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# **Monitoring Drug Epidemics and the Markets that Sustain Them Using ADAM II Executive Summary**

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## Final Report to the National Institute of Justice

### Executive Summary

Monitoring Drug Epidemics and the Markets that Sustain Them Using ADAM II

(Grant #2010-IJ-CX-0011)

Andrew Golub, PI; Henry Brownstein, Eloise Dunlap, Co-Investigators

August 20, 2012

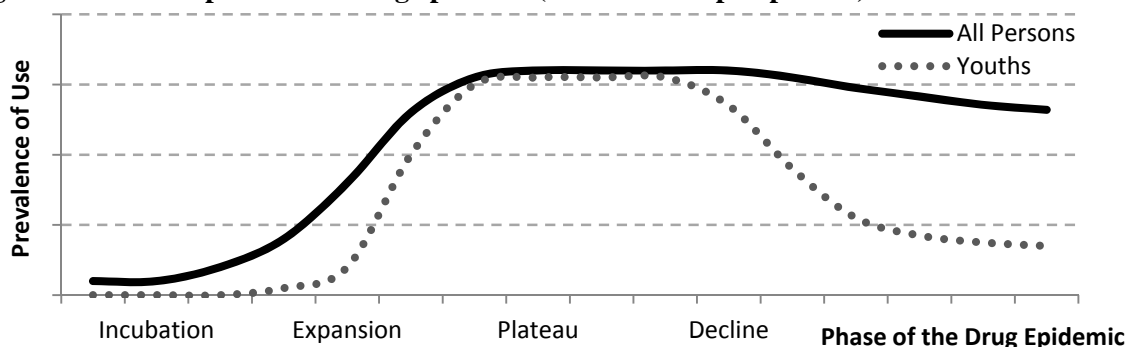
#### *Problem and Purpose*

The complex and combined problem of illegal drug use, drug dealing and associated criminality represents one of the largest problems facing law enforcement and related agencies today. Understanding, anticipating, containing and reducing these problems will greatly serve our nation. The development of responsive and effective law enforcement practices depends on an informed understanding of the underlying problems and the measurement of changes over time in response to initiatives. The Arrestee Drug Abuse Monitoring (ADAM) program has been one of the most valuable information resources with regard to confronting drug abuse, drug markets and the crime, safety and public health impacts associated with them. ADAM obtains careful scientific measurements of drug use and related experiences among those persons who sustain arrests. Additionally, ADAM provides location-specific information which is extremely valuable because drug use can differ dramatically across locations. In this regard, each jurisdiction must address its own local drug problem.

Prior empirical research suggests that the popularity of a particular drug tends to grow and then wane forming drug epidemics. This study advanced the use of ADAM II data by developing the more complete story behind drug use trends through the use of a drug epidemics perspective. Golub, Johnson and Dunlap (2005) identified that a drug epidemic tends to pass through four distinct phases as illustrated in Figure 1 and described below: incubation, expansion, plateau and decline. This framework was central in pinpointing the decline of the crack epidemic, the emergence of the recent Marijuana Epidemic, the course of the Heroin Injection Epidemic, and a modest rise in use of hallucinogens such as MDMA in the 1990s. This study used the drug epidemics perspective to identify the recent course of drug use and project the near term future of use for each of the most commonly abused street drugs (marijuana, crack, powder cocaine, heroin, and methamphetamine) at each of the ten geographically dispersed ADAM II locations. The larger study also looked into the nature of any changes in drug markets over the course of a drug epidemic.

The extensive and alternative exploratory analyses strongly indicate that there is no simple relationship between the nature of individuals' drug market purchases and trends in drug epidemics. Drug markets appear to be idiosyncratic. The details of drug market analyses are not included in this executive summary but are included in the full report.

**Figure 1: The four phases of a drug epidemic (A theoretical perspective)**



*Incubation phase.* A drug epidemic typically starts among a highly limited subpopulation. At that time, the prevalence of drug use is relatively low. In general, the incubation phase can not be identified in advance. It is only after an epidemic has undergone an expansion that one can observe when the incubation period occurred. Ethnographic research indicates that the incubation phase for recent drug epidemics has been associated with very specific contexts involving social gatherings, music, and fashion. The Heroin Injection Epidemic grew out of the jazz music scene (Jonnes, 2002). The Crack Epidemic started with inner-city drug dealers at after-hours clubs (Hamid, 1992). And, the recent Marijuana Epidemic was based in the hip-hop movement (Sifaneck, Kaplan, Dunlap, & Johnson, 2003).

*Expansion phase.* Sometimes, the pioneering drug users successfully introduce the practice to the broader population. The prevalence of use during this diffusion period tends to follow an s-shape with initial exponential growth that subsequently tapers off.

*Plateau phase.* Eventually, everyone most at risk of the new drug practice (typically users of other illicit drugs) has either initiated use or at least had the opportunity to do so. This point marks the end of the expansion and the beginning of the plateau phase. For a time, widespread use prevails. During this period, youths first coming of age typically initiate use of the currently popular drug(s), if any. These users form the core of a drug generation for whom the drug has particular symbolic significance based in their social activities and relationships.

*Decline phase.* Eventually, the use of an illicit drug tends to go out of favor. New conduct norms emerge that hold that use of a drug is bad or old-fashioned. Ethnographic research revealed that early in the decline phase of the Crack Epidemic that “crackhead” became a dirty word in inner-city New York and that youths avoided peers they suspected had used (Curtis, 1998; Furst, Johnson, Dunlap, & Curtis, 1999). The subsequent diffusion of innovation process of anti-use sentiments then competes with the prevailing pro-use norms. This leads to a gradual decline phase of a drug epidemic. During the decline phase, a decreasing proportion of youths coming of age become users. However, the overall use of the drug endures for many years as some members of a drug generation continue their habits.

## **Research Design**

### *The ADAM Program*

The DUF program was established in 1987 by the National Institute of Justice (NIJ) to measure trends in illicit drug use among booked arrestees across a geographically diverse group of local jurisdictions. Arrestees are a group of great interest to law enforcement and other related agencies tasked with dealing with illegal drugs and related problems. In 2000, the DUF program underwent substantial improvement, especially with regard to obtaining a representative sample and obtaining drug market information, and was renamed the Arrestee Drug Abuse Monitoring [ADAM] program (National Institute of Justice, 2003a, 2004b). The program went on a hiatus after 2003. In 2007, the ADAM program was reintroduced by the Office of National Drug Control Policy (ONDCP) as the ADAM II program. The ADAM II program purposefully follows the same recruitment and interview procedures as its predecessor in order to maintain compatibility (Hunt & Rhodes, 2009; ONDCP, 2010a). This study used the 37,933 adult male arrestees age 18 and above who provided urine samples from the 10 locations participating in ADAM II shown in Figure 2. The project obtained the ADAM 2000-2003 and the ADAM II 2007-2010 data from the National Archive of Criminal Justice Data (NACJD). Because of the gap between the ADAM and ADAM II programs, there are no data available for three years, 2004-2006.

**Figure 2: Geographic Variation in ADAM II Locations.**

|   |   |   |
|---|---|---|
| <b><u>West</u></b><br>Portland (OR)<br>Sacramento<br>Denver | <b><u>Midwest</u></b><br>Minneapolis<br>Indianapolis<br>Chicago | <b><u>Northeast</u></b><br>Manhattan<br>Washington (DC) |
|   |   | <b><u>Southeast</u></b><br>Charlotte<br>Atlanta         |

The ADAM program (hereafter referring to both ADAM and ADAM II) approaches a representative sample of arrestees awaiting booking within 48 hours of their arrest at each participating location and asks them to complete a 20-25 minute survey and provide a urine sample. They are offered a small incentive (e.g., a candy bar) for participation. Participation rates are generally strong. From 2000 to 2010, 75%-86% of selected respondents that were available agreed to participate and 77%-91% of those provided urine samples (National Institute of Justice, 2003a, 2003b, 2004a, 2004c; ONDCP, 2008, 2009, 2010b, 2011). In conjunction with data collection, the ADAM program uses censuses and propensity scoring to develop sample weights. Samples weights for each location for each year were renormalized so that the sum of all weights equaled the number of cases. This assured that the multi-year analysis would give the appropriate weight to data collected in any given year proportional to the number of cases collected. These weights were used in all statistical calculations presented in this report to provide unbiased estimates for the target population of adult male arrestees at each location.

The ADAM program performs urine tests to obtain an objective measure of recent drug use not subject to respondents' lack of full and accurate disclosure, which is a problem with the self-report data provided in other surveys (GAO, 1993; Harrison, Martin, Enev, & Harrington, 2007). The detection window differs between drugs (National Institute of Justice, 2003a; ONDCP, 2009). Methamphetamine, cocaine, and heroin pass through the system within 3 days. Marijuana can remain in the system for up to 30 days, depending on frequency of use. A major limitation of ADAM urinalysis data is that it does not distinguish mode of consumption. Arrestees that test positive for cocaine may have used crack or power cocaine. Hence, we use the term detected cocaine/crack use. For the following ADAM locations where more than 10% of arrestees in any year reported past-30-day use of powder cocaine, the study examined trends in self-reported past-30 day use of both crack and powder cocaine: Atlanta, Charlotte, Denver, Manhattan and Portland (OR). The analysis of self-report data provides a rough indication of whether detected trends in cocaine/crack use might be due to changes in use of crack or powder cocaine. The urinalysis tests also do not distinguish between heroin and other opiates. Hence, we use the term detected opiate/heroin use.

### *Analyses*

The project evaluated trends in detected marijuana, cocaine/crack, opiate/heroin, and methamphetamine at each of the ten ADAM II locations using a drug epidemics framework. The analyses of opiate/heroin and methamphetamine trends are limited to the ADAM sites that have had higher levels of use of these drugs. The analysis also examined the use of cocaine powder in contrast to crack cocaine at the five locations most affected by powder cocaine use. This executive summary describes the findings from a graphical trend analysis of

variation in detected use of each drug throughout the 2000s. The complete study further confirmed findings with a logistic regression analysis of the variation in detected use across birth cohorts, and a graphical analysis of the variation in detected use across birth cohorts.

The current phase of a drug epidemic can be identified by comparing a graph of the variation in drug use over time with the model for the expected course of a drug epidemic (Figure 1). The analysis examines two trend lines: the overall rate of use among all arrestees age 18 and above and use among youthful adult arrestees age 18-20. The transition from the incubation to expansion phase is identified as a dramatic increase sustained across multiple years in use among all arrestees. The transition from the expansion to plateau phase is identified by the prevalence among all arrestees reaching a sustained level across multiple years. The transition from the plateau to decline phase is identified using the trend among youthful adult arrestees as opposed to all arrestees. The decline phase is distinguished by a rapid decline among youthful adult arrestees, while the rate among all arrestees may remain relatively constant.

A major challenge to the visual analysis is the limited reliability of the estimates obtained with the ADAM data. The standard error (S.E.) the conventional measure of statistical reliability is calculated according to the following formula which reaches a maximum when the probability (P) is 50%:  $S.E. = \sqrt{P(1 - P)/N}$ . The number of ADAM arrestees interviewed at any location in any year was typically around 450. This provides a worst case S.E. at P=50% of about 2.4%. The number of youthful adult arrestees was typically 60 yielding an S.E. around 6.5%. Conventionally, analysts will often consider a margin of error around an estimate of twice the S.E., which corresponds to an approximate 95% confidence interval (CI). This leads to a margin of error of about 5% for adult arrestees and about 13% for youthful adult arrestees. In reading the graphs, greater credence was given to variations larger than the margin of error especially if they were sustained across multiple years. Single-year variations were given limited attention because of the possibility they resulted by chance.

### ***Limitations***

The primary limitation to this analysis is that it focused exclusively on male arrestees from the 10 urban locations included in the ADAM II Program. The trends identified do not necessarily parallel the trends in the general population. Additionally, there may be variations in drug use across gender not detectable with ADAM data. A major value of this study is that it confirms its own geographic limitations. The sometimes idiosyncratic drug use trends identified strongly suggest that it can be difficult and sometimes inappropriate to try to generalize the findings of this analysis based on 10 locations to the nation overall or to other locations not included in the ADAM II Program. The ADAM II locations provide geographic diversity but the program does not include any rural locations. Hence, it would be inappropriate to project the broader trends identified here to rural areas. Another problem is the possible existence of individual locations that are exceptions to the broader trends. Conceivably there could be some locations where crack may still be common among youthful adult arrestees and marijuana less common. This potential for location-specific trends is very important with regard to tracking the use of heroin, powder cocaine and methamphetamine which were common at only a few of the 10 locations studied. These substantial variations across locations indicate that it is not possible to tell whether a community is dealing with these less common drugs and the nature of any trends in use without data specific to that location. This location specific focus is both the primary advantage and the central limitation of the ADAM data.

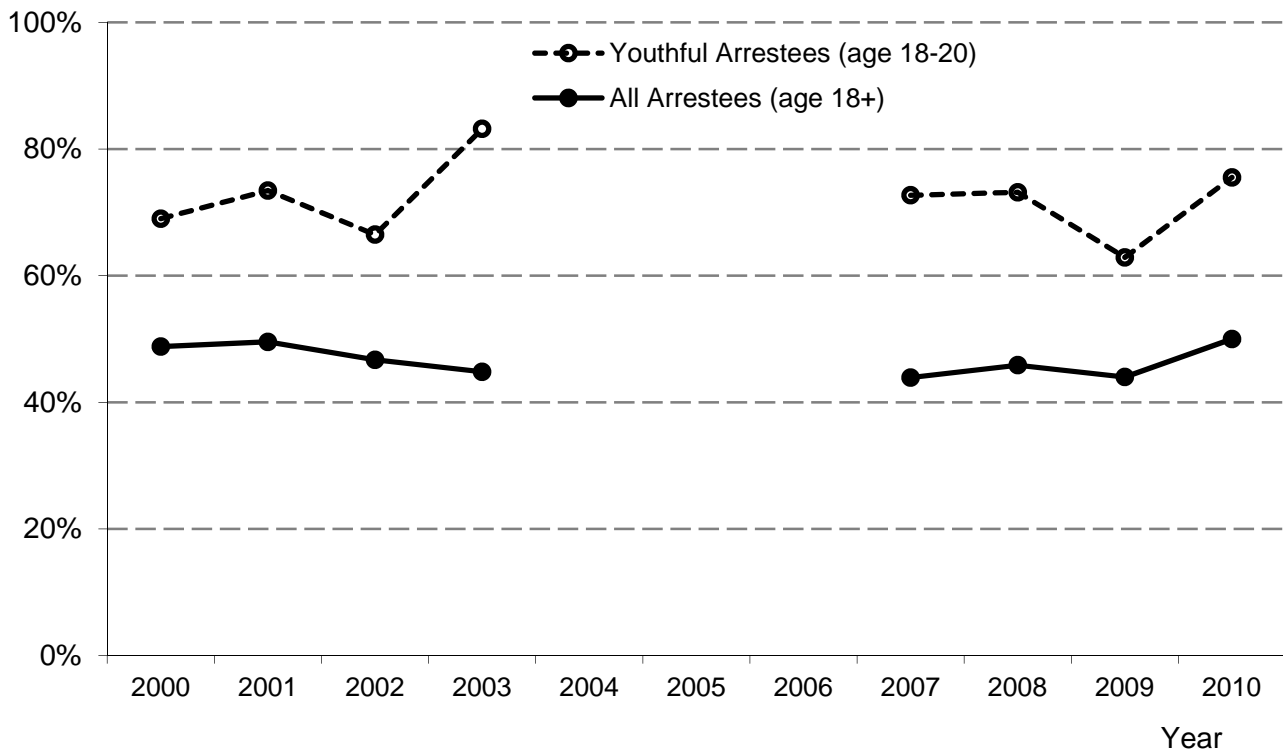
## Findings

Table 1 presents a summary of drug epidemic findings. As of 2010, the Marijuana/Blunts Epidemic was in its plateau phase across the country. It entered that phase in the mid 1990s or early 2000s at each location. Figure 3 presents the trend analysis for Indianapolis indicating stable and widespread use among arrestees. About half the adult arrestees and up to three quarters of youthful adult arrestees were detected as recent marijuana users. The one-year increase in 2003 was discounted as not part of a trend but rather likely the result of chance, especially because the prevalence for 2007-2010 was close to the rate from 2000-2002.

**Table 1: State of Drug Epidemics at ADAM II Locations as of 2010**

| ADAM Location   | State of the epidemic in 2010 (date of last major change) |                 |                                 |         |                 |
|-----------------|---|-----------------|---------------------------------|---------|-----------------|
|                 | Marijuana   | Crack           | Powder Cocaine                  | Heroin  | Methamphetamine |
| Atlanta         | Plateau (1996)  | Decline (<2000) | Plateau or early decline (2010) |         |                 |
| Charlotte       | Plateau (<2000)   | Decline (<2001) | Decline (<2001)                 |         |                 |
| Chicago         | Plateau (1996)  | Decline (1994)  |                                 | Decline |                 |
| Denver          | Plateau (1994)  | Decline (<2000) | Decline (2008)                  |         |                 |
| Indianapolis    | Plateau (1996)  | Decline (2003)  |                                 |         |                 |
| Manhattan       | Plateau (1996)  | Decline (1989)  | Decline (<2000)                 | Decline |                 |
| Minneapolis     | Plateau (<2000)   | Decline (<2000) |                                 |         |                 |
| Portland (OR)   | Plateau (2001)  | Decline (1994)  | Decline (2009)                  | Plateau | Decline (2008)  |
| Sacramento      | Plateau (<2000)   | Plateau (<2000) |                                 |         | Decline (2001)  |
| Washington (DC) | Plateau (1996)  | Decline (1990)  | --                              | Decline | --              |

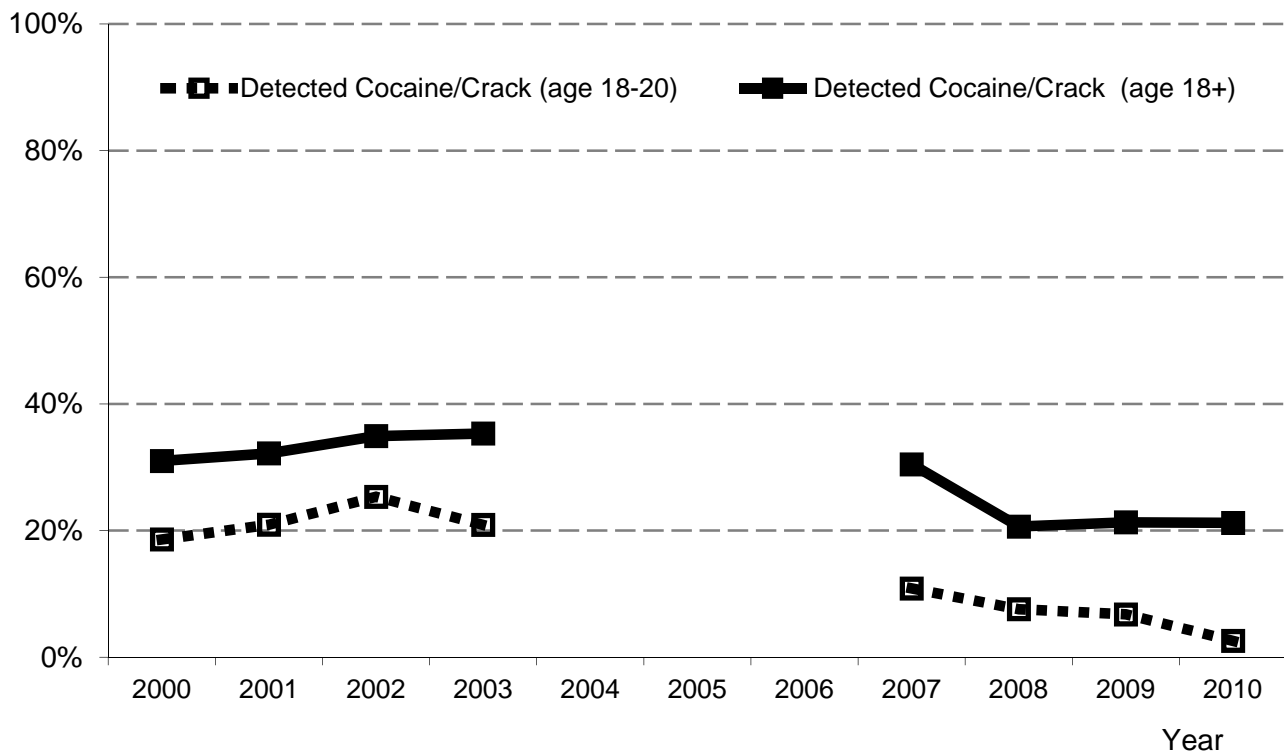
**Figure 3: Detected Marijuana Use among ADAM Arrestees in Indianapolis 2000-10**



At most ADAM locations, the Crack Epidemic has been in decline for some time among people who sustain arrests (Table 1). However, the timing of the decline phase varied substantially across locations. The

Crack Epidemic entered a decline first in the Northeast in Manhattan and Washington DC around 1990. The Crack Epidemic came somewhat later to Indianapolis (Golub & Johnson, 1997), which went through the expansion phase in the early 1990s. The plateau phase was reached in Indianapolis in 1994. Figure 4 indicates that the decline phase started in Indianapolis in 2003. In 2002, more than 20% of youthful adult arrestees were detected as recent cocaine/crack users. From 2003 to 2010, the rate among youthful arrestees tumbled from 25% down to 3%. The Crack Epidemic was still in the plateau phase in Sacramento as of 2010. Figure 5 indicates that detected cocaine/crack use among adult arrestees held constant around 20% from 2000 to 2008 and declined to 10% in 2009 and remained low at 13% in 2010. However this decrease was not mirrored among youthful adult arrestees. There was a large one-year decline in detected cocaine/crack use among youthful adult arrestees from 13% in 2008 down to 4% in 2009. However, the rate returned back to 13% in 2010.

**Figure 4: Detected Cocaine/Crack Use among ADAM Arrestees in Indianapolis 2000-10**





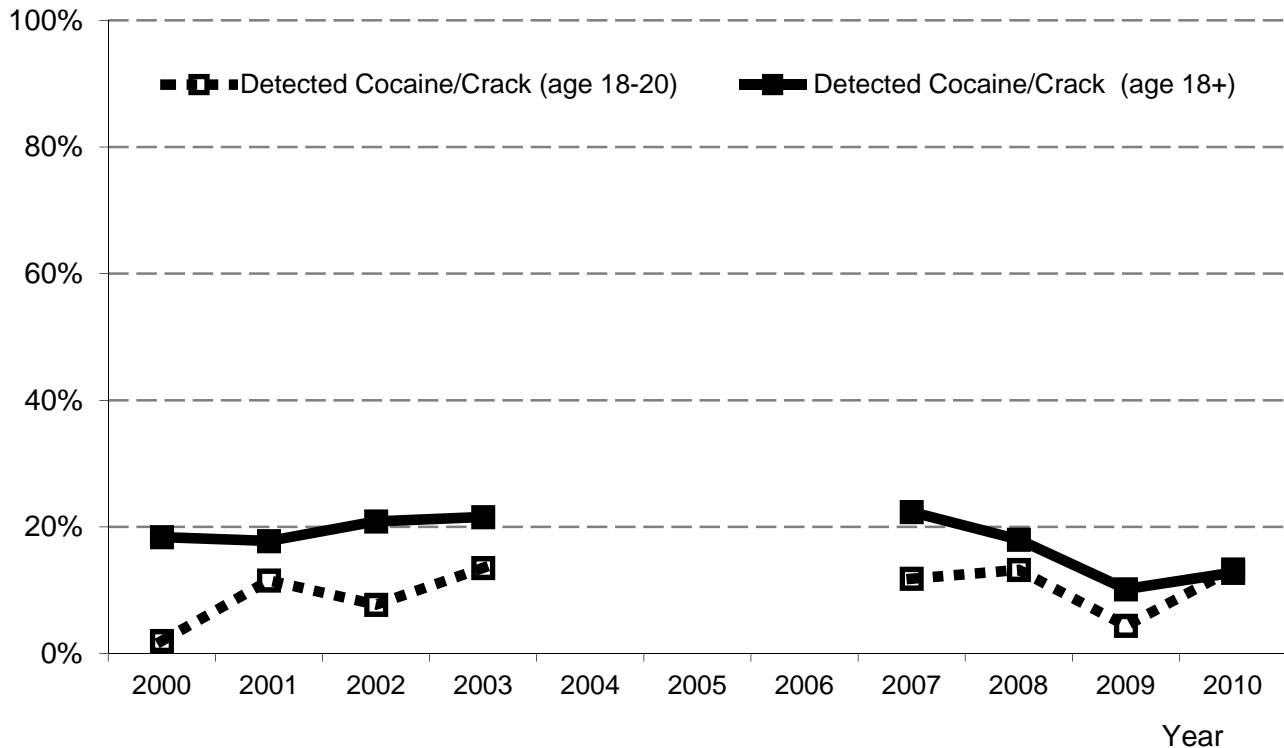
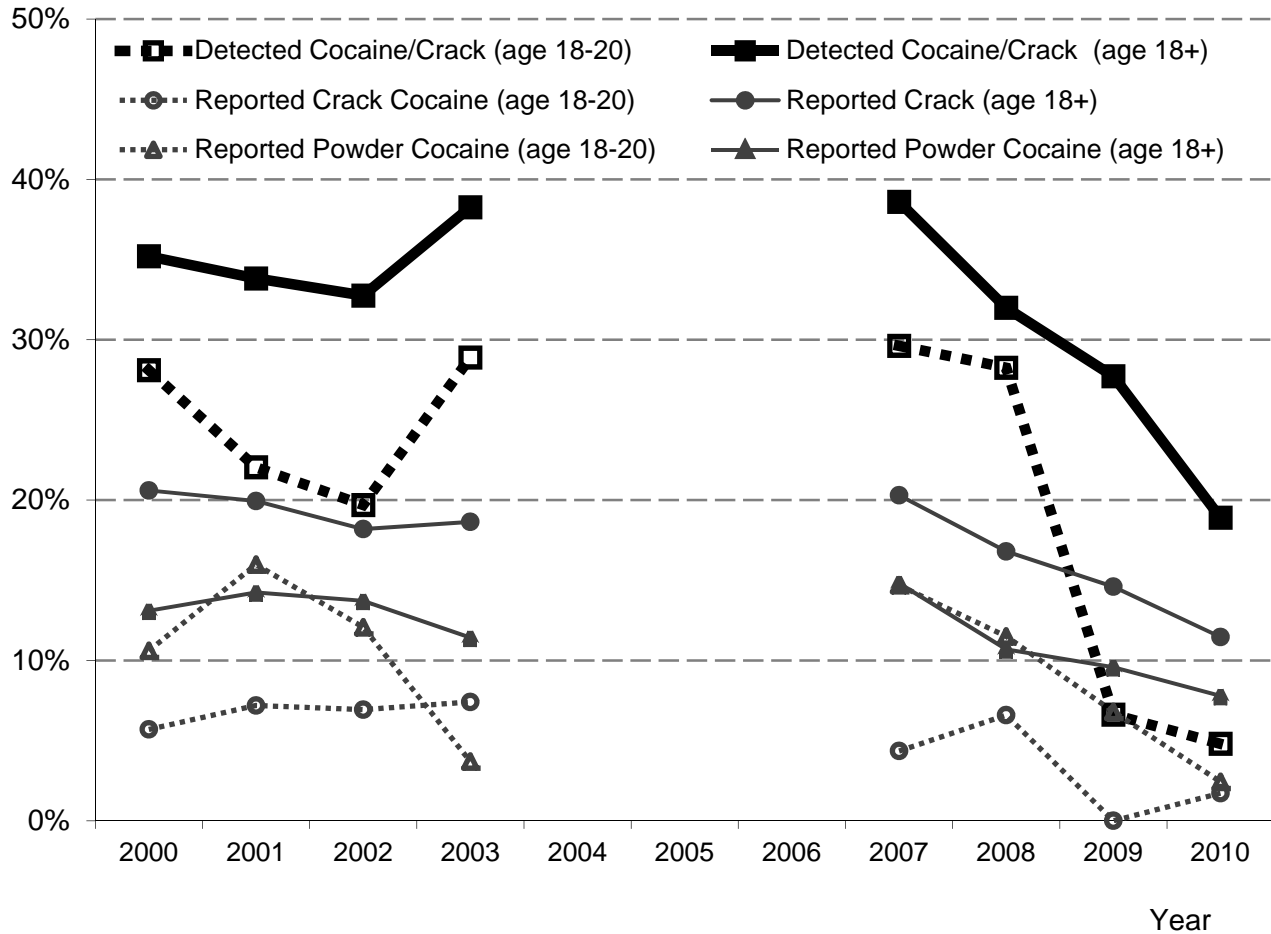
**Figure 5: Detected Cocaine/Crack Use among ADAM Arrestees in Sacramento 2000-10**

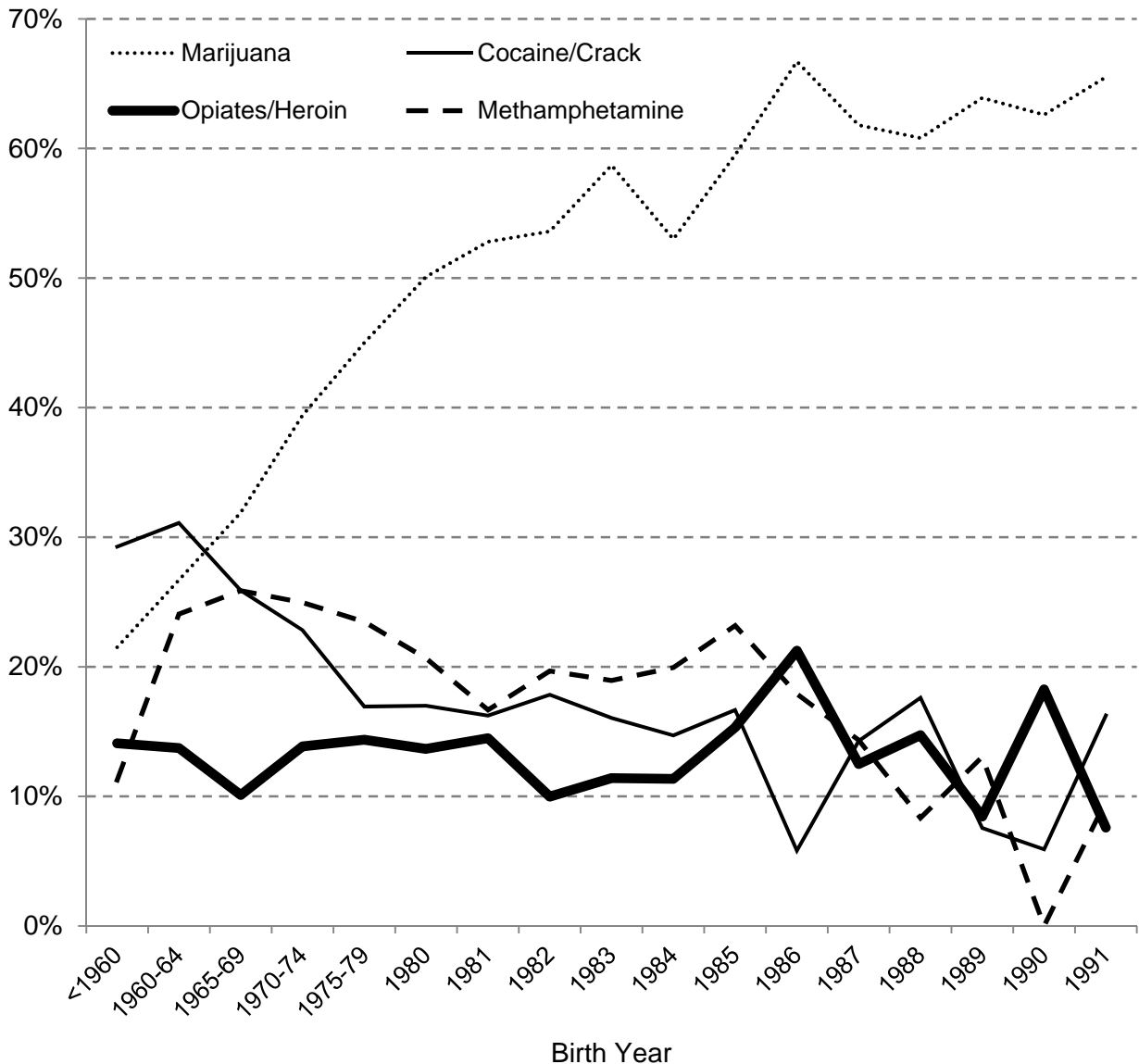
Table 1 illustrates one of the primary advantages of the ADAM data. The ADAM Program collects location specific information which facilitates tracking how drug epidemics vary across locations. The timing of the Crack Epidemic varied across locations. Moreover powder cocaine, opiate/heroin and methamphetamine use was widespread at some locations but not others. The Powder Cocaine Epidemic entered a decline early in the 2000s at two eastern locations (Charlotte and Manhattan) and closer to 2010 at two western locations (Denver and Portland). In Atlanta, the recent Powder Cocaine Epidemic was either still in plateau or had just entered the decline phase. Figure 6 examines detected cocaine/crack use as well as self-reports of crack and powder cocaine use in Denver. Powder cocaine as opposed to crack had become the drug of choice for those youths that do use cocaine. Reported use of crack cocaine among youthful adult arrestees was low throughout the 2000s dropping from 6%-7% during 2000-03 down to 0%-2% by 2009-10. Detected cocaine/crack use among youthful arrestees declined from 28% in 2008 down to 7% in 2009 and 5% in 2010. This drop was likely the result of decreasing powder cocaine use among youthful adult arrestees starting in 2008.

**Figure 6: Detected Cocaine/Crack Use among ADAM Arrestees in Denver 2000-10**

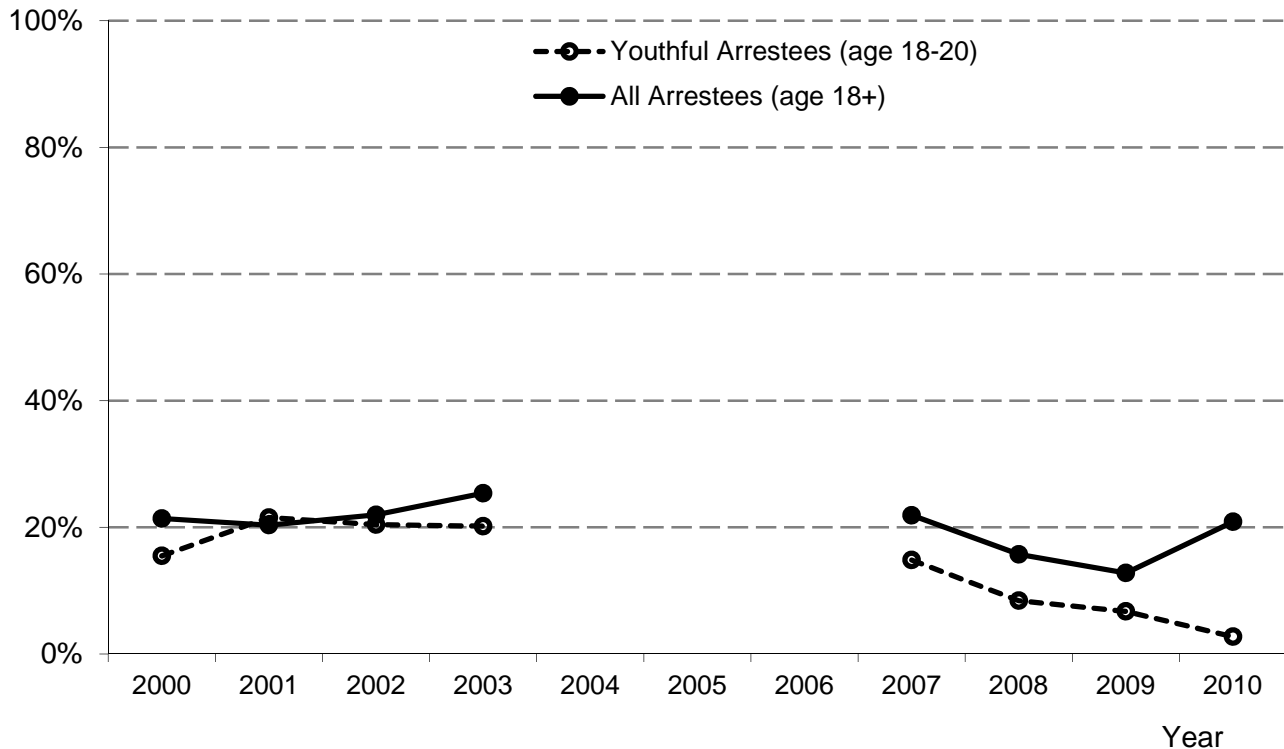


Detected opiate/heroin use was limited to four locations and was in decline at three of the four (Chicago, Manhattan and Washington DC). Opiate/heroin use appears to be endemic to Portland as indicated in Figure 7 which illustrates the variation in detected use of various drugs across birth years. The upper line clearly indicates that marijuana had become the drug of choice among arrestees born in the 1980s. Some older crack users born before 1965 were still sustaining arrests 2000 to 2010; however, the rate of detected use was much lower among arrestees born more recently. The rate of detected opiate/heroin use was relatively constant across birth years from those born before 1960 through those born 1990. This strongly suggests that opiate/heroin use is embedded within a small population that continues to attract new young users. Lastly, Figure 7 reveals that detected methamphetamine use declined from 23% among those born in 1985 down to zero in 1990 indicating that the methamphetamine epidemic is in decline in Portland.

**Figure 7: Variation in Detected Drug Use by Birth Year among ADAM Arrestees in Portland (OR)**



This analysis yielded surprising results regarding methamphetamine. The data suggest that there has been a shift in the popularity of methamphetamine at the two ADAM II locations with any substantial methamphetamine use: Sacramento and Portland (OR). In both West Coast locations, the Methamphetamine Epidemic appears to have entered the decline phase (also see Weisheit & White, 2009). When asked about methamphetamine use, police in Portland agreed that it is still around but that the greater problem has become pharmaceutical opiates and heroin use among young people. Figure 8 indicates that from 2000 to 2003, the methamphetamine epidemic in Portland had been solidly in the plateau phase with detected use near 20% among both adult arrestees and youthful adult arrestees. From 2007 to 2010, there was a steady drop among youthful adult arrestees from 15% down to 3%.

**Figure 8: Detected Methamphetamine Use among ADAM Arrestees in Portland (OR) 2000-10**

### *Conclusion and Implications for Policy and Practice*

This analysis highlights how the drug problems facing different jurisdictions can vary substantially. Law enforcement, drug abuse prevention and treatment, and related social services agencies can potentially tailor their policies and practice to the timing of the specific drug problems facing their communities. The analyses presented here are specifically relevant to the 10 jurisdictions studied. The most pressing drug-related concern for most of the ADAM II locations would be marijuana and any anti-social behaviors associated with its use. To the extent that marijuana use is involved with fewer drug-related problems than crack cocaine this is good news (see Johnson, Golub, & Dunlap, 2006, for a more extended discussion). In addition, with several states introducing medical marijuana programs allowing citizens to use and grow marijuana legally, the place of the expanding population of marijuana users in their communities may not be as disruptive as it might be for other illicit drugs. With regard to crack cocaine, all of the locations are facing a decline except Sacramento. During the decline phase, many older users will persist in their use and be of concern to law enforcement and related agencies. Accordingly, law enforcement and related agencies may focus their policies aimed at stemming problems associated with crack cocaine at this older persistent user population as opposed to focusing on younger users. Sacramento is still in the midst of its Crack Epidemic and therefore faces a qualitatively different challenge than the other ADAM II locations. Hence, policies in Sacramento may need to maintain a focus on reducing crack use among youths in an effort to help the Crack Epidemic to enter its decline phase.

Similar to the Crack Epidemic, the Opiate/Heroin Epidemic was in decline in three locations (Chicago, Manhattan, and Washington DC) suggesting that policies might be most appropriately aimed at an aging and shrinking population of heroin users. However, in Portland (OR) where the opiate/heroin use is endemic, the best policy might be to identify and target policies towards those young people who tend to become users. It

would be important to identify more about the nature of these young people with regard to geographic location, socio-economic status, and anything about their larger social experiences that can lead them to heroin use.

Methamphetamine use had been widespread in the West and was spreading to the Midwest and Southeast (Brownstein, Mulcahy, Taylor, Fernandes-Huessy, & Woods, 2010; Herz, 2000; Hunt, Kuck, & Truitt, 2005; National Institute of Justice, 2003a; Taylor et al., 2011; Weisheit & White, 2009). In response, there have been concerted efforts to reduce methamphetamine use through prevention and supply reduction (National Drug Intelligence Center, 2007; Taylor, et al., 2011). Our analysis suggests that the Methamphetamine Epidemic has entered a decline either on its own or perhaps as a direct result of these efforts at the two ADAM locations where use had been widespread among arrestees. This finding suggests that an appropriate policy intervention may focus more on problems among persistent users. Unfortunately, the ADAM data provide information only about arrestees from two locations heavily affected by methamphetamine. Further research is clearly needed to learn about methamphetamine use elsewhere. Our emphasis on the drug epidemics perspective suggests that analysts in these communities could benefit substantially from studying reports from youth leaders and youths themselves. A decline in use among young adults would indicate that the Methamphetamine Epidemic may be in its decline phase. It would also be useful to examine whether youths have developed strong social norms against methamphetamine use to further confirm that the Methamphetamine Epidemic may be in decline. A similar approach could be used to track the phase of other drug epidemics at locations not fortunate enough to be served by the ADAM II Program.

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