." *Epidemiologic Trends in Drug Abuse, Proceedings of the Community Epidemiology Work Group June 1994*, Rockville, MD: National Institute on Drug Abuse, 1994.
- Maxwell, J. C. "Substance Abuse Trends in Texas." *Epidemiologic Trends in Drug Abuse, Proceedings of the Community Epidemiology Work Group December 1994*, Rockville, MD: National Institute on Drug Abuse, 1995.
- Maxwell, J. C. "Substance Abuse Trends in Texas." *Epidemiologic Trends in Drug Abuse, Proceedings of the Community Epidemiology Work Group June 1995*, Rockville, MD: National Institute on Drug Abuse, 1995.
- Maxwell, J. C. "Substance Abuse Trends in Texas." *Epidemiologic Trends in Drug Abuse, Proceedings of the Community Epidemiology Work Group December 1995*, Rockville, MD: National Institute on Drug Abuse, 1996.
- Maxwell, J. C. "Substance Abuse Trends in Texas." *Epidemiologic Trends in Drug Abuse, Proceedings of the Community Epidemiology Work Group June 1996*, Rockville, MD: National Institute on Drug Abuse, 1996.
- Maxwell, J. C. "Substance Abuse Trends in Texas." *Epidemiologic Trends in Drug Abuse, Proceedings of the Community Epidemiology Work Group December 1996*, Rockville, MD: National Institute on Drug Abuse, 1997.
- Maxwell, J. C. *The Nature and Extent of Heroin Addiction in Texas: A Quantitative and Qualitative Study* diss., The University of Texas at Austin, 1997.
- Maxwell, J. C. and Wallisch, L.S. *Substance Use and Crime Among Probationers in Texas Counties* Austin, TX: Texas Commission on Alcohol and Drug Abuse, 1998.
- McLellan, A. T. et al. "Can the Outcomes Research Literature Inform the Search for Quality Indicators in Substance Abuse Treatment?" *Managing Managed Care : Quality Improvement in Behavioral Health* Washington, DC: National Academy Press, 1997.
- National Institute on Drug Abuse. *Drug Services Research Survey Phase I (DSRS)*, Rockville, MD: National Institute on Drug Abuse, 1992.
- Newmeyer, J. A. "The Prevalence of Drug Use in San Francisco in 1987." *Journal of Psychoactive Drugs* 20:2 (April-June 1988): 185-189.
- Nurco, D. and J. Shaffer. "Types and Characteristics of Addicts in the Community." *Drug and Alcohol Dependence* (1982): 43-78.

- Power, R. et al. "Help-Seeking Among Illicit Drug Users: Some Differences Between a Treatment and Nontreatment Sample." *International Journal of the Addictions* 27, 8 (1992): 887-904.
- Ramos, R. *An Ethnographic Study of Heroin Abuse by Mexican Americans in San Antonio, Texas*. Austin, TX: Texas Commission on Alcohol and Drug Abuse, June 1995.
- Ramos, R. *Black Tar Heroin Use in Three Southwestern Cities*. Rockville, MD: National Institute on Drug Abuse, 1990.
- Ramos, R. "Chicano Intravenous Drug Users." In *The Collection and Interpretation of Data from Hidden Populations*, edited by E. Lambert and W. Weibel. Rockville, MD: National Institute on Drug Abuse, 1990.
- Ramos, R. *An Ethnographic Comparison of the Mexican American Drug Culture in El Paso, Texas: 1987 to 1997*. Austin, TX: Texas Commission on Alcohol and Drug Abuse, 1998.
- Ross, M. W. et al. "A Comparison of Drug Use and HIV Infection Risk Behavior between Injecting Drug Users Currently in Treatment, Previously in Treatment, and Never in Treatment." *Journal of Acquired Immune Deficiency Syndromes* 6 (1993): 518-528.
- Rounsaville, B. and H. Kleber. "Untreated Opiate Addicts-How Do They Differ From Those Seeking Treatment?" *Arch. General Psychiatry* 42 (1985): 1072-1077.
- Schutz, C. G. et al. "Suspected Determinants of Enrollment into Detoxification and Methadone Maintenance Treatment Among Injecting Drug Users." *Drug and Alcohol Dependence*. 36 (1994): 129-1138.
- Sells, S. B. *Studies of the Effectiveness of Treatment for Drug Abuse, Volume 1: Evaluation of Treatments*. Cambridge, MA: Ballinger, 1974.
- Sells, S. B. *Studies of the Effectiveness of Treatment for Drug Abuse, Volume 2: Research on Patients, Treatments and Outcomes*. Cambridge, MA: Ballinger, 1974.
- Spence, R. T. Substance Abuse Trends in Texas." In *Epidemiologic Trends in Drug Abuse, Proceedings of the Community Epidemiology Work Group June 1986*. Rockville, MD: National Institute on Drug Abuse, 1986.
- Spencer, B. D. "On the Accuracy of Estimates of Numbers of Intravenous Drug Users." In *AIDS, Sexual Behavior, and Intravenous Drug Use*, edited by C. F. Turner, H. G. Miller, and L. E. Moses. Washington, DC: National Academy Press, 1989.
- Stephens, R. and S. Levine. "The 'Street Addict Role': Implications for Treatment." *Psychiatry* 34 (1971): 351-357.

- Stephens, R. C. et al. "Comparative Effectiveness of NADR Interventions." In *Handbook on Risk of AIDS: Injection Drug Users and Sexual Partners* edited by B. S. Brown and G. M. Beschner. Westport, CT: Greenwood Press, 1993.
- Sudman, S. et al. "Sampling Rare and Elusive Populations." *Science* 242 (May 20, 1988): 991-995.
- Sutter, A. G. "The World of the Righteous Dope Fiend." *Issues in Criminology* 2 (1966):177-222.
- Wallisch, L. S. *1996 Texas Survey of Substance Use Among Adults*. Austin, TX: Texas Commission on Alcohol and Drug Abuse, 1997.
- Wallisch, L. S. *1993 Texas Survey of Substance Use Among Adults*. Austin, TX: Texas Commission on Alcohol and Drug Abuse, 1994.
- Watters J. K. and Y. Cheng. "Toward Comprehensive Studies of HIV in Intravenous Drug Users: Issues in Treatment-based and Community-based Samples." In *Longitudinal Studies of HIV Infection in Intravenous Drug Users: Methodological Issues Associated in Natural History Research*, edited by P. Hartsock and S. Genser. Rockville, MD: National Institute on Drug Abuse, 1991.
- Wenger, L. D. and M. Rosenbaum. "Drug Treatment on Demand-Not." *Journal of Psychoactive Drugs* 26, 1 (1994): 1-11.
- Wickens, T. D. *Multiway Contingency Tables Analysis for the Social Sciences*. Hillsdale, NJ: Lawrence Erlbaum, 1989.
- Wickens, T. D. "Quantitative Methods for Estimating the Size of a Drug-Using Population." *Journal of Drug Issues* 23, 2 (1993): 185-216.
- Williams, M. L. *Report of Research Activities, March 1992 to August, 1992 of the Cooperative Agreement to Monitor Community-Based Drug Abuse and HIV Risk Behaviors*. Houston, TX: Affiliated Systems Corporation, 1992.
- Woodward, J. A. et al. "Estimating the Size of a Heroin-Abusing Population Using Multiple-Recapture Census." In *Self-Report Methods of Estimating Drug Use: Meeting Current Challenges to Validity*, edited by B. A. Rouse, N. J. Kozel, L. G. Richards. Rockville, MD: National Institute on Drug Abuse, NIDA Research Monograph 57, 1985.
- Woodward, J. A. et al. *Statistical Analysis of Drug Abuse Indicators: Final Report to the Drug Enforcement Administration and the National Institute on Drug Abuse*. Rockville, MD: National Institute on Drug Abuse, No. RA-ND-86-2, 1987.
- Woodward, J. A. et al. "Construct Validity of Heroin Abuse Estimators." *International Journal of the Addictions* 19 (1984): 93-117.

Zule, W. A. "An Ethnographic Study of HIV Risk Behaviors Among Intravenous Drug Users." M.P.H. thesis. Houston, TX: School of Public Health, University of Texas Health Science Center at Houston, 1991.

Zule, W. A. *Intravenous Drug Use in Bexar County, Texas 1990: Trends, Prevalence, and Characteristics of Users*. San Antonio, TX: University of Texas Health Science Center at San Antonio, 1990.

Zule, W. A. "The Role of Substance Abuse Treatment in Preventing Human Immunodeficiency Virus Transmission Among Injecting Drug Users." Ph.D. diss., School of Public Health, University of Texas Health Science Center at Houston, 1996.