The Response of Drug Injection Behavior to Local Heroin Prices and Prevalence of AIDS and Hepatitis

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Abstract

Using 1990-1997 data on arrestees from 24 major U.S. cities, this study measures the effects of heroin prices and local AIDS and Hepatitis C prevalence on drug injection participation. Results from several different probit regression model specifications show that increases in heroin price and AIDS prevalence lead to a significant decrease in the number of people who choose to inject drugs. This negative relationship is not found with respect to Hepatitis C prevalence.

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1. Introduction

Injecting drug users have been faced with many new risks over the past two decades. Not only is there a risk of criminal prosecution for the use of illegal substances, but there is also the risk of contracting deadly infectious diseases, a far more devastating result. According to the Center for Disease Control, approximately thirty-six percent of AIDS cases are injection-related, making injecting drug users the second highest AIDS risk group. Meanwhile, injecting drug users constitute over fifty percent of the total cases of Hepatitis C in the United States. Although Hepatitis C has gone relatively unnoticed compared to HIV and AIDS, it is no less alarming. CDC officials predict that deaths from Hepatitis C are likely to triple within the next ten years. Unlike HIV, Hepatitis C is not easily sexually transmitted, making injecting drug users the biggest risk group for the disease.

The purpose of this paper is to study the effects of both the explicit price of the drug and the non-monetary costs of injecting, as measured by risk of infection with AIDS and Hepatitis C, on the decision to inject drugs. The implications of this study are important for both drug enforcement and disease control policy. Since the primary goal of drug enforcement is to decrease the use of illicit drugs by increasing their price, it is important to know how responsive to price the demand for drugs is. There have been several studies of the relationship between drug prices and consumption, but none of these studies focused on drug injection behavior. Most of the previous research on illicit drug use restricts attention to the monetary cost and risk of criminal prosecution of using a specific drug.

The primary goal of disease control is to prevent the spread of infectious diseases. If perceived risk of infection impacts injection behavior, an unintended consequence of policies that reduce the incidence of infectious disease is increasing drug injection. Previous studies have examined the effects of AIDS prevalence on condom use and pregnancy and abortion rates. However, exposure to AIDS from heterosexual sex represents a relatively small percentage of the total AIDS cases in the U.S. It seems logical to study a group of people with a far greater risk of contracting AIDS.

The remainder of this paper is organized as follows. Section 2 reviews previous literature that is relevant to this study. Section 3 discusses the data used in the analysis. Section 4 describes the methods and model specifications used in the study. Section 5 presents the results and section 6 provides concluding remarks.

2. Literature Review

This study combines aspects from two different fields of previous research. The first field attempts to measure the effects of price and drug policy variables on the consumption of illicit drugs. Using various estimation techniques, previous literature has found mixed results regarding the price elasticity of illegal drugs. Grossman and Chaloupka (1998) estimate a price elasticity of cocaine demand for young adults using a rational addiction model with 1976-1985 data from the Monitoring the Future Program and drug price data from the DEA. Their rational addiction model is similar to a normal demand equation but assumes that current cocaine consumption is a function of both past and future consumption. Using two-stage least squares, Grossman and Chaloupka estimate price elasticities ranging from –0.7 to –1.7 for total consumption and from –0.45 to –1.28 for participation in cocaine use.

Saffer and Chaloupka (1999) use a conventional demand equation to estimate effects of drug prices on drug use participation in a pooled set of cross-sectional data from the 1988, 1990 and 1991 National Household Survey on Drug Abuse, which is again matched with DEA drug price data. Using probit regressions, they estimate average past month price elasticities of –0.28 for cocaine and –0.94 for heroin, and average past year price elasticities of –0.44 for cocaine and –0.82 for heroin. Consistent patterns in their estimates of cross-price elasticities provide evidence that illegal substances are complementary in nature.

Farrelly et al. (2000) study the joint demand for cigarettes and marijuana. Using 1990-1996 National Household Survey on Drug Abuse data, they estimate probits for participation and conditional demand of marijuana and cigarettes for 12 to 20 year-olds. Their two main variables of interest are the probability of arrest for marijuana possession and the price of cigarettes. They estimate probability of arrest elasticities for marijuana participation that range from –0.28 to –0.36 and insignificant cigarette price elasticities.

The second relevant field of previous research examines the effect of perceived risk of infection, measured by disease prevalence, on various behaviors. Philipson (1996) estimates the effect of measles prevalence on the propensity of parents to obtain measles vaccinations for their children. Using logit regressions and individual-level data on vaccinations from the National Health Interview Survey combined with CDC data on state-level measles prevalence, Philipson finds positive and highly significant estimates of prevalence elasticity.

Ahituv, Hotz and Philipson (1996) estimate the effect of local AIDS prevalence on the demand for condoms in 1984, 1986, 1988 and 1990 data from the National Longitudinal Survey of Youth. They find that an increase in local AIDS prevalence significantly increases the propensity to use condoms during sexual intercourse.

Mullahy (1999) studies the effect of perceived risk of getting the flu on the propensity to obtain a flu shot using data from the Health Promotion and Disease Prevention Supplement to the 1991 National Health Interview Survey along with CDC data on state level flu prevalence. The perceived risks of getting the flu are measured by the number of weeks a state reported widespread flu activity during 1989-1990, as well as dummy indicators that the respondent is a health care worker and of self-perceived health status. The independent variable is a binary indicator of whether the individual obtained a flu shot in the past year. Mullahy uses ordinary and two-stage least squares techniques and finds that increases in perceived risks of getting the flu significantly increase the propensity to obtain a flu shot.

3. Data

This study builds on the literature just described. As stated earlier, data limitations have restricted past studies from concentrating on the drug injection decision. Because injecting drug users make up only a small part of the U.S. population, few nationally representative surveys ask specific questions regarding drug injection. This study remedies the problem by using data comprised of arrestees, who are disproportionately likely to inject drugs compared with the U.S. population as a whole.

The primary data used in this study comes from the Drug User Forecast (DUF) Program of the National Institute of Justice (NIJ). The DUF Program was started in 1987 as an effort to monitor levels and trends in drug use among adults and juveniles arrested and booked in 24 major U.S. cities. Arrestees are asked at the time of booking to voluntarily provide information about their drug use through interviews and donations of urine samples. The interview is approximately twenty minutes in length, and all information obtained is confidential and anonymous. Over 80 percent of those approached agree to be interviewed, and about 80 percent of those interviewed agree to provide urine specimens. Because the DUF Program is designed specifically to measure drug use among arrestees, the data cannot be used to make inference about the drug use of the U.S. population as a whole. However, according to Rhodes and McDonald (1991), the population sampled by DUF accounts for at least 90 percent of cocaine and heroin consumed in the U.S. because the vast majority of the total consumption of these drugs is by individuals who enter the criminal justice system. Thus, price responsiveness among the U.S. population as a whole is likely to be similar to that estimated by this study.

Several restrictions are placed on the DUF Program data to generate the sample analyzed here. First, because of limitations in availability of data on AIDS prevalence rates, the sample is restricted to the years 1990 through 1997. Second, the DUF Program data contains several inconsistencies regarding the age ranges of respondents coded as juveniles and adults. Between the years 1990 and 1997, the maximum age of respondents coded as juveniles was 24 years old, while the minimum age of respondents coded as adults was 14 years old. Because the age ranges of each category were inconsistent and juveniles were sampled in a limited number of cities, the sample is restricted to respondents coded as adults who were aged 18 and above. The analysis sample consists of 188,548 observations, 135,943 of which are males and 52,605 of which are females.

This study also utilizes annual average city-level cocaine and heroin prices calculated from the System to Retrieve Information from Drug Evidence (STRIDE) data set of the Drug Enforcement Agency (DEA). STRIDE contains information on the total cost, weight and purity of illicit drugs purchased by undercover DEA agents, as well as the date and location of purchase. Drug prices data are merged to each DUF observation based on the year the data was collected and the city in which the arrestee was booked. The average price is then converted into real 1997 dollars using the Consumer Price Index.

Two issues must be addressed when calculating city-level prices using individual observations from STRIDE. First, several DUF cities have an insufficient number of STRIDE observations in certain years to calculate an average annual price. Past studies have remedied this inconvenience by aggregating all of the price observations in a state, and using state-level prices for those cities with an insufficient number of observations. Using this technique is likely to introduce measurement error, as the price level in a particular city is likely to be different from that of the state as a whole. Since the supply of illicit drugs is higher in highly populated cities, using state-level prices to estimate the price in a large city will most likely overstate the actual price in that city.

We therefore opt for an alternative technique to estimate prices for these problem cities. According to Caulkins (1994), the two major geographic determinants of illegal drug prices are population size and distance from point of entry of the drug into the U.S. For this reason, we use price observations from similar-sized cities in the same census division to calculate an estimate of average cocaine and heroin price in cities with inadequate price observations.

The second issue that must be addressed when using drug price data from STRIDE involves calculating the standardized price per pure weight of each drug purchase before averaging within cities and years. If total cost increased in proportion to the increase in pure weight, we could construct the standardized price as total cost divided by the product of weight and purity. However, as in markets for legal goods, there exists a quantity discount in the purchasing of illicit drugs. A second problem in this method of computation arises because the buyer has imperfect information about the actual purity of the drug. Caulkins (1994) argues that the standardized price is not a function of the actual purity of the drug, but rather the buyer's expected purity of the drug. This study implements the Expected Purity Hypothesis outlined in Caulkins (1994), which uses two stage least squares to calculate an adjusted standardized price. In the first stage, the log of purity is regressed on the log of weight and dummy variables for year and city, and the estimated coefficients are used to generate a predicted purity for each price observation. The second stage regresses the log of total purchase cost on the log of weight, the log of predicted purity, and dummy variables for year and city. Because no instruments are used in the first stage, the second stage model is identified by restricting the coefficient on log predicted purity to equal the coefficient on log weight. This coefficient β is then used along with each observation's total cost, weight and predicted purity in the computation of a standardized price as follows:

$$\text{Adjusted Price per Pure Gram} = \frac{TotalCost}{\left(\hat{P}urity \times Weight\right)^{\beta}}$$

In our data β equals approximately 0.8 < 1, and is thus the quantity discount factor showing the non-linear relationship between expected pure weight and total cost. The adjusted price per pure gram for each observation is then averaged by year and location.

Metropolitan area data on AIDS prevalence rates was obtained from various issues of the CDC's *HIV/AIDS Surveillance Reports*. These reports, first published in 1990, contain information on the number of cumulative AIDS case reports as well as yearly case reports by state, metropolitan area and several demographic characteristics. Yearly AIDS case rates per 100,000 population are merged to the DUF Program data by year and city.

Data on yearly Hepatitis C case reports was obtained from various issues of the CDC's annual *Summary of Notifiable Diseases*, published as part of the *Morbidity and Mortality Weekly Report*. Because data on Hepatitis is not published by metropolitan area, state-level data is used. Yearly reported cases are converted to rates per 100,000 population using U.S. Census Bureau yearly state population estimates. These rates are then merged to the DUF Program data by year and state.

4. Methods

This paper focuses on the decision to inject drugs in the past six months, which is self-reported by the arrestee at the time of interview. Six specifications of the model are estimated using probit regression techniques. Each model specification includes age and its square, years of education and its square, self-reported legal and illegal income in 1997 dollars, a dichotomous variable signifying gender with male equal to one, dichotomous variables indicating race with whites excluded, and dichotomous variables indicating marital status with singles and widowers excluded. Model specification I is

$$\Pr(I > 0) = \Phi(X\beta_1 + P_H\beta_2 + Year\beta_3 + MSA\beta_4), \qquad \text{(I)}$$

where I equals one if the arrestee reports having injected drugs within the past six months and zero otherwise, Φ is the standard normal cumulative density function, X is the vector of demographic variables described above, P_H is equal to the average price of heroin in the given year and city, *Year* is a vector of seven dichotomous variables indicating the year in which the arrestee was booked and interviewed, and *MSA* is a vector of twenty-three dichotomous variables indicating the city in which the arrestee was booked and interviewed.

All six specifications include year indicator variables, and the first five model specifications include the MSA indicator variables. These year and city fixed effects serve an important purpose in the study by controlling for all unobserved differences across time and between cities. These unobserved differences include preferences, attitudes, and levels of drug enforcement and disease prevention, which affect injection behavior as well as the explanatory variables of interest. Leaving these fixed effects out of the model may cause a problem of endogeneity. One intuitive example of this endogeneity rises from the strong correlation between drug enforcement level, average heroin price and past six-month injection participation. If the fixed effects are left out of the model, the effects of the level of enforcement are likely to show up in the estimated coefficient on average heroin price. Since increased drug enforcement will increase the average heroin price, the price coefficient will likely overestimate the actual effect of price on past six month injection participation. Many past studies of the effects of drug price on consumption do not include city or state fixed effects in their model specifications. If the data does not provide enough variation in the price variables within a city or state across time, it may be difficult to identify both the effects of the price variables and the effects specific to a city or state. Because of this problem, some past studies use controls for division or region of the country, or leave out fixed effects completely.

Model specification II includes all of the variables included in the first specification and adds the average price of cocaine as an explanatory variable. The model is

$$\Pr(I > 0) = \Phi(X\beta_5 + P_H\beta_6 + P_C\beta_7 + Year\beta_8 + MSA\beta_9), \qquad \text{(II)}$$

where P_C is the average price of cocaine in 1997 dollars, and all other variables are as described above. The relationship between the price of cocaine and the decision to inject is not entirely clear. Although heroin is by far the most injected illicit drug, cocaine is also sometimes injected. This would imply a negative relationship between the price of cocaine and the decision to inject. Since heroin is the most injected drug, however, the relationship between cocaine price and the dependent variable may reflect the relationship between cocaine and heroin consumption. If heroin and cocaine are complementary in nature, the resulting coefficient on cocaine price may take on a negative value. If heroin and cocaine are substitutes, a positive coefficient on cocaine price may result.

Model specification III adds the AIDS prevalence variable to the second specification. The resulting model is

$$\Pr(I > 0) = \Phi(X\delta_1 + P_H\delta_2 + P_C\delta_3 + LagAIDS\delta_4 + Year\delta_5 + MSA\delta_6), \qquad \text{(III)}$$

where *LagAIDS* is equal to the lagged AIDS rate per 100,000 population in each city and year. The one-year lagged rather than current-year value of the AIDS rate is used for several reasons. The most important reason is that arrestees are interviewed throughout the year. The current year AIDS rate is clearly inappropriate for arrestees interviewed early in the year because it primarily reflects AIDS cases that have yet to be reported. Using the lagged value ensures that our AIDS rate variable reflects AIDS cases that have already been reported, so that the relationship we estimate represents the effects of AIDS on injection behavior rather than vice-versa. Another reason for using the lagged AIDS rate is that it likely takes time for information about increasing or decreasing rates of AIDS to be dispersed throughout the community. Thus, changes in the perceived risk of AIDS infection may not occur concurrently with changes in reported AIDS infection rates, but rather some time after the fact.

Model specification IV builds on the third specification by adding Hepatitis C prevalence rates to the equation:

$$\Pr(I > 0) = \Phi(X\delta_7 + P_H\delta_8 + P_C\delta_9 + LagAIDS\delta_{10} + LagHCV\delta_{11} + Year\delta_{12} + MSA\delta_{13}), \quad \text{(IV)}$$

where *LagHCV* is the lagged Hepatitis C rate per 100,000 population for each respondent's state and year, and all other variables are as described above. The lagged value of reported rates of infection with the Hepatitis C virus was used for the same reasons as described above for AIDS. Because the Hepatitis C prevalence data represent state-level rather than city-level rates, some measurement error that may affect the estimated coefficient on the Hepatitis C rate is possible.

Model Specification V includes all of the variables in the fourth model but adds a measurement of peer group injection rates. The specification is

$$\Pr(I > 0) = \Phi(X\lambda_1 + P_H\lambda_2 + P_C\lambda_3 + LagAIDS\lambda_4 + LagHCV\lambda_5 + Peer\lambda_6 + Year\lambda_7 + MSA\lambda_8) \quad \text{(V)}$$

The peer group measure is the percent of sample individuals interviewed in the same city and year as the respondent, but not including the respondent, that have injected in the past six months. This measure not only varies by year but also within the city depending on whether the respondent reports injecting. This variable is therefore a measure of the extent of drug injection that occurs in the city of residence of the respondent. Because individuals are influenced by their surroundings, one would expect this variable to have a positive coefficient.

In specification VI, the city fixed effects are replaced with fixed effects for the census division. The specification is

$$\Pr(I > 0) = \Phi(X\lambda_9 + P_H\lambda_{10} + P_C\lambda_{11} + LagAIDS\lambda_{12} + LagHCV\lambda_{13} + Peer\lambda_{14} + Year\lambda_{15} + Division\lambda_{16}) \quad \text{(VI)}$$

with *Division* representing a matrix of dichotomous variables indicating the census division of the respondent. As discussed earlier, using division fixed effects as opposed to city fixed effects may lead to endogeneity. Specifically, we would expect to see an increase in the effect of the price variables on the past six-month injection participation decision as compared to those estimated in model V.

5. Results

Table I presents the descriptive statistics for the DUF Program sample. Of the 188,548 observations, ten percent reported injecting drugs in the past six months. The average price of heroin, $972.12, is far greater than that of cocaine, $127.31, and also has more variation. It is important to note the relatively small average Hepatitis C rate of 2.326 per 100,000 population. The average AIDS rate is about 15 times larger. Thus, we would expect the AIDS rate to have a far greater impact on injection behavior. The average age in the sample is a little over 30 years old. Seventy-two percent of the respondents are males, fifty-four percent are black, and twenty-eight percent are white. A little over half of the sample is single, close to seventeen percent are divorced and fourteen percent are married. The average number of years of education is only eleven years, which is not surprising given the selection of the sample. The average legal income in 1997 dollars is $898.33, while the average reported illegal income is $529.25. The means of each of the eight dichotomous year variables are presented to illustrate the distribution of the sample by year. The next page of table 1 presents the means of each of the twenty-four DUF Program data collection site dummy variables. Los Angeles has the most observations with 6.1% and Kansas City has the fewest with 1.5%.

Table 2 presents marginal effects, standard errors and estimated elasticities for the independent variables of interest in each of the six model specifications. All of the elasticities are calculated as the product of the marginal effect and the mean of independent variable divided by the mean of the dependent variable. Specification I estimates a past six-month injection participation heroin price elasticity of –0.095. This implies that as the average price of heroin increases by 10%, past six-month injection participation declines by approximately 1%.

Model specification II estimates the same past six-month injection participation price elasticity of –0.095 for heroin. This specification estimates a positive but insignificant marginal effect of average cocaine price.

Specification III estimates marginal effects that are negative and significant at the 1% level for both average heroin price and lagged AIDS prevalence rate. Once again, the marginal effect of average cocaine price is positive but not significantly different from zero. The elasticity calculated for the lagged AIDS rate implies that a 10% increase in the prevalence of AIDS leads to a 0.8% decrease in past sixth month injection participation. When the AIDS prevalence variable is added to the specification, the heroin price elasticity decreases in magnitude to –0.084.

Specification IV adds lagged Hepatitis C rates to the model. The elasticity for average heroin price again decreases slightly in magnitude to –0.077. The marginal effect of cocaine price goes from positive to negative when Hepatitis C is added, but remains insignificant. The AIDS marginal effect remains negative and significant with very little change. The estimated elasticity for the lagged AIDS rate is again –0.08. The marginal effect estimated for Hepatitis C prevalence is surprisingly positive and significant. The elasticity calculated for Hepatitis C in this specification is 0.01, implying that a 10% increase in last year's Hepatitis C rate leads to a 0.1% increase in past six month injection participation.

Specification V includes the peer group measure. The addition of this variable causes several changes in the previous estimates. Both heroin price and AIDS prevalence marginal effects decrease both in absolute value and in significance, although still significant at the 5% level. This model estimates an elasticity for heroin price of –0.048

and an elasticity for AIDS prevalence of –0.049. The marginal effect of cocaine price on past 6-month injection remains negative as in the previous specification, but is now significant at the 10% level with an estimated elasticity of –0.068. The marginal effect of Hepatitis C prevalence decreases in size and is now significant only at the 10% level, with an estimated elasticity of 0.005. The newly added peer group measure has a positive marginal effect, as expected, and is significant at the 1% level. The elasticity is 0.333, implying that a 10% increase in the proportion of injection drug users in a city increases the probability of past 6-month injection by approximately 3.33%.

Marginal effects for the demographic characteristics estimated from specification V are displayed in table 3. All else equal, males arrestees are less likely to have injected drugs in the past six months than female arrestees by approximately 1.26 percentage points. Injection participation increases with age at a decreasing rate, reaching a maximum at age 45. Participation in past 6-month injection also increases with years of education at a decreasing rate but only to a maximum at 6.6 years of education, after which injection participation decreases with additional years of education. All things equal, black arrestees are less likely to have injected drugs in the past 6-months by 9.6 percentage points and other races are less likely to inject by 2 percentage points. Those arrestees that are married are 1.7 percentage points less likely to inject than singles and widowers, while divorcees are 0.5 percentage points more likely to inject. Past 6-month injection decreases as legal income increases and increases as illegal income increases. The dichotomous year variables show a consistent decrease in the likelihood of past 6-month injection percentage since 1990.

Returning to table 2, model specification VI illustrates the results of using division fixed effects as opposed to city fixed effects. All variables of interest are now significant at the 1% level. As was hypothesized earlier, the heroin price elasticity gets larger, increasing from –0.048 to –0.066. The AIDS prevalence elasticity doubles in size and is now estimated to be –0.096. Both of these results clearly show the bias that is associated with leaving important fixed city-level differences out of the model specification. The elasticity for Hepatitis C prevalence remains positive and jumps to 0.019. Similarly, the elasticity of the peer effect variable jumps from 0.333 to 0.447.

The results from each of these six model specifications imply that there is a positive relationship between the prevalence of Hepatitis C and the decision to inject drugs. In theory, we would expect Hepatitis C prevalence to affect injection behavior similarly to the prevalence of AIDS. We have two theories to potentially explain the positive results for this variable. First, the positive effect of drug injection on the probability of infection with Hepatitis C may be too strong to overcome by simply lagging the value of Hepatitis C infection rates used as an explanatory variable. Thus, the positive results may simply reveal that cities with fewer injecting drug users have lower Hepatitis C rates. The second hypothesis has to do with the nature of the disease itself. Although the CDC estimates that there are between 28,000 and 180,000 new Hepatitis C infections per year, most of those infected with the disease never experience acute symptoms, and therefore the disease goes unnoticed. In some cases it takes up to twenty years before the disease is discovered. It is for this reason that only a small number of Hepatitis C cases are reported each year. Combined with the fact that the attention given to AIDS in the past two decades has overwhelmed the attention given to Hepatitis C, this may lead to the disease having little or no effect on drug injection behavior. Although the results from Hepatitis C data are unexpected, they represent a clear need for disease prevention policy to better inform the drug injecting community of the risks associated with this disease.

6. Conclusions

The various models presented in this paper conclude that higher average heroin prices and higher prevalence of AIDS lead to a significant decrease in the number of people who choose to inject drugs. Although the data used in this study have numerous advantages, there remain several limitations.

First, it is likely that drug injection behavior is affected more by HIV prevalence than by AIDS prevalence. In the past, monitoring the number of AIDS cases reported in the U.S. provided enough information to reflect changes in the prevalence of HIV infection. However, recent advances in the treatment of HIV have slowed the progression of HIV infection into full-blown AIDS. Data on AIDS prevalence no longer gives an accurate representation of HIV infection trends. It is for these reasons that the CDC has only recently required states to report data on both full-blown AIDS and HIV.

Second, it is unlikely that all of the injection behavioral changes caused by AIDS can be measured using an injection participation equation. Injecting drug users are more likely to change dangerous injection habits, such as needle sharing, than to stop injecting all together. To fully understand the impact that AIDS has on the injecting drug community, a study must be conducted measuring the propensity to share needles conditional on injecting drugs. Although some of the early DUF Program surveys ask questions about needle sharing, these data are not available for all years.

Using the DUF Program arrestee data, we estimate past six-month injection participation heroin price elasticities ranging from –0.048 to –0.095. Although these participation elasticities are small compared to elasticities measured in other studies, it is important to remember that these numbers were generated using data from arrestees. The arrestee population is likely to contain individuals that are less willing to change their addictive habits, and therefore price may have a small effect.

We estimate past six-month injection participation elasticities for AIDS prevalence ranging from -0.049 to –0.080. These elasticities, though also small, show the significant negative relationship between AIDS prevalence and injection participation. As stated earlier, these elasticities do not fully describe the effects that AIDS and HIV have on injection behavior. Future studies must make use of the HIV prevalence data that the CDC is starting to collect if we are to fully understand the behavioral changes caused by this disease.

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Table 1 - Descriptive Statistics

	N=188,548	
	Mean	Standard Deviation
Past 6 Month Injection Participation	0.100	0.300
Real Average Heroin Price	$972.12	$571.57
Real Average Cocaine Price	$127.31	$37.84
Lagged AIDS Rate per 100,000	34.992	29.190
Lagged Hepatitis C Rate per 100,000	2.326	5.260
Peer Group Measure	0.088	0.055
Age	30.125	8.603
Male	0.721	0.448
Black	0.542	0.498
White	0.281	0.449
Other Race	0.170	0.376
Married	0.141	0.348
Divorced	0.167	0.373
Single	0.516	0.500
Widowed	0.010	0.101
Living with Boyfriend/Girlfriend	0.165	0.371
Years of Education	11.260	2.166
Real Legal Income	$898.33	$2,468.10
Real Illegal Income	$529.25	$3,133.17
Interview Year Dummy Variables		
Year: 1990	0.114	0.318
Year: 1991	0.128	0.334
Year: 1992	0.129	0.335
Year: 1993	0.119	0.324
Year: 1994	0.116	0.320
Year: 1995	0.133	0.339
Year: 1996	0.132	0.338
Year: 1997	0.130	0.336

Table 2 - Probit Regression of Past 6 month Injection Participation

	Model Specification					
	(I)	(II)	(III)	(IV)	(V)	(VI)
Real Heroin Price	-0.0000098**	-0.0000098**	-0.0000087**	-0.0000079**	-0.0000050*	-0.0000068**
	(0.0000022)	(0.0000022)	(0.0000022)	(0.0000022)	(0.0000023)	(0.0000019)
	[-0.0949]	[-0.0950]	[-0.0841]	[-0.0766]	[-0.0480]	[-0.0660]
Real Cocaine Price	-	0.0000071	0.0000159	-0.0000048	-0.0000537^	0.0000846**
		(0.0000302)	(0.0000303)	(0.0000308)	(0.0000311)	(0.0000254)
		[0.0090]	[0.0202]	[-0.0061]	[-0.0683]	[0.1075]
Lagged AIDS Prevalence Rate	-	-	-0.0002301**	-0.0002285**	-0.0001394*	-0.0002748**
			(0.0000677)	(0.0000677)	(0.0000678)	(0.0000313)
			[-0.0804]	[-0.0798]	[-0.0487]	[-0.0960]
Lagged Hepatitis C Prevelence Rate	-	-	-	0.0004415**	0.0002000^	0.0008125**
				(0.0001048)	(0.0001059)	(0.0001011)
				[0.0103]	[0.0046]	[0.0189]
Peer Group	-	-	-	-	0.3812202**	0.5108184**
					(0.0249614)	(0.0148892)
					[0.3332]	[0.4465]
Fixed Effects	MSA	MSA	MSA	MSA	MSA	Division

Table shows Marginal Effects, Standard Errors in parentheses, Elasticities in brackets.
N=188,548 Arestees aged 18+. All regressions include the demographic variables presented in table 3.
**Significant at the 1% level, *Significant at the 5% level, ^Significant at the 10% level

Table 3 - Demographic Results for Model Specification V

	Marginal Effect	Standard Error
Male	-0.0126212**	(0.0012532)
Age	0.0200283**	(0.0003878)
Age Squared	-0.0002207**	(0.00000549)
Years of Education	0.0091567**	(0.0010715)
Years of Education Squared	-0.0006952**	(0.0000507)
Black	-0.0964634**	(0.0015479)
Other Race	-0.0200256**	(0.001323)
Married	-0.017347**	(0.0013962)
Divorced	0.0055348**	(0.0015217)
Living with BF/GF	-0.000256	(0.0015562)
Real Legal Income	-0.00000433**	(0.0000003)
Real Illegal Income	0.00000463**	(0.0000001)
Year: 1991	-0.0043542^	(0.0023708)
Year: 1992	-0.0107729**	(0.0024775)
Year: 1993	-0.0163519**	(0.0024894)
Year: 1994	-0.0168389**	(0.0036726)
Year: 1995	-0.0259866**	(0.0028864)
Year: 1996	-0.0339577**	(0.0025787)
Year: 1997	-0.0354316**	(0.0025369)

**Significant at the 1% level, *Significant at the 5% level, ^Significant at the 10% level
N=188,548

Table 1 - Descriptive Statistics (continued)

	N=188,548	
	Mean	Standard Deviation
DUF Site Dummy Variables		
Atlanta, GA	0.037	0.188
Birmingham, AL	0.039	0.194
Chicago, IL	0.029	0.169
Cleveland, OH	0.039	0.194
Dallas, TX	0.046	0.209
Denver, CO	0.050	0.217
Detroit, MI	0.033	0.179
Ft. Lauderdale, FL	0.046	0.210
Houston, TX	0.044	0.206
Indianapolis, IN	0.049	0.215
Kansas City, MO	0.015	0.123
Los Angeles, CA	0.061	0.239
Miami, FL	0.025	0.155
New Orleans, LA	0.043	0.203
New York, NY	0.046	0.210
Omaha, NE	0.032	0.175
Philadelphia, PA	0.049	0.216
Phoenix, AZ	0.058	0.234
Portland, OR	0.046	0.210
San Antonio, TX	0.037	0.189
San Diego, CA	0.047	0.211
San Jose, CA	0.047	0.211
St. Louis, MO	0.042	0.200
Washington DC	0.040	0.197