If drug treatment works so well, why are so many drug users in prison?
Preliminary Draft

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A whole array of programs have been developed over the last twenty years that take advantage of two facts (1) a substantial fraction of those arrested for criminal offenses in the United States are users of expensive and dependency creating drugs (2) reducing their drug use leads to large reductions in the individual's crime rates. The list of programs includes drug courts, other forms of diversion from the criminal justice system into treatment, intensive probation supervision, in-prison treatment and coerced abstinence. All these aim to reduce the extent of criminality among those who have already developed drug dependency. Despite this there has been no decline in the incarceration of drug users, both for drug offenses and for other criminal activities; the numbers incarcerated for drug offenses has increased almost every year since 1980 (Caulkins and Chandler, 2007). This is particularly surprising since the number of individuals with expensive illegal drug habits was estimated to have declined in the period 1988-2000, the most recent year for which a published estimate is available (ONDCP, 2001).

Our hypothesis is that there are two principal reasons for the large numbers. First, eligibility criteria, particularly for drug courts, is restricted so that though the various programs are effective and even cost-effective with the clients they recruit they can make little contribution at the population level. Second, as criminally active drug users age the system treats them increasingly harshly for each successive offense; they have longer criminal histories, longer records of unsuccessful treatment and worse employment histories. The result is that they get longer sentences.

Both these matters have to be understood in the context of the changing age structure of the population dependent on expensive drugs, particularly cocaine and heroin. A good deal of our effort so far has gone into that aspect.

Getting offenders into treatment

Drug courts Even though the drug court movement is almost 20 years old and over 2,300 separate programs have been created (Washington Post, July 14, 2009), a 2008 study estimated that only 55,000 drug involved defendants were processed in such courts in the middle of this decade; the same study estimated that over 1 million such defendants entered the criminal justice system each year (Bhati, Roman and Chalfin, 2008).

The small number of enrollees is largely the consequence of eligibility restrictions. "Despite the pervasiveness of the drug treatment court model, drug courts routinely exclude most of the eligible population. A survey of adult drug courts in 2005 (Rossman et al 2008) found that only 12% of drug courts accept clients with any prior violent convictions. Individuals facing a drug charge, even if the seller is drug dependent, are excluded in 70% of courts for misdemeanor sales and 53% of courts for felony sales. Other charges that routinely lead to exclusion include property crimes commonly associated with drug use (theft, fraud, prostitution), young offenders with marijuana charges, and current domestic violence cases (only 20% accept domestic violence cases)." (Bhati, Roman and Chalfin, 2008, p.7). A study of drug courts in six Washington state counties (Cox et al., 2001) found substantial variation in the eligibility requirements. For example in King County, only defendants facing drug possession charges were eligible whereas in Pierce County a long list of property crimes were also eligible.

The few cohort studies of drug users (e.g. Hser et al, 2001; Hser et al, 2006) show that long-term users of cocaine and heroin have accumulated long histories of convictions for property and violent crimes. Thus they are excluded from most drug court programs.

Estimating the potential effect of relaxing eligibility requirements is a major research challenge. The existing findings of effectiveness of course reflect the tight eligibility requirements. Drug courts choose certain clients, and exclude the more serious offenders, in the belief that defendants with longer and more serious criminal histories are likely to do less well in drug courts. They may be correct; without evaluations of the effects with these other client groups, the research strategies for making projections are indeed very speculative.

We propose to examine the findings of evaluations of drug courts with varying strictness in eligibility requirements.

Coerced abstinence, a twenty year crusade of by UCLA's Mark Kleiman (e.g. Kleiman 1997 and 2009), is a program that takes advantage of simple findings from psychology and public policy. A large number of offenders are under community supervision at any one time, whether it be pretrial release, probation, or parole. Because they have been arrested or convicted, the government can subject these individuals to random drug tests and indeed does from time to time.

Coerced abstinence involves making sanctions certain, immediate and short rather than (as is normally the case) random, delayed and long. A small number of studies (Harrell, Cavanagh, and Roman, 1998; Kleiman and Hawken, 2008) have found that such programs have the predicted effects on recidivism but so far efforts to implement them on a large scale have failed

In-prison treatment

Though it is routinely asserted that half of those entering state prisons have substance abuse problems, it is estimated that only 15% actually receive any treatment services while incarcerated. The research on the effects of in-prison treatment is less clear-cut….

Diversion programs

California's Proposition 36 provides the largest instance of diversion from the criminal justice system. Under Prop 36 first or second time drug possession arrestees are subject to a drug abuse assessment, after which, if appropriate, they are placed in a drug treatment program. The assessments consistently suggest that the use of non-criminal penalties has not led to any increase in crime rates, either as a result of higher recidivism or of reduced deterrence.

These findings, if they hold up to more detailed scrutiny, suggests that there are substantial potential gains both in terms of reducing crime and unnecessary incarceration of drug using offenders. The opportunities arise from extending the reach of drug courts to include more serious offenders, implementing coerced abstinence broadly and making better use of in-prison treatment for drug-involved offenders.

Sentencing careers

Our second hypothesis should be easily tested but in fact there is a dearth of studies of sentencing careers, as opposed to criminal careers, and none of their relationship to drug use. The 33 year follow-up study of a cohort of heroin users (Hser et al, 2001) found that the participants continued high levels of criminal activity well into their 40s. 12-year follow-up data on cocaine users is more favorable, though still indicating significant levels of incarceration and criminal offending at 12-year follow-up (Hser, et al. 2006).

This may be an important observation about stasis in the system but its policy implications are less obvious. We think that the offender trajectories of these long-term drug addicts is probably quite stable. That (weakly) suggests that they should not be getting longer sentences but we could hardly argue that there is any crime fighting gain in a sentencing regime in which their drug addiction was a (weakly) mitigating factor.

We then turn to the question of sentencing "careers" of drug involved offenders. One possibility is that the cohort studies of cocaine and heroin users, all associated with Yih-Ing Hser at UCLA, have data on the sentences subjects received at successive convictions.

Aging cohorts of drug users independent of interventions

What is possible by way of interventions with drug users is conditioned on their age. It is well-known that key drug-related risks and social costs vary by age and by the length of drug-using careers. The full implications of this pattern receive surprisingly little attention. In this conference draft, we use data from the TEDS and NTIES datasets to explore this issue further.

One potential consequence bears closer investigation. Over the 1990s, the only systematic estimates of the number of "chronic users" of cocaine and heroin showed steady decline (Office of National Drug Control Policy, 2001). Yet the number of ED admissions and the number of deaths related to these drugs markedly rose. In the case of heroin, it was estimated that the total number of chronic users fell from 1,000,000 in 1990 to 800,000 in 1999 while the number of ED admissions related to heroin more than doubled, from 33,000 to 84,000. Over this same time period, the rate of ED admissions per heroin addict rose from about 3 per hundred to 10 per hundred. This is consistent with a population which, through aging, is increasingly subject to acute health problems (Scott, Thomas, Pollack, and Ray 2007).

Another manifestation may be the decline in crime despite continued high rates of detected crack use. Levitt (2004) argued that the receding of the crack epidemic was a major factor in explaining the decline in black youth homicides in the 1990s, just as the epidemic itself was a principal driver of the rise in the 1980s. In a subsequent article (Fryer, Heaton, Levitt and Murphy, 2005), Levitt and colleagues develop a crack index that summarizes diverse indicators of crack use. The index was flat through most of the 1990s, and the authors conjecture that the decline in homicide, in particular, arose from the creation of property rights in a stabilized market. No direct evidence is offered for this claim of the emergence of property rights.

Given the established fact that male violence declines with age, a simpler compelling hypothesis for the changing linkage between aggregate measures of crack use and homicide may be found in the aging of the crack-using population. This gets no mention in either of the above studies, except for a cursory reference to a conjecture in MacCoun and Reuter (2001).

These contrasting trends in numbers and adverse consequences suggest that the overall number of drug users is just one of several variables that influence the health, employment, and crime consequences of substance use. The age of substance users, the duration of their drug use, and other factors play important role.

Similar insights apply to the supply-side of illicit drug markets. The aging of drug-sellers and the maturing of drug markets may be more important than the overall number of drug-sellers in determining the social impacts of these markets on local communities. Levitt and Venkatesh (2000) used data collected in the early 1990s to examine the young and eager sellers willing to work for low wages in the hope of succeeding to the position of a senior dealer. These sellers may have been replaced by an aging cohort of cocaine-dependent sellers, who are advantaged by

the fact that they take some of their return in the form of reduced price drugs. Youths may no longer be so readily tempted to enter into drug selling rather than completing school.

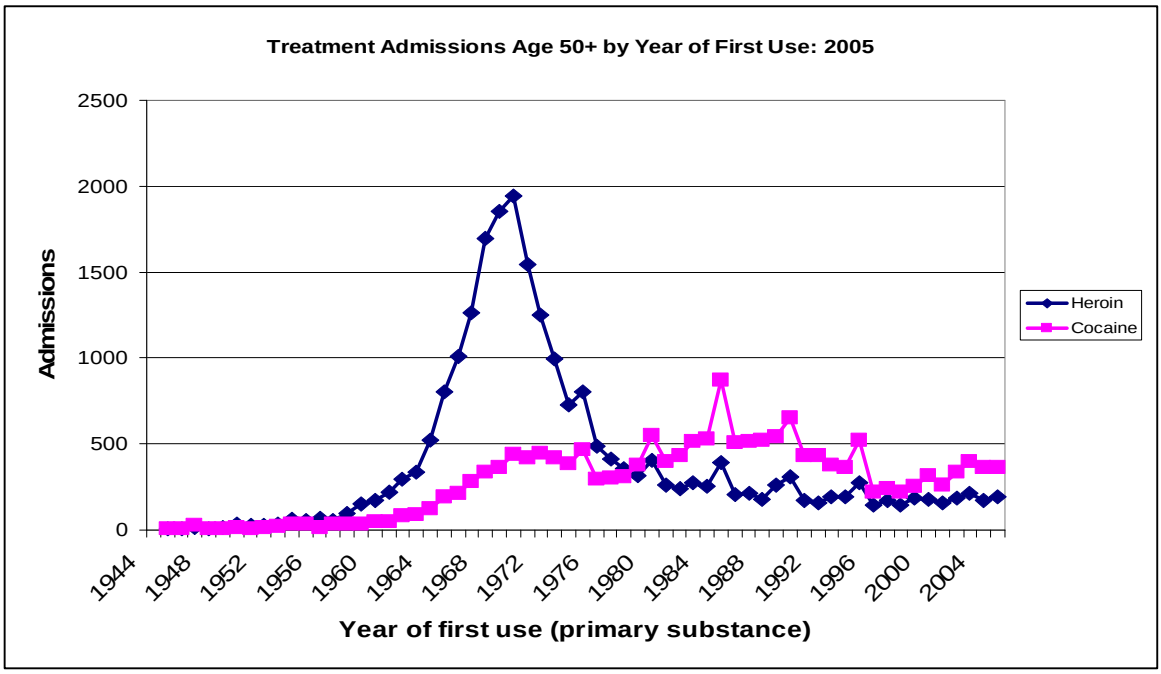
Given that substance use disorders are chronic, relapsing, life-time conditions, these age-patterns become especially important. For example, Hser *et al*. (2001) found that the risk of incarceration varied over the 33 years that they followed a cohort of heroin addicts recruited in 1964. At first follow-up in 1973-74, the average age of surveyed users was 37. Twenty-three percent of the cohort was incarcerated at that survey wave. By 1996-1997, the average age of remaining respondents was 57. Only 14 percent of these individuals were incarcerated. (As noted below, some of this change might reflect higher mortality or incarceration rates among criminally-active respondents. Our cohort simulations will help to clarify such effects.)

Most recently, Basu, Paltiel, and Pollack (2008) used data from the National Treatment Improvement Evaluation Study (NTIES) to examine criminal offending among treatment clients. These authors report that clients under age 25 were four times as likely to report that they had recently robbed someone with a weapon as were clients over age 30. By standard measures, older clients achieved better treatment outcomes. Yet because of these large age-related differences in offending, substance abuse treatment provided greatest net benefit when provided to men below age 25.

There has been some recent attention to the aging of the population being treated for alcohol and drug dependence. Trunzo and Henderson (2007) show that the number of clients over age 50 quintupled between 1992 and 2005, whereas the total treated population rose only by 14 percent over the same approximate period 1993-2003. According to 2005 Treatment Episodes Data System (TEDS) data, treatment clients over age 50 have been using for a long time (Trunzo and Henderson 2007). Average duration of cocaine use was 20 years; average

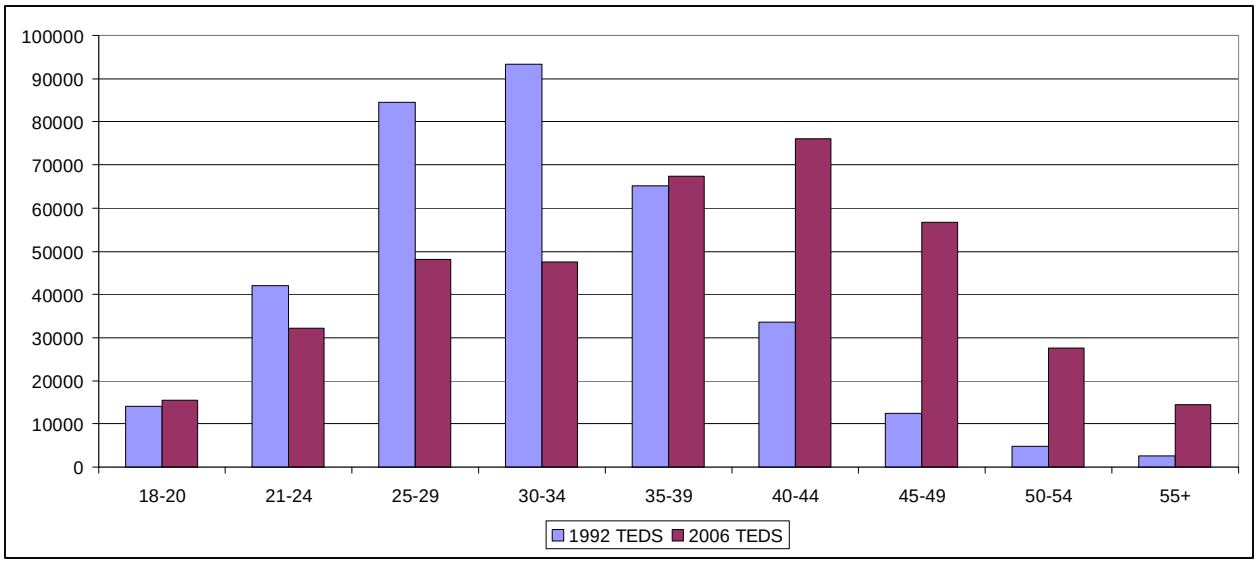
duration of heroin use was 34 years.

Perhaps most striking are the period effects in the reported initiation of substance use. Figure 1 below shows the reported year of first-use among individuals age 50 or above. (The figure is modified, with permission, based upon Trunzo and Henderson 2007.) Within this age



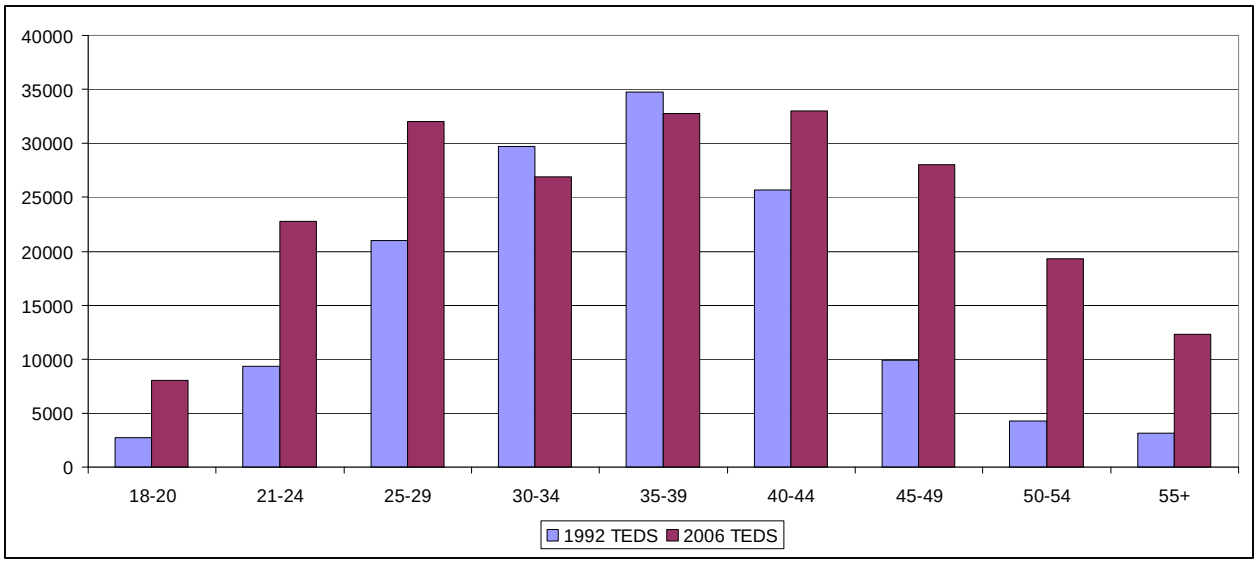
group, more than 1/3 of patients recently admitted for heroin use disorders initiated use between 1966 and 1971. More than ¾ initiated use before 1980. We observed no comparable pattern among admitted cocaine patients in the same age group, who were a notably more recent user group with more uniform initiation patterns. Sixty-two percent initiated use after 1980.

Figures 2 shows another indication of cohort aging among in-treatment substance users. The figure, computed using 1992 and 2006 TEDS data, displays changes in the age distribution of adult clients admitted into substance abuse treatment who reported cocaine-related disorders. We drew data from the 1992 TEDS because this was the earliest year of available data. In similar fashion, the 2006 TEDS was the latest available at this writing.



In our 1992 data, 40 percent of these clients were under the age of 30. By 2006, that figure had dropped to 26 percent. The fraction of clients over the age of 40 rose from 15 percent to 47 percent over the same period. This was not the consequence of an epidemic of new use among older individuals; rather it represented the aging of those who were caught in the earlier epidemics.

We observed a more complex pattern within the population of admitted heroin users. As shown in Figure 3 below, the over-45 population displayed a similar pattern to that found in the population of cocaine users. Yet there was also a substantial population of admitted heroin users below the age of 30.



The contrast between heroin and cocaine is indicated in Figure 4. This shows the year of first use for all admitted patients, not just those over age 50. Year of first use among cocaine patients showed a strong peak in the mid-to-late 1980s, along with a more recent peak that may correspond to newly-dependent users. In contrast, the trend for heroin users suggests a steady and rapid rise in the number of initiates each year from 1980 onwards, so that the number of 2005 treatment clients who began use in 2000 is almost three times the number who began use in 1980. Over time, the highly-peaked incidence of the late 1960s and early 1970s accounts for a shrinking proportion of the overall population of admitted patients.

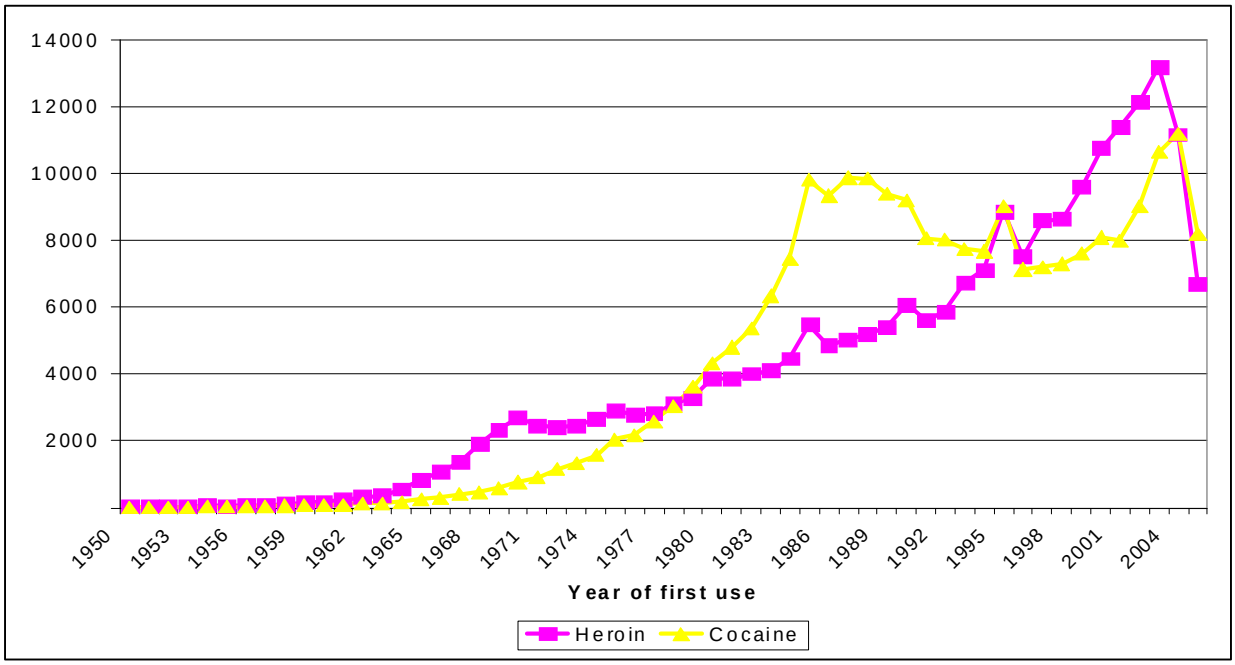


Figure 4: Year of first use for <u>all</u> patients (2005 Treatment Episodes Dataset)

Interpretation of these treatment "year of first use" numbers is complicated by the dynamics of drug using careers. For example, members of the 1980 initiate cohort are more likely than their 2000 counterparts to have died, to be in prison and perhaps to have desisted. Other heroin users may have enrolled in long-term methadone maintenance and thus do not appear in the population of new treatment admissions. These uncertainties suggest the need for analysis of multiple populations and longitudinal datasets, as well as the need for explicit statistical modeling and simulations to scrutinize implications of changing population dynamics and initiation patterns for the current drug-dependent population.

Such patterns suggest that current service utilization reflects the long-term reverberation of specific epidemics of cocaine and heroin use in the United States. In an epidemic process, rates of initiation rise sharply as new and highly contagious users of a drug initiate friends and peers, a model first well developed by Hunt and Chambers (1976)).

In the case of heroin, there is much evidence of a sudden elevation of initiation rates during the late 1960s and early 1970s, followed by a rapid incidence decline over the 1970s and 1980s (Kozel and Adams, 1986). Rocheleau and Boyum (1994), in an early 1990s sample of street heroin users, also found evidence of much higher initiation rates in the early 1970s than in the following two decades. For cocaine powder the decline is not so pronounced as with heroin (Everingham and Rydell, 1994). In a recent paper, Caulkins et al. (2004) reported estimates of annual cocaine initiation using NHSDA and a variety of methods; all show a peak in 1980 followed by a decline of two thirds in the next five years. For crack cocaine the epidemic was still later, starting between about 1982 and 1986, depending on the city (Cork, 1999).

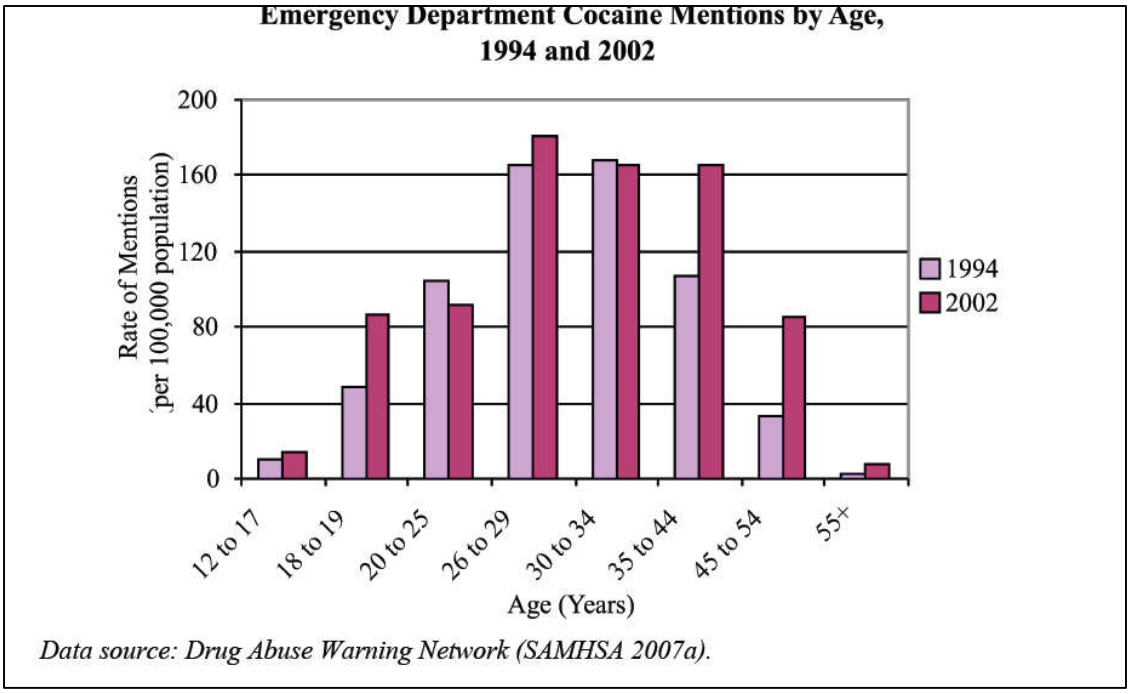
A new class of epidemiologic models has been developed by Caulkins and collaborators (e.g. Caulkins, 2007; Caulkins et al., 2004) which use diverse data to document the long trajectory of drug epidemics. After the peak, the initiation rate does not return to its original zero level but falls to a rate well below the peak. Under reasonable assumptions, the result is a flow of new users who do not fully replace those lost through desistance, death, or incarceration. Thus, the number of users declines over time. Moreover, the drug-using population ages with corresponding changes in the health, employment, and crime consequences of substance use.

The phenomenon is not restricted to the U. S. Similar analyses of the aging heroin-dependent population can be found in Switzerland (Nordt and Stohler, 2006) who show the kind of sharp increase and decline in heroin initiation. They reference a similar pattern in Italy. However, data from England (deAngelis et al., 2004) and Australia (Law et al, 2001) show a much slower and less peaked epidemic of initiation. This is a reminder that epidemics that represent social rather than biological contagion will vary over time and place.

All of the above studies rely upon data from the mid-1990s or before. More recent data suggest the possibility of new heroin incident drug-use cohorts that suggest a changing demography of heroin use.

At the older end of the distribution, the aging of the cocaine- and heroin-dependent population has important potential implications for both policy and clinical interventions. Treatment units will find their patient populations to have different medical co-morbidities, reflecting specific effects of long histories of addiction, homelessness, and more general morbidity associated with aging. Police departments may find that fewer arrestees are users of these expensive drugs, and may find different patterns of drug-related crime.

These patterns will have implications for other care and service systems. The incarcerated population will plausibly include growing numbers of older drug-dependent users requiring increased medical attention (Gfroerer, *et al.*, 2003). Similar evidence of population aging is apparent in DAWN data concerning the population receiving emergency care. Population-adjusted rates of cocaine-related admissions hardly changed between 1994 and 2002 for individuals younger than age 35. Admission rates increased by 75 percent for patients aged 35-44, and more than doubled for those 45-54. By 2002, the incidence rate of cocaine-related ED visits was substantially higher among 35-54-year-olds than among the population of adolescents and young adults under the age of 25.



The impact of population changes on crime

We performed a preliminary analysis to explore the impact of these demographic changes on criminal offending. Here we linked population characteristics available from TEDS to age-related data on criminal offending available.

Data to be analyzed.

We use two principal datasets in our empirical analysis: The 1992-97 National Treatment Improvement Evaluation Study (NTIES), and the 1992 and 2006 waves of the Treatment Episodes Data System (TEDS).

TEDS. The Treatment Episodes Dataset (TEDS) provides individual-level data regarding demographic characteristics and substance use disorders for 1.9 million annual client admissions to treatment facilities for substance use disorders. Among data items collected are: information regarding primary and secondary substances of abuse, treatment referral source, prior treatment

episodes, age at first use, metropolitan area, and age. The 2006 TEDS included more than a half-million treatment referrals from the criminal justice system, providing ample coverage of this key population of public health and law enforcement concern. Facilities that receive state funding (including federal block grant funding) for alcohol or drug disorders form the TEDS sample frame. In 1997, TEDS was estimated to cover about 67 percent of all substance abuse treatment clients (Westat 2006, 5-200).

NTIES. Our individual-level crime data come from NTIES. These data provide both administrative and client-provided data for critical variables. NTIES also features a large sample size of treatment clients across five principal modalities: inpatient short-term (N=261) , residential short-term (N=1,655) , residential long-term (N=1,980) , outpatient methadone (N=514) , and ambulatory outpatient (N=2,175) treatment.[1] NTIES has a higher follow-up response rate (82%) than any comparable client-level follow-up treatment survey.(Gerstein and Johnson 2000; Flynn, Simpson et al. 2001; Gerstein and Johnson 2001) For further information on the NTIES data, see (Gerstein, Datta et al. 1997).

NTIES was not designed to be nationally representative of treatment clients. It does not address individuals out of contact with the substance abuse treatment system. The sample universe is drawn from units supported by the Center for Substance Abuse Treatment. Compared with nationally representative client surveys, NTIES included a high percentage of nonwhites and criminal justice clients. It is therefore well-suited to analyses of a criminally-active client population.(Zarkin, Dunlap et al. 2002)

NTIES is especially useful because its pre- and post-treatment measures explore whether respondents have committed various specific offenses. If respondents report committing such a crime, NTIES explores the number of such crimes the individual committed over the 12 months

[1] We dropped observations from one long-term treatment modality, which included only 8 respondents.

prior to treatment admission. As with most SAT-related studies, crime data are self-reported. Moreover the number of offenses is reported categorically and is top-coded at 100 per year.

We use pre-treatment offenses as our preferred estimate of drug-related crimes, since these numbers correspond most closely to the population of street drug users, most of whom are not receiving treatment services. Moreover, NTIES survey design renders post-treatment data most susceptible to bias due to self-reporting attrition.

Dependent variables

We examined several offenses:

1. Number of times one has attacked or threatened someone with a weapon.
2. Number of times one has committed armed robbery
3. Number of times one has committed auto theft
4. Number of times one has shoplifted
5. Number of times one has sold drugs

We chose these offenses because we *hypothesize* that the age-offending profile will be steeper for violent offenses than for income-generating offenses that do not involve violence. Shifts in the age-structure of the drug-using population will therefore be most important for violent offenses.

Methodology

For any individual j, let Y_j be self-reported offending. Let X_j be a set of individual characteristics such as race/ethnicity, education, and primary drug of abuse. Let A_j be a vector of age-related characteristics.

We then use our NTIES data to estimate a (bootstrapped) linear regression specification

$$Y_j = X_j\beta + A_j\theta + \varepsilon_j \qquad (1)$$

Given these estimates, we then compute expected number of crimes per treatment client, using the observed X's within the NTIES data, applying the age distribution of the 1992 and the 2006 TEDS data. We perform these calculations separately for the cocaine-using and heroin-using populations, since these populations exhibit different demographic shifts in our data.

Given the highly skewed distribution of offenses, we compute boostrapped standard errors. These will be provided in the next draft.

Results

The attached tables show our cocaine regression results, and Table 2 shows our heroin regression results for specific offenses. All offenses exhibited declining age-offending profiles.

	Cocaine Users		Heroin Users	
Offense	**Predicted annual offending rate, given TEDS 1992 age distribution**	**Predicted annual offending rate, given TEDS 2006 age distribution**	**Predicted annual offending rate, given TEDS 1992 age distribution**	**Predicted annual offending rate, given TEDS 2006 age distribution**
Threaten or injure with a weapon	1.03	0.75	1.609	1.700
Armed robbery	1.09	1.04	1.366	1.562
Auto theft	0.49	0.34	1.56	1.70
Burglary	2.33	2.33	3.44	3.64
Drug-selling	17.63	15.96	22.43	22.95
Shoplifting	5.35	5.25	11.25	11.05

Table 3: Predicted annual offending rate per client

	Armed robbery	Threaten/attack w/ weapon	Burglary	Auto theft	Shoplifting	Drug Selling
age	-1.928*	-2.893***	-4.344***	-3.319***	-6.445***	-17.61***
	-1.06	(0.96)	(1.36)	(1.05)	(2.15)	(3.28)
Age squared	0.0493	0.0777***	0.112***	0.0929***	0.190***	0.475***
	-0.031	(0.03)	(0.04)	(0.03)	(0.06)	(0.10)
Age Cubed	-0.000409	-0.000689***	-0.000931**	-0.000848***	-0.00180***	-0.00423***
	-0.0003	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
African-American	0.231	-0.447	-0.616	-0.266	-1.399	-3.442*
	-0.3	(0.37)	(0.53)	(0.37)	(0.95)	(1.85)
Hispanic	1.062	-0.952	-1.242	0.726	-2.347*	0.976
	-0.91	(0.62)	(0.89)	(0.76)	(1.37)	(3.00)
Alcohol indicated	-0.0934	0.316	0.0745	0.354	1.195	-0.736
	-0.27	(0.26)	(0.35)	(0.31)	(0.74)	(1.44)
Heroin indicated	0.698	1.166**	1.062**	1.248**	8.557***	4.743**
	-0.48	(0.47)	(0.52)	(0.52)	(1.35)	(1.99)
HS Graduate	-0.181	-0.0134	-0.813*	-0.066	-0.469	1.22
	-0.36	(0.29)	(0.44)	(0.24)	(0.73)	(1.30)
9th Grade Graduate	-0.143	0.107	0.939	-1.915**	0.91	3.624
	-0.71	(0.41)	(0.64)	(0.95)	(1.49)	(2.49)
Constant	25.14**	36.21***	56.33***	40.56***	74.84***	227.4***
	-11.8	(10.90)	(15.30)	(12.10)	(23.20)	(35.10)
Observations	2487	2487	2487	2487	2487	2487
R-squared	0.02	0.04	0.05	0.05	0.04	0.06

(Bootstrapped Standard errors)
*****p<0.0001, **p<0.01, *p<0.05**

Table 4: Bootstrapped regressions: NTIES cocaine client population.
Dependent variable: Predicted annual offending rate per client

	Armed robbery	Threaten/attack w/ weapon	Burglary	Auto theft	Shoplifting	Drug Selling
age	-2.456*	-2.855**	-3.587**	-2.563	-2.174	-6.614
	(1.34)	(1.42)	(1.81)	(2.07)	(3.31)	(5.23)
Age squared	0.0668*	0.0746*	0.0975*	0.0647	0.0766	0.149
	(0.04)	(0.04)	(0.05)	(0.06)	(0.10)	(0.15)
Age Cubed	-0.000584*	-0.000644*	-0.000847	-0.000538	-0.000794	-0.00113
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
African-American	-0.742	-1.413*	-2.044*	-0.913	-7.332***	1.122
	(0.69)	(0.81)	(1.09)	(0.63)	(2.13)	(2.86)
Hispanic	0.814	-0.293	0.59	1.27	-4.479*	16.01***
	(0.90)	(1.04)	(1.39)	(1.02)	(2.38)	(3.86)
Alcohol indicated	0.985	0.714	-0.0632	0.335	4.397***	-0.479
	(0.69)	(0.58)	(0.82)	(0.67)	(1.62)	(2.71)
Cocaine/Crack indicated	-1.444***	-1.442***	-1.182	-0.795	-3.608	-7.154*
	(0.40)	(0.37)	(1.16)	(0.97)	(2.43)	(4.05)
HS Graduate	-0.607	0.143	-1.187	-0.336	-0.127	-3.486
	(0.65)	(0.57)	(0.93)	(0.59)	(1.69)	(2.56)
9th Grade Graduate	0.2	1.451***	2.381	-2.792	4.801*	8.759**
	(1.18)	(0.53)	(1.50)	(1.80)	(2.57)	(4.03)
Constant	30.04*	36.39**	44.86**	37.39	26.26	108.0*
	(15.70)	(16.50)	(19.40)	(23.80)	(35.20)	(57.00)
Observations	903	903	903	903	903	903
R-squared	0.02	0.04	0.02	0.04	0.03	0.07

(Bootstrapped Standard errors)
*****p<0.0001, **p<0.01, *p<0.05**

Table 5: Bootstrapped regressions: NTIES heroin clent population.
Dependent variable: Predicted annual offending rate per client

Discussion

This preliminary analysis contains many limitations. Our essay requires the assembling and interpretation of many data sources, no one of which fully characterizes the hidden population of criminally active drug users. The analysis inherently requires extrapolation at many points.

Our particular analysis of the implications of aging populations confirms some of our prior hypotheses and refutes others. Our TEDS analysis of heroin and cocaine treatment clients indicates that the number of older users has significantly increased; they now constitute a substantial share of the treated population. The number of treatment clients over age 45 has more than doubled.

In the case of cocaine, this pattern appears to reflect straightforward aging of a cohort that initiated use during the 1980s, some proportion of whom continue to experience use disorders two decades later. The heroin population appears more heterogeneous. The 2006 TEDS treatment population exhibits higher age-variance than the 1992 TEDS population did. The 2006 sample included far more clients over the age of 45, but it also included far more clients younger than age 30. Relatively young, recently-initiated heroin users are a large fraction of the current treated population.

Turning to the implications for criminal offending, we hypothesized that violent crimes would display a sharper decline with age than would nonviolent crimes. This was indeed borne out in our regressions.

The crime implications of these trends were somewhat unexpected, although both the heroin and cocaine-using populations aged, much of the strongest observed 1992-2006 age trends occurred within populations that had already, in 1992, “aged out” of key offending

subgroups for key offenses. We did observe some predicted decline in violent offending associated with aging. All else equal, we predict a 25 percent decline in threatening or using a weapon associated with population aging in our simulations. We also predicted small declines in the rate of armed robbery, with a sharp decline in the predicted incidence of auto theft. We observed no predicted decline in other examined offenses.

We were surprised by our heroin findings. Between 1992 and 2006, we observed an aging cohort of older users, but also an incident cohort of younger users predicted to have higher rates of crime. Thus, with the exception of shoplifting, changes in demographic structure predict higher incidence of every examined crime between the two cohorts.

Next steps

There are three potential paths forward for this paper. At present we are most engaged by the analysis of changes in the age structure of the cocaine and heroin-dependent populations and its implications for crime. How much progress we can make on that depends partly on what turns out to be useful in data sets such as ADAM and the longitudinal data sets of other researchers.

The second path is to explore what is known about the potential for increasing treatment involvement of the same offenders, though the variety of programs discussed above. We will list all the drug-specific interventions that have been developed to reduce drug-related crime. We start with drug treatment itself and ask whether there are methods of improving its attractiveness to criminally involved addicts or its effectiveness in treating them specifically, separate from changes in the recruitment paths from the criminal justice system. Then we turn to the various diversion programs such as drug courts and assess what part of the drug involved offender

population they include and exclude. We ask what is known about the extensive margin; how effective would these programs be if they included more serious offenders. We are confident that we can make progress on this, with many assumption about the shape of the extensive margins for each program.

The third path, on sentencing careers, strikes us as the most straightforward. Neither of us is experienced with the data sets most relevant to pursuing this and we look forward to advice on how it might be pursued.

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