

DYNAMICS OF METHAMPHETAMINE MARKETS IN NEW YORK CITY

by

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## Abstract

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Using Respondent Driven Sampling, this study piloted an innovative research design mixing qualitative and quantitative data collection methods, and social network analysis, that addresses a gap in information on retail methamphetamine markets and the role of illicit drug markets in consumption. Based on a sample of 132 methamphetamine users, buyers and sellers in New York City (NYC), findings describe a bifurcated market defined by differences in sexual identity, drug use behaviors, social network characteristics, and drug market behaviors. The larger sub-market is a closed market related to a sexual network of men who have sex with men (MSM) where methamphetamine (referred to as “tina”) is used as a sex drug. The smaller submarket is a less-closed market not denominated by sexual identity where methamphetamine (referred to as “crank,” “speed,” or “crystal meth”) overlaps with powder and crack cocaine markets. Participants in the MSM submarket viewed “tina” as very different from cocaine, due to what they characterized as the drug’s intense sexual effects, whereas participants in the smaller non-sexual-identity-denominated submarket saw “crystal meth” as a cost-effective alternative to cocaine. While majorities of participants in all subpopulations studied reported that their use of methamphetamine primarily centered on sex, almost all (91%) MSM reported this. Many MSM reported that their sexuality had become indistinguishable from their drug use. Participants were more willing to discuss accessing or purchasing

methamphetamine than they were to discuss providing or selling the drug, although all indications are that most market participants do both. Findings from the study indicate that the most striking characteristic of the methamphetamine market in New York City is the extent of the secondary market. Participants reported essentially no violence in connection with methamphetamine markets in NYC. Participants have a lifetime total of 13 methamphetamine possession arrests for the sample of 132; none has ever been arrested for methamphetamine distribution. Study findings may be useful to practitioners, policy-makers and researchers in fields including law enforcement, criminal justice, and public health and substance abuse treatment.

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The Joint Initiative was funded to encourage methodologically innovative research into retail drug markets, especially methamphetamine markets, in order to address gaps in our knowledge of the functioning of these markets, and the implications of drug markets for law enforcement and drug abuse policy responses. I would like to express my gratitude to NIDA and NIJ for funding my research, and in particular to express my gratitude to my unfailingly-helpful NIJ Program Officer, Dr. Linda Truitt.

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Travis Wendel

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## INTRODUCTION/BACKGROUND AND SIGNIFICANCE

New York City methamphetamine<sup>1</sup> markets have received little attention until recently when concern about growing levels of methamphetamine use and associated HIV risk behaviors in the MSM (men who have sex with men)/gay<sup>2</sup> community began to arise (Hirshfield et al. 2004, Morin et al. 2005). Methamphetamine has nonetheless always been available in New York City and has attracted a certain coterie of “insider” users (Curtis and Wendel 2000, Curtis et al. 2002). Recent attention from federal law enforcement confirms the existence of methamphetamine markets in New York City (Drug Enforcement Administration (DEA) 2004, 2006, National Drug Intelligence Center (NDIC) 2008a,b). The small body of literature that is currently available on methamphetamine use in New York City focuses on use among MSM but offers little information about markets and distribution in general or about use outside of MSM communities. This study seeks to address this gap in the literature, which exists in part because methamphetamine markets have remained inaccessible to

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<sup>1</sup> While this report is primarily concerned with use of methamphetamine, given that it is the most popular form of amphetamine in illegal markets in the United States in recent years, it is important to note the pharmaceutical equivalence of all amphetamines. Just as all narcotics have essentially identical effects and are thus measured in terms of equivalent doses of morphine, different forms of amphetamine differ only in that the dosage necessary to produce a given effect may be lower with more potent forms of the drug. In clinical studies, far from being able to distinguish between different forms of amphetamine, drug-naïve research subjects typically cannot distinguish between the effects of cocaine and amphetamine (Julien 2001). Many of the participants in the present study would disagree with this finding (see below); of course, few if any participants could be described as “drug-naïve” with regard to either cocaine or amphetamine.

<sup>2</sup> Because of the contexts within which methamphetamine use and distribution occurs in New York City, there is extensive discussion of MSM sexual activity in this report. Throughout this report, the term “MSM” is used exclusively when referring to behavior; the term “gay” is used only in quotations, and in reference to a cultural identity built or oriented around same-sex sexual behavior, as opposed to the behavior that may underlie that identity.

researchers who employ methods and techniques that are ill-suited to recruiting users and collecting critical information about markets and distribution and the relationship of consumption and use patterns to markets.

## ***Amphetamines and Methamphetamine: Licit Production and Use***

Amphetamine and methamphetamine use have been widespread in the industrialized world since these substances were introduced to the market in the 1930s, following their initial discovery in 1887 and 1893, respectively.

Amphetamine was patented in the US in 1932 and marketed under the trade name Benzedrine (Brecher 1972). Methamphetamine was first marketed in Europe in 1938 under the trade name Pervitin, and shortly after in the US under the names Methedrine (by Burroughs-Wellcome) and Desoxyn (by Abbott Laboratories), as out-of-patent competitors with Smith, Klein and French's wildly successful Benzedrine (Rasmussen 2008, 112). This was a lucrative market: total sales were estimated at two million doses daily in 1945, with Smith, Klein and French alone selling three times that by the end of the decade (Rasmussen 2008, 112).

Amphetamine and methamphetamine were widely used by both the Axis and Allied military forces in World War II. By the end of the war, American consumption was estimated to be one million 5-10 mg amphetamine tablets daily based on production figures from pharmaceutical manufacturers (Rasmussen 2008). Military use continued to be common for much of the remainder of the twentieth century (Rasmussen 2008, Cornum et al. 1997) and continues today. For example, in the US war in Iraq, combat pilots were prescribed Dexedrine by military medical personnel (Buncombe 2002).

Legal use remained common in the US prior to the Drug Abuse Control Amendments of 1965 (DACA), which banned or greatly restricted some

amphetamine formulations, including Methedrine (a trade name for methamphetamine). The FDA estimated 1962 production at eight billion 10 mg tablets (Rasmussen 2008, 177). The Act followed an initial 1962-3 crackdown on loose prescribing practices around injectable amphetamine; the first illicit amphetamine labs in California sprang up immediately following this crackdown (Brecher 1972). Pharmaceutical production actually increased following the DACA; by 1969, the FDA estimated that production might have been as high as ten billion tablets annually (Rasmussen 2008). A 1970 survey found that 5% of adults in the US had used amphetamines medically in the previous year (Rasmussen 2008).

### ***Amphetamine, Methamphetamine and American Culture***

The “speedfreak” amphetamine-injector subculture of the late 1960s to early 1970s, a spin-off of the hippie psychedelic-based counterculture, attracted near-universal condemnation (Brecher 1972, Grinspoon and Hedblom 1975, Jenkins 1999), with anti-amphetamine injection campaigns emerging from both the expected mainstream and the then-burgeoning counterculture uniting around the slogan “Speed Kills!”. Widespread injection of methamphetamine led to youth revolutionary Abbie Hoffman’s political/harm reduction formulation that “the only dope worth shooting is [then-President Richard] Nixon!” (Hoffman 1969).

Amphetamine use has long been prevalent in sports, particularly baseball. The autobiographical *Ball Four* (1970) by ex-Yankee Jim Bouton, which discussed players’ reliance on amphetamine tablets called “greenies”, was the first public acknowledgement of the degree to which the sport had become reliant on the drug. Despite the notoriety attracted by these revelations in the early 1970s, amphetamine use was not banned in baseball until 2005 (Curry 2006). The first round of testing in 2006 revealed some notable users, including home run hitters Barry Bonds (Quinn 2007a) and Jason Giambi (Quinn 2007b).

Because of use by writers, artists, and musicians, amphetamine use has been influential on culture. The Beat generation writers, especially Jack Kerouac, were prolific users of Benzedrine; most of Kerouac’s *On the Road* (1957) was famously written under the influence. Allen Ginsburg’s epic Beat poem “Howl” (1957) begins with a litany of the acts of self-immolation by “angelheaded hipsters”

who<sup>3</sup> chained themselves to subways for the endless  
ride from Battery to holy Bronx on benzidrine [sic]  
until the noise of wheels and children brought  
them down shuddering mouth-wracked and  
battered bleak of brain all drained of brilliance  
in the drear light of Zoo

William Burroughs, perhaps the most famous drug user in modern literary history, preferred opiates, but his wife, Joan Vollmer, whom he shot in the head while doing a “William Tell routine”, was a heavy amphetamine user after being introduced to Benzedrine by Kerouac. Their son Billy was a heavy user of methamphetamine until his early death. His debut novel was the autobiographical *Speed* (1970).

Andy Warhol’s “Silver Factory” period of the mid-1960s, during which he produced the majority of his films, was another artistic milieu in which amphetamine use was a creative inspiration: “Since many in his circle were on amphetamines during those years, are we to say that the Age of Warhol is the Age of Speed?” (Danto 2009, 105). Warhol said he made his film *Sleep* (1963) because “I could never finally figure out if more things happened in the sixties because there was more awake time for them to happen in (since so many people were on amphetamine), or if people started taking amphetamine because there were so many things to do that they needed to have more awake time to do them in... Seeing everybody so up all the time made me think that sleep was becoming pretty obsolete, so I decided I'd better quickly do a movie of a person sleeping” (Warhol and Hackett 1980, 33).

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<sup>3</sup> Among *many* other things, though early on the list.

Musicians have also been frequent users of amphetamine. One webpage on amphetamine culture (<http://scahr.info/culture/songs.htm>) lists a total of 95 songs about amphetamine use, ranging from early 1960's Mods the Small Faces' "Here Comes the Nice" (about meeting one's dealer) to three different recent techno songs called "Speedfreak". One curious absence is the song "Dr. Robert" by the Beatles, about a Manhattan doctor known as "Dr. Feelgood" for his B12/methamphetamine injections: "If you're down, he'll pick you up" (*Revolver* (1967), Parlophone Records). Many bands, from 60s bands like Australia's Purple Hearts (a slang term for Dexamyl, a dextroamphetamine and amobarbital formulation), to the UK's hugely influential Motorhead (slang synonym for "speed freak") in the 1970s, to the more recent US act REO Speeddealer (a pun on the name of 1970s act REO Speedwagon), have had names referring to amphetamine use. The English musician Lemmy Kilminster of the 1960's psychedelic act Hawkwind and later the punk/heavy metal Motorhead is perhaps the most outspoken advocate of amphetamine use in current popular culture. He described bonding with one of his bandmates in Hawkwind: "[We] discovered we had a mutual interest in how long the human body could be made to hop around" (*Hawkwind: Do Not Panic* [BBC documentary, 2007]).

The impact of amphetamine and methamphetamine on American culture has been evident in a number of areas, and while its influence has not always been acknowledged, it has nevertheless been substantial.

### ***Illicit Methamphetamine Use and Variations In Use***

Following up on the 1965 DACA, The Comprehensive Drug Abuse and Control Act of 1970 created the current system of regulating substances on a series of Schedules. Initially, most amphetamine formulations, including methamphetamine tablets, were listed on Schedule III, allowing, for example, refillable prescriptions, with only injectable liquid methamphetamine on the severely-restricted Schedule II, meaning “high potential for abuse...[but having] a currently accepted medical use” (21 U.S.C. 812). Eventually, methamphetamine and amphetamine were placed under Schedule II. After the 1970 Act, amphetamine prescriptions declined drastically; Benzedrine was withdrawn from the market. With the very large decline in licit manufacture and availability, use did not disappear: Drug Abuse Warning Network (DAWN) mentions of amphetamine for 1977 (at the height of the so-called “disco culture” that glamorized cocaine use) ran higher than for cocaine (1.6% v. 1%, cited in Jenkins 1999).

Many media sources (cited in Jenkins 1999) argued there was a resurgence of use in the 1990s. The question, however, is whether use ever really decreased in the 1980s. Jenkins (1999 unpublished, see also Jenkins 1999) argues that in fact amphetamine use has remained more or less at the same rate since at least the 1950s, though attention to this has varied over time:

[A]mphetamines represent a vital and largely unwritten chapter in the long history of the American encounter with drugs and substance abuse. Since the late 1980s, the mass media have discovered what appear to be the growing menace of methamphetamine and other cognate drugs, which seem to be growing rapidly in use in areas of the west and south-west. However, a convincing case can be made that amphetamines and

especially methamphetamine have been popular in these precise areas at least since the 1950s, and that what is now being noted by the media is really a very old-established problem. Certainly some very early case-studies indicate widespread methamphetamine use in trucking centers and near military bases at least through the 1950s, and it is hard to deduce when, if ever, this usage declined. The fact that these drugs were so thoroughly neglected in years gone by partly reflects law enforcement priorities, but also demonstrates the Eastern biases of the media. It further reflects the racial assumptions and prejudices of journalists and editors, who tended to classify drug abuse as a strictly urban and minority phenomenon, so that predominantly white users were not taken seriously. The implication is that some “new” drug menaces might in reality represent not new phenomena, but the sudden discovery of pre-existing circumstances.

Some recent data suggest a rather drastic decline in methamphetamine use between roughly 2000 and 2009 and show, unsurprisingly, considerable regional variation in use (DAWN 2009, ADAM II 2009). DAWN (2009) reports that the national estimate of methamphetamine-related emergency room visits dropped from 132,576 in 2004 to 66,308 in 2008. Similarly, ADAM II (2009) data show significant declines in those testing positive for methamphetamine upon arrest in recent years. Regional variations are also significant in ADAM II data, with use concentrated in Portland, Oregon and Sacramento, California, the only two western sites in which the study collects data. Even in these western locations with high numbers of methamphetamine-positive arrestees relative to other areas, “the proportion of arrestees testing positive for methamphetamine ... was significantly lower when compared to earlier ADAM collections. In Portland, over 20 percent of arrestees tested positive from 2000 to 2007, significantly higher than found in 2009. In Sacramento use reached a high point in 2003 at 46

percent positive, significantly higher than found in 2009 (31 percent)” (ADAM II 2009).

It is important to note, however, that ADAM II’s sample—i.e. arrestees—may not be representative of methamphetamine-using populations in all areas. Indeed, a key finding of the present study is the existence of a closed network of MSM methamphetamine users in New York City who are relatively shielded from law enforcement. The nature of this network, and presumably of others like it, perhaps complicates ADAM II’s (2009) finding that “what is a serious problem in Sacramento...can be virtually non-existent in New York (0 tested positive)” (viii). Clearly, ADAM II data contain valuable information about regional variations in rates of illicit drug use; however, as Jenkins (1999) points out, what appears to be a “non-existent” problem in a particular area may in fact be an invisible problem. Besides largely missing methamphetamine use in the Northeast, ADAM II data may also significantly underestimate the overall prevalence of methamphetamine use nationally because it does not collect any data from southwest border counties where methamphetamine use is known to be prevalent.

The very latest data on methamphetamine seizures by law enforcement indicate that methamphetamine availability is, yet again, on the rise in the US, which will likely lead to increasing use in years to come. The Justice Department’s *National Methamphetamine Threat Assessment 2010* notes that

After gradually declining since 2006, domestic methamphetamine availability has rebounded and is at a 5-year high as a result of increasing large-scale production of the drug in Mexico and, to a

lesser extent, the increasing prevalence of small-scale production in the United States. (NDIC unpublished 2010, 1)

This uptick in availability is attributed to Mexican DTO's increased ability to acquire the precursor chemicals ephedrine and pseudoephedrine, use alternative precursors such as phenylacetic acid, and open new smuggling routes (NDIC unpublished 2010). Increased production has led to significant declines in price. Data from System to Retrieve Information from Drug Evidence (STRIDE), reported in the National Methamphetamine Threat Assessment 2010,

show that in 2009, the price per pure gram for methamphetamine reached its lowest point since 2005—a year in which methamphetamine availability was very high. The recent decline in methamphetamine prices was very sharp, with a 37 percent decrease (\$175.81 to \$110.87) from the first quarter of 2009 to the fourth quarter of 2009. (NDIC 2010 unpublished, 1).

The salient point to make here is that with increased production, wider availability in the US, and lower market prices, methamphetamine use will likely rise in the US in the next few years. Data trends in the literature show, for instance, that the number of people entering substance treatment for methamphetamine at publicly funded facilities rises and falls with levels of availability of the substance (NDIC unpublished 2010).

In addition to noting temporal and regional variations in methamphetamine use, the literature also shows considerable variation in use by subpopulation. Studies carried out in the 1990s found “an enormous diversity of user groups”, including “homosexual and bisexual men, college students, white-collar businessmen, young adults and youth in the rave or club culture and living on the street and longtime user groups such as outlaw motorcycle gangs” (Pach and

Gorman 2002, 88). In a recent ethnographic study, researchers found that “user groups and associated patterns of use varied according to age, gender, sexual preference, ethnicity, occupation and residence” (Pach and Gorman 2008, 96). A review of epidemiological data from a range of sources on amphetamine and methamphetamine use in North America found “different types of users at various times” (Maxwell and Rutkowski 2008, 229). Maxwell and Rutkowski (2008) note that a “US survey of young men newly diagnosed with HIV in the southeastern United States found that the number using methamphetamine and other ‘club drugs’ such as ecstasy increased from 12% in 2000 to 22% in 2005” (233). Reported use also varies considerably by race (Pach and Gorman 2002, DAWN 2010). Overwhelmingly, methamphetamine users, according to the literature, are white (Maxwell and Rutkowski 2008, DAWN 2009), and are often working-class whites from rural areas (Booth et al. 2006, Herz 2000, Siegal et al. 2006, Schoeneberger et al. 2005, Wang et al. 2006). DAWN (2009) reports that of the 66,308 people visiting emergency departments for methamphetamine-related issues in 2008, 37,789 were white; 3,217 were black; and 8,056 were Hispanic. Data tend to show methamphetamine use to be distributed more equitably by gender (Brecht et al. 2004), though males continue to be represented at significantly higher rates than females in some studies. In 2008, 39,210 males visited emergency departments for methamphetamine-related issues, while only 27,095 women did (DAWN 2010).

Since the Comprehensive Drug Abuse and Control Act of 1970 began to regulate methamphetamine according to the current Schedule system, illicit use

has continued virtually unabated. According to the narrative contained in the literature, methamphetamine use exploded during the 1990s, declined throughout the first decade of the twenty-first century, and is likely again on the rise. However, the presumed explosion of use in the 90s can perhaps be attributed to increased attention from law enforcement and the media during the period, and studies reporting declines in recent years may suffer from methodological concerns related to sampling and study design. The high diversity of methamphetamine-using populations render estimating the scope of the methamphetamine problem difficult, to say the least. Clearly, more research focusing on “hidden” populations of methamphetamine users is called for in order to assess the breadth of illicit methamphetamine use in the US today.

### ***Amphetamine, Methamphetamine Use and Health***

Amphetamine use has been associated with a variety of health risks (Grund et al. 2010). The media, in particular, portrays amphetamine and methamphetamine as drugs that have led to a cascade of bad outcomes for users and their families, all the more so as their popularity has increased. Advertisements for methamphetamine prevention campaigns have focused on “meth mouth” as one of the primary negative health consequence of use. The drug itself does not affect the teeth; rather, it contributes to poor dental hygiene and grinding of teeth, which can lead to problems. As disgusting as the images of rotten teeth may be, the message delivered by the campaign is not one that portrays using the drug as life-threatening per se, as was so often the case with crack, heroin, and amphetamine according to the anti-speed campaigns of yesteryear.

As compared with some other illegal drugs (heroin and cocaine, in particular), methamphetamine appears to be associated with fewer serious health problems for users and less incidents of deaths by overdose. Methamphetamine can be passed via the placenta and breast milk to children, but there has been little research or prevention work around the issue of the drug’s impact on children and neonates (Chomchai et al. 2004, Horton et al. 2003, Wouldes et al. 2004), which is somewhat surprising given the extraordinary amount of scrutiny that “crack babies” received when that drug was popular.

The threat to public health posed by illegal methamphetamine labs has generated some interest by researchers (Hohman et al. 2004, Santos et al. 2005) and coverage in the media, but it is not clear that the problem has the potential to

affect large numbers of people given that labs are typically located in sparsely populated areas. Recent media coverage, however, has noted that the general public should be increasingly concerned because “the latest public safety hazard to emerge from the ever-shifting methods of producing methamphetamine” involves discarding toxic chemicals used in the manufacture of methamphetamine out the windows of moving cars that operate as mobile labs (Saulny 2010).

As methamphetamine markets mature and a cadre of core users emerges to sustain the market, the impact of long-term use on health is increasingly of interest to researchers (Guilarte et al. 2003, Kalechstein et al. 2000, Rawson et al. 2002, Thomas and Kuhn 2005, Urbina and Jones 2004). Some researchers have noted that the effects of methamphetamine extend well beyond the immediate impact the drug has on individual users and must be viewed in a community context that draws attention to increased levels of violence, child neglect and abuse, and other public health consequences (Watanabe-Galloway et al. 2009). Clearly, more research is needed to understand the wider health implications associated with the growth of methamphetamine markets.

### ***Methamphetamine Use, Sex, And MSM***

One topic that is not often discussed in the literature of methamphetamine prior to the 1990s is the use of methamphetamine as a sexual stimulant. There are exceptions: Jenkins (1999, 40) quotes one 1960s account that is very similar to some of the discussions of methamphetamine and sex from study participants quoted below: “On Methedrine [the former trade name for methamphetamine] you are capable of any form of erotic behavior... Meth orgasms are like a winding spring building for hours... Methedrine enforces a concept of sex as conquest and achievement, of endurance and power.” A more typical 1960s sentiment as to sex and amphetamine use, characteristic of hippie anti-amphetamine attitudes, is

If you don't like sleeping, and don't want to screw,  
Then you should take lots of amphetamine, too!  
The Fugs, “New Amphetamine Shriek”, *Virgin Fugs*,  
(1967), ESP Disc.

Clearly many of the participants in our study quoted below would disagree with this sentiment.

Much of the literature on methamphetamine is found in the field of public health and has focused on individual risk behavior, especially hypersexual activity during episodes of use and attendant HIV risk (Anglin et al. 2000, Domier et al. 2000, Molitor et al. 1999, Gay Men's Health Crisis 2004, Latino Commission on AIDS 2005, Rotheram-Borus et al. 1994, Semple et al. 2002). Shrem and Halkitis (2010) provide a survey of the psychological literature on methamphetamine abuse, sexual risk taking and treatment issues.

Osborne (1997) contends that MSM have been using methamphetamine for as long as the rest of American society, but “gay/MSM” methamphetamine use is, and has always been, primarily around use during sex, whereas non-MSM use, he argues, has been associated with work contexts. One 1961 study, “Amphetamine addiction and disturbed sexuality”, found that “overt perverse sexuality including homosexuality was present in 29% of the cases prior to addiction. In 36% of cases, sexual drive was markedly increased while using amphetamines. Some addicts used amphetamines for this very purpose and were thereby enabled to perform extraordinary feats” (Bell 1961). In a 1976 study on the effects of amphetamine on sexuality and aggression, 26% of the users studied were “practicing homosexuals”, with a large majority of those MSM users reporting that they used the drug in “marathon” sex sessions (Angrist and Gershon 1976).

It is important to note that many of the cultural figures cited as using amphetamine above were open MSM at a time when societal homophobia made this a risky identity to publicly assume: Allen Ginsberg embraced the gay liberation movement, while Andy Warhol and William Burroughs, who both rejected the “gay” cultural identity, were both nonetheless famous for their open MSM lifestyles. The use of amphetamine by these culturally-prominent MSM from the 1950s onwards is an indication that use of amphetamine by MSM is not a recent phenomenon; it is likely that use by these culturally-prominent MSM was matched by use among less-famous MSM. Given the extremely underground nature of MSM culture prior to the 1970s, it is hardly surprising that only limited

evidence is available concerning amphetamine use among MSM in this period, especially use in the context of sexual acts that were also the subject of criminal laws until very recently.

Although a number of studies (and law enforcement data) suggest that methamphetamine use is a white working-class phenomenon and that methamphetamine use is popular in rural areas (Booth et al. 2006, Herz 2000, Siegal et al. 2006, Schoeneberger et al. 2005, Wang et al. 2006), the public health literature has principally focused on MSM populations (Colfax et al. 2004, Frosch et al. 1996, Gorman et al. 1997, Gorman and Halkitis 2003, Halkitis et al. 2001, 2003, Halkitis and Parsons 2002, Koblin et al. 2003, Reback and Grella 1999, Shoptaw et al. 2002). An interesting parallel to the present study is Reback (1997), which, in approaching methamphetamine use among MSM from a public-health, rather than a criminal-justice, perspective, reaches very similar conclusions to the present study.

The literature suggests that there are both broad and fine-grained distinctions that methamphetamine users employ and that structure their cultural environment. For example, Koblin et al. (2007) argue, citing Diaz et al. 2005, Halkitis, Fischgrund and Parsons 2005, Kurtz 2005, Semple, Patterson and Grant 2002, that HIV negative men use methamphetamine for social reasons whereas HIV positive men use the stimulant to enhance sex and to deal with negative physical effects and self-image problems caused by their HIV status. This distinction is reminiscent of that between “party use” and marginalized use noted by Grund et al. (2010) with regard to stimulant substances including

amphetamine and cocaine: “[In] western EU [European Union] countries [...] a division between integrated (party) and marginalised users of amphetamine seems to exist, similar to that between cocaine snorters and smokers or injectors.” Researchers have generally focused their attention on individual-level risk behavior, and far less is known about methamphetamine use and distribution networks; although there has been considerable research about networks involving other (especially injected) drugs (see, for example, Friedman et al. 1997), more work is necessary to understand whether the lessons learned from examining those drugs apply to methamphetamine or not.

## ***Drug Markets***

Drug markets have been variously conceptualized in the literature as places (see e.g. Eck 1995), as economic relationships (Reuter et al. 1990, 2004, Caulkins et al. 1998), as social relationships contingent on particular historical factors (Dorn, Murji and South 1992, Curtis and Wendel 2000, Curtis et al. 2002, Murji 2007), and of course, as targets for extermination. One strand of the economic drug market literature is summed up by the wonderfully-titled “The numbers game: Let’s all guess the size of the illegal drug industry!” (Thoumi 2005). Estimating the overall size of methamphetamine markets has been less of a focus than calculating the breadth of heroin and cocaine markets, perhaps reflecting the status of methamphetamine as “something of a poor relation in the burgeoning literature on narcotics” (Jenkins 1992).

It is certainly true, however, that despite the relative lack of overall attention as compared to heroin and cocaine, law enforcement puts considerable resources into determining the scope of methamphetamine markets, and interdicting those markets, especially in western states. There are law enforcement efforts to discover clandestine labs, track precursor chemicals, chart seizures, and test for contents and purity, all of which help in projecting availability and determining the shape, size, and character of the overall methamphetamine market (see Hunt et al 2006). For example, the DEA operates STRIDE, a system that uses drug evidence to form various data sets. STRIDE data, however, are not routinely made available and are generally intended for law enforcement purposes, though references to the data occasionally appear in law enforcement reports, as in the National

Methamphetamine Threat Assessment 2010, discussed above.

Much of the literature about drug markets has been focused on evaluating the effectiveness of various types of law enforcement interventions aimed at disrupting or eliminating drug distribution (Moore 1977, Zimmer 1987, Kleiman 1988, Sviridoff et al. 1992).

Another group of studies focused on the relationship between drugs and violence. Brownstein and Taylor (2007) argue that “In New York City... much of the violence and violent crime associated with drug markets was the product of uncertain and unstable relationships among market participants” (Brownstein et al. 1992, Goldstein et al. 1992). Goldstein (1985) suggested that there is a tripartite division of the relationship between drugs and crime: psycho-pharmacological (crime resulting from the effects of the drugs themselves); economic-compulsive (property crime resulting from the financial demands of expensive drug habits); and systemic (crimes within the market itself). Other studies building on Goldstein’s include Fagan 1990, Fagan and Chin 1990, and Goldstein et al. 1989, 1992. Recent studies examining the links between drug markets and violence include Naylor 2009, Friman 2009, and Andreas and Wallman 2009. Another approach to drug market violence, “training” markets to avoid undesired behavior, has been developed recently (Curtis and Wendel 2007, Kennedy 2008). Research specifically linking methamphetamine and violence, discussed below, also appears with some regularity in the literature (Cohen et al. 2003, Caulkins et al. 2006, Baskin-Sommers and Sommers 2006).

The drug markets literature has remained largely focused on these two

issues and has devoted less attention to relationships between markets and drug use, that is, between distribution and consumption (but see Wendel and Curtis 2000, Wendel et al. 2003, Curtis et al. 2002). This relative absence in the literature is unfortunate considering that in nascent markets where roles between sellers and buyers are not always clearly defined, patterns of drug use often emerge as an outcome of interactions between drug sellers and members of their social networks (Hamid 1992). Sales and Murphy (2007, 944) argue that “The role of the social characteristics of sellers and types of sales settings in understanding drug markets is pivotal” and that “the nature of buyer-seller relationships [in their case, social networks of friends selling Ecstasy] plays a major role in drug sales practices and social arrangements.” Compared with the sometimes highly organized markets that have existed for other illegal drugs (e.g., heroin, cocaine, marijuana), retail methamphetamine markets have remained, by contrast, relatively primitive in their social and technical organization. Indeed, Eck (1995) argues that methamphetamine dealers typically sold through their social networks rather than through markets featuring elaborate distribution structures. Cocaine and heroin dealers, on the other hand, typically sold to strangers in high volume, rendering social networks inconsequential. As a result of inter-network selling, methamphetamine dealers faced lower risks than sellers of these other substances. While methamphetamine dealers typically sold the drug from their homes, like dealers of other drugs, those homes were less concentrated in high poverty areas of their communities. Several researchers have commented on the “closed” nature of

methamphetamine markets (Eck 1995, Pennell et al. 1999, Rodriguez et al. 2005, 686) and have noted that these markets are typically formed among people who know each other: most transactions were arranged on the phone, took place indoors, and involved a customer purchasing from one steady source. Studies centered explicitly on understanding the social networks of methamphetamine sellers and users in order to draw conclusions about the character of methamphetamine markets do not exist.

### ***Methamphetamine Markets***

As discussed above, the initial development of illicit production of methamphetamine can be seen as a reaction to evolving controls on pharmaceutical production and distribution of amphetamine, while the subsequent evolution of illicit production has largely occurred as a response to controls on precursor chemicals and trafficking methods. Outlaw biker gangs had long been major consumers of amphetamine (Thompson 1967), but became producers only in the wake of the 1970 Act (Jenkins 1999, Jenkins 1992) as diverted pharmaceutical amphetamine became very scarce. Illicit “speed labs” became more common after the 1966 DACA when the restrictions on licit amphetamines raised prices to the point where illicit manufacture was potentially profitable (Brecher 1972), but illicit production became more profitable still when the 1970 Act largely eliminated diverted licit amphetamine formulations from drug markets.

Most production of illicit amphetamine up to about 1990 probably used the P2P (phenyl-2-propanone) synthesis. After P2P was listed on schedule II of the Controlled Substances Act in 1980, the price of P2P went to \$10,000 per gallon, an amount that would produce 8 pounds of methamphetamine worth \$9-15,000 per pound (Jenkins 1992). After the crackdowns on P2P reduced availability, and thus increased black market prices during the 1980s, many clandestine labs shifted to various syntheses using red phosphorus (often collected from matchheads) and ephedrine or pseudoephedrine (NDIC 2005). The colorfully-named “Nazi Method”, or Birch reduction, became widely used during the 1990s because it reduced lab set up time, was faster than the ephedrine reduction

method, and involved chemicals that were easier to obtain (Drug Identification Bible 2001, 684). Techniques of methamphetamine manufacture that had been the jealously guarded secrets of bikers and other outlaw producers became more widely available in the 1980s and 1990s, as underground books (see, e.g., “Uncle Fester” 1996, 1998; the first has gone through many editions since some time in the mid-1980s) and then websites spread methamphetamine “recipes” (these sites tend to be ephemeral, but generally involve discussions of the “dreams” of “SWIM” [“Someone Who Isn’t Me”] about detailed chemical procedures).

Jenkins (1992) provides a comprehensive examination of methamphetamine production and wholesale distribution in Philadelphia, the alleged “Speed capital of the world” from 1970 to 1990 (a title that has been disputed by San Diego, and Portland, Oregon, among others, Jenkins 1999). He identifies an interlinked web of network contacts among individuals and small “crews” drawn from members of the Mafia/Cosa Nostra families, officials and members of unions including the Teamsters and construction trades unions, outlaw motorcycle gangs, most prominently the Pagans and the Warlocks, and independent operators, such as a former burglary “crew”, and argues that the structure of the methamphetamine industry in Philadelphia bears little resemblance to conventional narratives of (highly-) organized crime “syndicates.”

Rodriguez et al. (2005) argue that “the individual and community level predictors of methamphetamine markets are significantly different from [those for] marijuana, cocaine and opiate use...” (686) because methamphetamine markets,

unlike other drug markets, take place in “communities or niches where a portion of the population maintains particular social or cultural norms tolerating or even fostering their [*sic*] use” (686). They further note that, in addition to differing market locales between methamphetamine markets and other drug markets, methamphetamine markets are characterized by different types of social relationships: “[M]ethamphetamine users have established personal relationships with their sources...” (687). The study found that methamphetamine users are different from users of other drugs in age, race and employment status: older members of the sample, which consisted of arrestees, were more likely to use cocaine and opiates than methamphetamine (681, 682); Latino/Hispanic, black, and Native American respondents were more likely to use cocaine and opiates than methamphetamine as compared to whites (681, 683); and arrestees from neighborhoods with higher unemployment rates were more likely to use cocaine and opiates than methamphetamine (681, 683, 684).

The literature on methamphetamine often explicitly links methamphetamine use and markets to violence. Baskin-Sommers and Sommers (2006) found in a study of 106 methamphetamine-using young adults between the ages of eighteen to twenty-five that “38 percent of males and 30 percent of females committed methamphetamine-related violence, respectively” and concluded that “methamphetamine use is a risk factor for violence” (p. 661). In a large study of 1,016 methamphetamine users in treatment, researchers report that “[p]ast and current interpersonal violence is a characteristic of the lifestyles of the majority entering treatment for methamphetamine dependence” (Cohen et.

al. 2003). One article from the economic literature on illicit drug markets reflects the seemingly indissoluble connection between methamphetamine and violence: “The logic we develop pertains in markets in which there is a ubiquitous presence of potential violence—violence in which sellers impose substantial externalities on each other. The markets for expensive illegal drugs such as cocaine, heroin, and methamphetamine, often fit the bill” (Caulkins et al 2006). This claimed linkage between methamphetamine use and violence is particularly interesting in light of the present report’s finding of a near-total *absence* of violence in the methamphetamine user networks discovered through the research.

## ***The Evolution of Methamphetamine Markets in the US***

Much of the available literature and empirical data about methamphetamine *markets*, as opposed to *use*, today comes from law enforcement sources. For more than a decade, law enforcement agencies have been active in expanding their capacity to address the problem in rural areas, and have more recently expanded their focus to urban areas that feature methamphetamine markets, including New York City.

According to the NDIC (2006, 9), “Caucasian independent dealers and OMGs [outlaw motorcycle gangs] are the predominant retail dealers in rural areas of the [New York/New Jersey] region, where most methamphetamine is distributed and consumed.” Law enforcement has also reported a growth in the number of very small labs/”cooks”, including mobile labs in moving vehicles.

So-called “cold cook” methods for small-scale production of methamphetamine, discussed below, have been the subject of much attention from law enforcement. Others are more skeptical, with some even dismissing “cold cook” methamphetamine as mythical (i.e., law enforcement sources cited in Boeri et al. 2009, although methamphetamine users in that study accepted “cold cook” products as getting them high). From the NDIC’s Methamphetamine Threat Assessment 2009, 13):

“One-Pot” or “Shake and Bake” Methamphetamine Production: A one-pot methamphetamine laboratory actually uses a variation of the lithium ammonia method of production; however, in the one-pot method, a combination of commonly available chemicals is used to synthesize the anhydrous ammonia essential for methamphetamine production. Cooks using this method are able to produce the drug in approximately 30 minutes at nearly any location by mixing, or “shaking,” ingredients in easily found containers such as a 2-liter plastic soda bottle, as opposed to using other methods that require

hours to heat ingredients. Producers often use the one-pot cook while traveling in vehicles and dispose of waste components along roadsides. Discarded plastic bottles may carry residual chemicals that can be toxic, explosive, or flammable.

This process allegedly allows production in a 2-liter soda bottle with commonly available ingredients. Electrolytic production (the “Festerlytic Method”, named after its inventor “Uncle Fester”, the Timothy Leary of illicit methamphetamine production) is another comparatively recent method offering the promise of small-scale “tabletop” production (“Uncle Fester” 1998). It is difficult to assess the validity of claims regarding “cold cook” methamphetamine and whether small producers have any impact on the market, but the longer-term effects of efforts to control production through precursor regulation (Hunt et al. 2006) have led to the expansion of production, smuggling and trafficking by large drug trafficking organizations, and to a decrease in the number of large-scale labs/“cooks” within the United States (NDIC 2008a,b, 2010, 2010 unpublished).

Law enforcement has identified Mexican drug trafficking organizations (DTOs) as controlling most of the wholesale methamphetamine distribution in the United States, with Mexico “the primary source of methamphetamine consumed in the United States” while “Mexican DTOs, along with Hispanic street gangs, control much of the midlevel and retail distribution in the region’s cities and towns” (NDIC 2010, 2010 unpublished). Most recently, “[f]rom mid-2008 through 2009, methamphetamine availability increased in the United States. Drug availability indicator data show that methamphetamine prices, which peaked in 2007, declined significantly during 2008 and 2009, while methamphetamine purity increased... Methamphetamine seizures also increased in 2008 after

dropping in 2007, and 2009 data indicate that seizures continue to rise” (NDIC 2010). While much of the activity in the market is often attributed to Mexican DTOs, domestic production of methamphetamine continues to present problems to law enforcement, and law enforcement reports note that a recent increase in local production “was realized primarily in small-scale methamphetamine laboratories throughout the country, especially in the Southeast Region; however, methamphetamine superlabs in California also increased in scale and number during the same period” (NDIC 2010).

### ***Methamphetamine Markets in New York City***

The New York/New Jersey Region is not seen by law enforcement as being among the most problematic areas for methamphetamine, and the threat posed by methamphetamine in this region is considered relatively low. Law enforcement does note, however, that “the methamphetamine abuser population is expanding, particularly in New Jersey” (NDIC 2008b). Methamphetamine distribution at the import and wholesale level in the New York/New Jersey region is largely controlled by Mexican DTOs, according to federal law enforcement (NDIC 2006, 9; NDIC 2010, 2010 unpublished). In New York City, a recent report identifies the Federation, Gulf Coast, Tijuana Mexican drug trafficking cartels as dominating the market, with the Juárez cartel operating in neighboring Newark, New Jersey (NDIC 2008b). The vast majority of the methamphetamine consumed in the region originates in Mexico and the western United States, and is “transported overland by private and commercial vehicles. DTOs also use parcel delivery services and couriers on buses, trains, and commercial aircraft to transport the drug” (NDIC 2006, 9; NDIC 2010).

Recent methamphetamine arrests in New York City have involved methamphetamine labs (DEA 2006) and distribution located in the heavily gay Chelsea area of Manhattan (DEA 2004). Law enforcement sources cite recent increases in purity, supply and availability of methamphetamine, a development that has been associated with increased use of smokable (ice) amphetamine. Law enforcement sources have also noted an increase in the volume of use among long-term users (MSM and in the night club scene in NYC), “populations [that] have long been on the cutting edge of drug trends that later spread to the

general population” (NDIC 2006, 9). Law enforcement reports also note new groups of users, notably Mexican Hispanics (NDIC 2007), a growing population in New York City, Asians (NDIC 2006, 9), and younger and more affluent users (NDIC 2008b). As evidence of a greater number of users in the area over the last several years, the NDIC (2008b) notes that “the number of amphetamine-related (including methamphetamine-related) admissions to publicly funded treatment facilities in the New York/ New Jersey Region increased 15 percent overall from 2002 (685) to 2006 (787).”

## ***Summary***

Beyond providing an overview of how methamphetamine distribution is structured, how it has evolved over time, and the activity level of law enforcement units in various jurisdictions across the country, the sparse number of law enforcement sources about methamphetamine markets offer few details to provide guidance for policy makers and professionals who are concerned about this issue. Little is known about the relationship of consumption to distribution or the role of social networks in methamphetamine markets, beyond the fact that social networks are more important with regard to methamphetamine than with many other illicit drugs. By focusing attention on networks and on connections between sellers and buyers, this study will improve our knowledge about how consumption affects market structure, how methamphetamine markets operate, and the role of social networks in methamphetamine markets.

## **METHODS**

### ***Overview Of Methods***

To accomplish the study goals, the study combined several innovative approaches to data collection and analysis. An initial period of formative research grounded the following substantive data-collection phase of the study in a thorough overview of retail methamphetamine markets in New York City.

Using insights provided by the formative research, the data collection phase of the study used Respondent-Driven Sampling (RDS) to recruit 132 methamphetamine market participants. Each study participant did a roughly 1- to 2-hour structured interview that recorded participant demographics, drug use patterns and market participation, and also focused on enumerating and describing the members of their drug use and distribution networks (including drug buying, selling, trading, and in-kind transaction partners). Each participant was invited to recruit three additional eligible participants according to the RDS protocol. Participants were instructed to return one month after their initial interview date to collect recruitment incentives and complete a follow-up interview that focused on changes in patterns of use, distribution or network membership since the first interview.

### ***Formative Research***

The formative stage of the research process provided an overview of the state of methamphetamine retail markets in New York City and defined relevant market attributes to lay the foundation for data collection. The major goals of the formative research were to:

- Guide the recruitment of RDS “seeds” (see below for a discussion of RDS procedures employed) so that they were broadly representative of the underlying population of methamphetamine users and distributors in New York City
- Formulate questions related to methamphetamine buying, selling and use to be addressed in the data collection phase of the project
- Assist in the development of field plans to operationalize and optimize data collection, including identifying research locations and formulating study logistics
- Identify key stakeholders and cultural experts who could provide detailed information about New York City retail methamphetamine markets and broker entrée to networks of distributors and users
- Identify potential seeds to begin respondent-driven sampling recruitment
- Develop eligibility screeners to ensure that RDS recruits were in fact market participants

To accomplish these goals, the project conducted:

- Secondary data review
- Cultural expert interviews
- Focus groups

## **Secondary data review**

The research team reviewed available data about methamphetamine markets and use in New York City, including public health records (including emergency room, treatment admission and mortality data), criminal justice records (including records of arrests, prosecutions and convictions for methamphetamine possession and distribution) and traditional substance abuse measures (National Survey of Drug Use and Health, Drug Abuse Warning Network, e.g.). In addition, online news databases were searched and reviewed on an ongoing basis for references to methamphetamine use and distribution locally; these compiled data were used to help guide recruitment strategy and contextualize and triangulate data that the project collected.

## **Cultural expert interviews**

The research team conducted formal interviews of 20 “cultural experts”. Among these 20 were users and distributors of methamphetamine, users of other stimulant drugs (especially powder cocaine, crack and Ecstasy), sex workers, service providers (outreach workers, community health workers and drug counselors) and local activists. The interviews were semi-structured and open-ended to allow for in-depth discussion of issues or topics in detail. The interviews elicited participants’ perceptions and understandings of methamphetamine use and distribution in New York City, and their descriptions of distribution and use networks, their members, and linkages that may exist between distinct groups of users and distributors. Interviews took place in a variety of settings (e.g., in participants’ homes, in parks, on the street, and in our

Lower East Side project office) to maximize the comfort of the respondent. Procedures were followed to obtain informed consent, and all interviews were digitally recorded for selective transcription. Incentives were offered to all cultural experts. Some key informants also became seeds for the RDS recruitment described below.

### **Focus groups**

The research team conducted two focus groups during the Formative Research phase of the study. One was conducted with participants in an MSM-oriented HIV service organization; the other was conducted with staff at a community organization for gay, lesbian, bisexual and transgender New Yorkers. The focus groups were helpful in exploring community practices and norms around methamphetamine use among MSM in New York City. Procedures were followed to obtain informed consent, but the focus groups were not recorded. Incentives were offered to the participants at the HIV service agency, but not to the staff members at the community center, who participated in the regular course of their employment.

### ***Study Recruiting: Respondent Driven Sampling***

The study recruited 132 current methamphetamine users and distributors (persons who had used or sold methamphetamine in the previous thirty days) over a 33-month data collection period, using Respondent Driven Sampling. Respondent Driven Sampling (RDS) is a methodology that is used to recruit samples of hard-to-reach groups by taking advantage of intragroup social connections to build a sample pool (Heckathorn 1997, 2002, Heckathorn et al. 2002, Abdul-Quader et al. 2006, Robinson et al. 2006). RDS was designed for use among hard-to-reach populations—where participation in the study may be stigmatized, or where no ordinary sampling frame that would allow random sampling existed (Heckathorn 1997, 2002, 2007). RDS has been used nationally and internationally in studies of groups including injection drug users, commercial sex workers, and men who have sex with men (Abdul-Quader et al. 2006, Johnston, et al. 2006, Simic et al. 2006), and has been previously used by the research team to recruit 500 injection drug users in New York City in both 2005 and 2009, and 500 heterosexuals at elevated risk for HIV in both 2006-7 and 2010 (CDC National HIV Behavioral Surveillance), more than 300 teenage prostitutes in New York City (Evaluation of the OJJDP's Commercial Sexual Exploitation of Children demonstration Programs, NIJ Grant 2005-LX-FX-0001,CFDA#16.560) and nearly 200 drug dealers in Rochester, New York (Controlling Drug Markets and Related Harms in Rochester, New York (funding by the City of Rochester)). RDS has been expanded to include population proportion estimates and error estimation functions. More than simply a recruiting/sampling method, RDS also provides a powerful set of

analytic/statistical tools for creating weighted population estimates (Heckathorn 2002, Salganik and Heckathorn 2004).

Following the initial interview, initial “seeds” and subsequent waves of study participants were given 3 numbered coupons that they were instructed to pass along to other people they know who currently participate in retail methamphetamine markets, as buyers, sellers, and/or users. The numbers on these coupons allowed the research team to prevent duplication, to identify who recruited each participant and to keep track of subsequent recruitment patterns using the RDS Coupon Manager software. In order to reduce the likelihood that too many respondents would come from a small number of well-connected people, the researchers limited the recruitment potential of each participant with the rationing of coupons (Heckathorn 2002). Researchers also included a thirty-day expiration date on the coupons in an attempt to ensure a reasonable pace of sample recruitment. Brief recruiter training sessions were conducted with the seeds and each subsequent eligible respondent, explaining: recruitment criteria; incentives for interviews and recruiting (\$50 and \$20 respectively); how recruits should contact the project; the time limit and sample size limit on recruiting; and discussion of appropriate recruiting techniques to avoid coercion and ensure participation was voluntary. When necessary, researchers selected new seeds because recruitment chains were slow to develop; many participants did not recruit.

RDS aims to improve on prior peer referral/snowball sampling methods by countering tendencies toward “volunteerism,” “masking,” and homophily-induced

sample bias (see Erickson 1979). The key to the RDS method is the long sampling chains made possible by participant recruitment, which are critical for overcoming bias because they mimic first order Markov chains (Heckathorn 1997), such that a degree of randomness enters the process at each iterative step, and thus that a large number of steps ensures that the final state is independent of the starting position (following Kemeny and Snell 1960). In other words, as recruitment chains go through many waves of referral, the biasing effects of initial seed selection are minimized (Heckathorn 2002, Salganik and Heckathorn 2004).

Later studies have shown that RDS can control for differential recruitment based on differences in individual network size, and provide population proportion estimates for the study population as a whole (Heckathorn 2002). RDS has also been modified to analyze and produce estimates across continuous variables, like age, (in addition to discrete variables like race/ethnicity or gender considered in previous versions, see Heckathorn 2007). Salganik and Heckathorn (2004) have proposed models for determining confidence intervals associated with the population estimates of earlier versions of RDS, which are now incorporated in RDS analysis software. Still further, by resampling the RDS sample based on recruiting patterns apparent in the original sampling trees, Salganik subsequently argued that bootstrapping methods can produce more accurate confidence intervals than those drawn from treating RDS populations as though they were the result of random sampling, though these methods do not produce intervals as high as those produced under pure random sampling

conditions. Salganik initially argued that confidence levels approaching the range of 0.9 were possible (2006), though in more recent work he has been less certain (Goel and Salganik 2010).

Because RDS has become common, there have been a number of evaluations (e.g., Gile and Handcock 2010, Goel and Salganik 2010, Johnston et al. 2008, Magnani et al 2005, Platt et al. 2006, Robinson et al. 2006, Semaan et al. 2002, Simic et al. 2006, Wang et al. 2005). Some have argued that RDS may not gather an adequate sample, because of factors such as geographical clustering, or inadequate incentives (Simic et al. 2006). Other studies found that RDS provides better estimates of female sex worker populations than time-location and better network information (allowing for better post hoc correction of sampling biases, see Johnston et al. 2006; see also Robinson et al. 2006). Platt et al. compared RDS and chain recruiting by indigenous fieldworkers and found that “no consistent trend emerges from the analysis of the effect of recruitment method on sample characteristics” (2006, 50) among injecting drug users in nine separate sites in Russia and Estonia.

Recent assessments (Gile and Handcock 2010) have found that RDS occasionally performs worse than expected (Goel and Salganik 2010). In particular, RDSAT-generated confidence interval estimates may be too small, and design effects of 5-10 may be more likely than the previous assumed value of 2. Both large design effects and incorrect confidence intervals occur when the underlying network has significant bottlenecks. For example, a network bottleneck between street-based and brothel-based sex workers could cause

poor performance for the RDS estimate of HIV prevalence, if the street-based and brothel-based groups differ in infection rate. The reason for this is that the RDS sample can get "stuck" in one group leading to too high or too low an estimate.

Scott (2008a) started a heated debate about RDS when he claimed that RDS promotes "the violation of federal guidelines governing the protection of human research subjects" (2008, 50), though, despite this, he continues to support the use of RDS (Scott 2008b). Critics of Scott point out that many of the problems that Scott cites apply to Scott's own research, and similar problems were typical of other recruitment methodologies and typical of most research with injection drug users (IDUs) (Broadhead 2008, Ouellet 2008; see Scott 2008b for his reply; see more generally Semaan et al. 2008). While the recruitment incentives will mean that people will always try to "game" the system, RDS screening methods seek to ensure that eligibility for participation (and non-duplication) can be supplemented with questions about the links between participants to clarify the basis of their connection (Heckathorn 2007).

There are two main reasons why the research team chose RDS in doing research with this population, neither of which is based in the analytic strategies associated with RDS. First, and of paramount importance, is the issue of trust and building rapport with research participants. The peer-driven network recruiting method used by RDS facilitates building rapport and thus eliciting more truthful information. Following the methodology, the researchers are always introduced to each new participant by an associate who can describe the non-

threatening nature of participation in the study beforehand, and vouch for the researchers' good faith. For methamphetamine users and distributors who are renowned for their distrust of outsiders, the importance of rapport and trust cannot be underestimated. Second, and almost equal in importance, are the savings of time (and hence, money) that RDS affords the data collection phase of the project (Abdul-Quader et al. 2006, Robinson et al. 2006). Using traditional ethnographic methods or recruiting eligible respondents from venues where methamphetamine use and distribution are prevalent is likely to take much longer and recruit fewer study participants than RDS methods, which have been shown to recruit large numbers of study participants in a very short amount of time (Abdul-Quader et al. 2006, Robinson et al. 2006, Wang et al. 2006). Instead of making estimations directly from the sample to the population, RDS outlines a methodology for making indirect estimates by way of the social networks connecting the population (Salganik and Heckathorn, 2004).

### ***Participant Methamphetamine Consumption And Distribution Networks***

One major substantive focus of this research is on the social networks of study participants in their respective and overlapping roles as methamphetamine users, buyers and sellers. Social Network Analysis (SNA) has long been recognized as a significant research tool for tracking and understanding flows of information, goods and diseases across systems of human relations (Wasserman and Faust 1994, Brandes 2005). More recently, advances in computer-based analysis have dramatically outstripped previous abilities, and, at present, the analytical potential of SNA greatly exceeds available data (Newman 2006). Past SNA approaches to drug user networks have shown the virtue of parameterization of network topologies for understanding the spread of diseases (Klov Dahl et al. 1994, Friedman et al. 2000), the evaluation of law enforcement strategies (Curtis and Sviridoff 1994), and the framing of prevention and intervention strategies (Friedman et al. 1999).

Previous research on the accuracy of drug users' descriptions of their drug use and sex partners (Goldstein et al. 1995; see also, Hser et al. 1992) demonstrated a high degree of concordance in their responses about each other, and it suggests that the data gained by linking respondents in this fashion is a reliable source of information about network structure and dynamics, thereby allowing the research team to perform far more detailed and powerful analyses of network data than would otherwise be available via traditional RDS methods. Collecting network level data from drug-using populations is challenging in part because of both the constraints imposed by human subjects protections, and the participants' own wariness about disclosing information about third-party

contacts. In the tumultuous world of the street drug user, information is often a currency to be exchanged for drugs and other valuable resources, or guarded zealously in order to preserve access to resources, such as drug-purchase connections and illicit income generating opportunities. Distrust of outsiders further limits their willingness to provide extensive and accurate data regarding their contacts; indeed, data may be systematically missing vs. missing at random. Successful collection of SNA data from drug-user populations demands the development of methods that protect the confidentiality interests of third parties, and do so in a way that is apparent to interview participants, so that they will feel confident in sharing information.

Traditional social network studies usually depend on having a complete census of the network members; this completeness will seldom be obtained in studies of illegal drug users because the population is often transient, wary of disclosing information, and busy; studies will seldom succeed in collecting data from all network members or about all network ties. Absent this completeness, traditional SNA methods require supplementation; application of SNA methods to clandestine social networks requires the development of methods that allow analysis of a network from a sample of that network.

RDS has proved extremely useful in quickly recruiting large numbers of people from hidden populations, allowing researchers to describe the salient characteristics of the population and, in some instances, make population estimates. However, it has been far less successful in helping researchers understand how the branches of the recruitment tree are connected. This is

because, although RDS uses network connections to recruit representative samples of individuals within hidden populations, it does not aim to characterize network topologies themselves. The spanning tree graphs discovered via the RDS method may or may not characterize the networks themselves (and, for drug using populations, likely do not). Expansion of the RDS method is necessary to ascertain actual network topologies as well as population data during the research phase.

## ***Data Collection And Implementation***

### **Variable development**

Based on the existing drug markets literature and the formative research phase of the study, the research team developed an interview instrument (see Appendix 1, “Study Instrument”) to collect data that screened participants for eligibility and focused on five topic areas:

- Participant demographics,
- Consumption behavior,
- Market participation, including participants’ methamphetamine use, distribution and consumption networks,
- Involvement with violence, and
- Involvement with the criminal justice system.

The instrument elicited extensive information about consumption practices and routines because of the posited connection between consumption practices and the social organization of markets (Wendel and Curtis 2000, Curtis and Wendel 2000, Curtis et al. 2002). Questions as to consumption behavior were primarily derived from the review of existing literature and formative research activities. Because both the literature review and formative research activities agreed that much methamphetamine use, especially among MSM, took place in sexual contexts, a series of questions exploring this topic was included.

Questions about market participation were based in part on the instrument used in a UK Home Office study, “The Illicit Drug Trade in the United Kingdom” (Matrix Knowledge Group 2007), which conducted interviews with 222 persons imprisoned for serious drug offenses. This study focused on dealers, including wholesale dealers and larger-scale traffickers (questions from the Home Office

study focused on non-retail transactions were not used in our study), and many questions required some adaptation for use with non-distributor participants. For example, questions intended to elicit information directly as to distributor practices from distributors were adapted to elicit customer information as to distributor practices. Because formative research confirmed that methamphetamine markets were deeply embedded in social networks, questions elicited information about network contacts in methamphetamine use and distribution and consumption.

The extensive literature cited above about the posited connection between drug markets and non-drug criminal activity, and especially connections between drug markets and violence, was used to design questions to elicit participants' experience of violence in the course of their participation in NYC methamphetamine markets, and other criminal activity engaged in, in connection with drug use. Further questions explored the participants' experience of the criminal justice system, including arrest, and of other market interventions, such as those by non-governmental actors.

### **Eligibility screening**

Eligibility screening is an especially important concern in a social recruitment process like RDS, which provides an ideal medium for recruiters coaching their peers in what to say to pass the screener, a process the researchers have observed in other studies. To reduce the likelihood that ineligible individuals would be included in the sample and that non-productive recruitment chains would develop from non-user referrals, during formative research, the research team developed an eligibility screener that asked potential

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participants about drug use and preparation techniques, folkloric beliefs related to methamphetamine use, and market conditions and prices. For example, the researchers asked potential participants about whether they held in inhaled methamphetamine fumes when smoking or exhaled them immediately, and then probed a bit on this issue. It is widely believed that holding in inhaled methamphetamine fumes should be avoided, because “it will crystallize in your lungs and fuck them up”; other users say they hold in inhaled fumes with no ill effects. The goal of the probing is to determine whether or not the interviewee has ever heard this fact/myth, which is so commonly discussed by users that it would be difficult for a user to avoid hearing it; conversely, this is something few non-users appear to be familiar with.

**Data collection: Sample demographic and other descriptive characteristics**

Interviews collected a variety of information about sample demographic characteristics, and other descriptive characteristics, including age, race/ethnicity, gender, sexual identity, birthplace, years resident in New York City, level of formal education, income, income sources, drug use history, current drug use, drug sales history, current drug sales, and criminal justice experience. Interviews eliciting this data produced a wealth of other information for subsequent coding and analysis. RDS-specific data relating to the characteristics of participants’ methamphetamine using/buying/selling networks were also collected and recorded in the RDS Coupon Manager software program, which tracks recruitment and participants’ incentives. Physical descriptions, and a coded unique identifier (created from participants’ initials, birth month, birth year,

race/ethnicity, and gender) were also recorded for each participant both to ensure correct payment of RDS incentives and to eliminate participants recruiting themselves (sample duplication), and to facilitate linking of network participants.

### **Data collection: Participant market behavior**

To learn more about buying and selling methamphetamine, detailed questions were asked about: how often participants buy or sell methamphetamine; the locations where these transactions take place (bars, clubs, restaurants, hotels, apartments, on the street); how transactions are arranged: by phone/pager/internet or meeting at a fixed location; relationships between buyers and sellers; quantities (actual (weighed), putative or dollar-denominated) that are bought and sold; packaging and handling the drug: Is the purchase pre-packaged? Is it sealed against tampering?; perceived quality as compared to other transactions: Does the quality vary between dealers and between purchases from the same dealer?; problems that have accompanied buying or selling: Is the buyer/seller reliable? Is the product always available or intermittently available?; interactions with law enforcement or others outside the market: Have the police prevented you from buying or selling? Have the police confiscated your drugs? Have neighbors or other community residents prevented you from buying or selling methamphetamine?; changes in the market: Are there any new groups of buyers or sellers that you have noticed in the recent past? Are there any new ways of buying or using the drug that you have encountered in the recent past?

### **Data collection: Participant consumption behavior**

Participants were interviewed about each episode of methamphetamine consumption during the previous 30 days, and related events including: generating money and buying methamphetamine: income sources (legitimate employment, other income sources); mode of ingestion and drug preparation: Do participants sniff, smoke or inject methamphetamine?; companions and activities during use; cycle of use; post-use “crash” and recovery period; effects on other life activities; involvement in other criminal activity: Has methamphetamine use led to other illegal behaviors to make money, get drugs or avoid the police?

### **Anonymized network elicitation techniques**

To supplement the RDS recruitment tree network data, the research team included an extensive set of questions that asked study participants to describe people in their use and distribution networks, using an anonymized social network data collection protocol developed by the research team. Building upon the techniques initially employed by Friedman et al. (1997, 1999) to collect network data among injection drug users, the research team asked study participants to describe up to ten people they have used methamphetamine with or bought methamphetamine from or sold methamphetamine to in the last thirty days. For each of these network members, participants provided a brief physical description (race, sex, height, weight, hair and eye color), limited information about the last three digits of each network contact’s cellphone number (Is each of the last three digits even or odd, and 0-4 or 5-9?)<sup>4</sup>, and some information about

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<sup>4</sup> The research team developed the informal term “telefunken code” (after the German electronics manufacturer) for the phone digit data collected.

the nature of their relationship with that network member. This technique was developed through formative research interviews, where the research team determined that study participants were comfortable with divulging this information about themselves and their network contacts. This data is used for analyses to be included in the study team's upcoming National Institute of Justice report, and that are outside the scope of this dissertation.

### **Random-selection network sampling**

Where participants had a very large number of network contacts, the research team elicited a random selection of their network contacts. Participants were presented with a list of the letters of the alphabet arranged in random order and asked to name network members whose names began with the letters on the list (proceeding to the next letter on the list if they did not have a network contact whose name began with any given letter) until at least five network members had been obtained.

### **Non-randomized selection network sampling**

The research team also asked participants to provide similar network data about the person in their network who they would be most likely to obtain methamphetamine from if normal sources were unavailable, whether that person was a dealer or not.

### **Simultaneous qualitative/quantitative interviewing**

The research team employed a novel approach to data collection in order to collect both qualitative and quantitative data and to facilitate the integrated analysis of both. This method was based on the research team's past experience, when the effort to elicit answers to a quantitative data-gathering

instrument often produced a gush of rich qualitative information, which the interviewers struggled to fit into the available coded answers. The researchers' data-collection process tried to take advantage of this observation: the interviewer conducted an open-ended, but structured interview, entering data on a computer database form, while simultaneously employing a high-quality stereo recorder to record the entire interview for subsequent selective transcription and analysis.

This provided a number of advantages over traditional interview techniques. Traditional quantitative data collection is limited by the initial choice of questions and coding of possible responses; there is little flexibility to vary this as new ideas, themes and hypotheses are developed during data collection and analysis. On the other hand, traditional qualitative data collection approaches produce data of great depth, but uncertain generalizability. By preserving the full audio recording of the participant interviews and reviewing and selectively transcribing those recordings, additional quantitative data can be generated from material already gathered, and material can be recoded as understanding deepens or new themes emerge.

### **Follow-up Interviews**

Participants were also invited to return for a one-month follow-up interview (timed to coincide with payment of recruitment incentives in order to maximize follow-up rates), which 1) explored changes in the membership of their consumption and distribution networks since the initial interview, 2) described their drug use and distribution activities over that time, and 3) allowed the researchers to ask follow-up questions to clarify unresolved issues raised during Dynamics of retail methamphetamine markets in New York City

the initial interview. By comparing responses on the initial interview with those on the 30-day follow-up, the research team hoped to gain insight into the short-term dynamics of the market, a much better picture of rates of change in networks of users and distributors, and a more accurate view of the stability of consumption routines.

## ***Analytic Methods***

### **Quantitative analysis**

The analysis of the study sample employed bivariate analysis, grouping participants by sexual identity (MSM, MSM/W, Others (all those who do not participate in MSM sexual activity)), and, for some criminal justice variables, by race. The study reports on distributions,  $p$ -values, and likelihood ratios ( $G$ ).

To evaluate and correct population estimates for RDS biases, the research team uses Heckathorn's techniques, as implemented in the RDSAT analysis package. The degree to which selection probability can be accurately measured for each participant depends on relatively precise measurement of network size; this study collected more extensive network information than is typical of other RDS studies. Heckathorn's technique for correcting RDS biases and providing confidence intervals on population proportions can be used (Heckathorn 1997, 2002, Salganik 2006), provided the Markov chain is mixing (Goel and Salganik 2009). Frequency analyses of the following variables have been conducted, using both the sample statistics, and an analysis that corrects for RDS sampling bias (as implemented by RDSAT).

Recall the recent criticism of RDS analysis by Goel and Salganik (2010), which points out that network bottlenecks between sub-populations can result in design effects much larger than had been previously estimated, and incorrect confidence intervals. The RDSAT software tries to account for bottlenecks along the trait being estimated, but does not account for bottlenecks on other dimensions. Thus, when bottlenecks are present, this can cause the estimated confidence intervals and presumed design effects to be too small. RDSAT fails to

produce adjusted univariate (respondent bivariate) measures of population proportion whenever a subcategory (relative to the property being investigated) recruits entirely within themselves. For example, if all black-haired individuals recruit only black-haired individuals, then this would render impenetrable the sampling biases that RDS introduces in quantifying the proportions of the population with respect to hair color. Fortunately, in the present study's data set, such extreme levels of homophily and pure within group recruitment does not frequently occur.

In order to measure the relative magnitudes of differences between subpopulations, the research team has provided the Shannon-Jensen divergence between the two distributions where comparisons of sub-populations within the study population have been carried out (see Appendix 2, "Shannon-Jensen Divergence As A Measure Of Inter-Group Difference", on interpreting Shannon-Jensen divergence scores and ratios). Shannon-Jensen divergence is a well-established method of measuring the difference between two probability distributions. It is also known as total divergence to the average, or the information radius. The Shannon-Jensen divergence is 0 when the two distributions are identical, and is 1 when they are maximally different (with respect to their individual and joint entropy). Two distributions are said to be significantly different if their Shannon-Jensen distance exceeds 0.000136<sup>5</sup>.

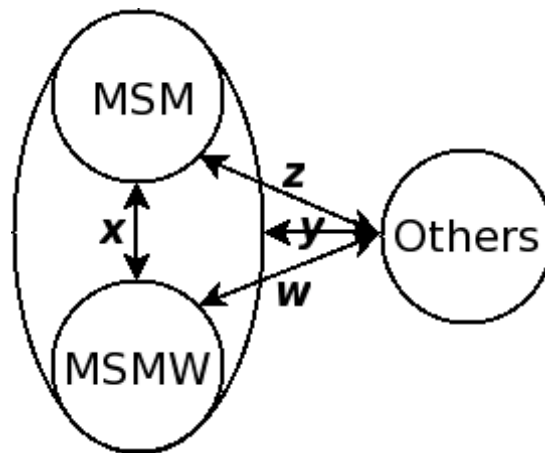
In the present analyses, for each variable, the research team considers three subpopulations:

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<sup>5</sup> The Shannon-Jensen divergence between a 50-50 distribution and a 45-55 distribution is 0.000136. This value has been chosen as a threshold value because of its straightforward and intuitive definition.

- i. MSM: men who have sex with (only) men
- ii. MSM/W: men who have sex with men and women
- iii. Others, i.e. everyone else – including men who have sex only with women, women regardless of their sexual identity, and transgender persons.
- iv. The union of sets (i) and (ii).

Between these four sets, the research team computes the four Shannon-Jensen distances depicted in the following diagram.



X represents the distance of the variable distributions manifested by the MSM and MSM/W populations.

Z represents the distance of the variable distributions manifested by the MSM and Others populations.

W represents the distance of the variable distributions manifested by the MSM/W and Others populations.

Y represents the distance of the variable distribution manifested by the MSM+MSM/W and Others populations.

When any of these quantities approach 0, the corresponding pair of distributions become identical.

To help evaluate the significance of these numbers, the research team constructs a ratio table, in which the (row I, column J) entry has the quotient of the variable associated with row I and the variable associated with column J:

	<b>Bigger</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>W</b>
<b>Smaller</b>		X	Y	Z	W
<b>X</b>	X	X/X	Y/X	Z/X	W/X
<b>Y</b>	Y	X/Y	Y/Y	Z/Y	W/Y
<b>Z</b>	Z	X/Z	Y/Z	Z/Z	W/Z
<b>W</b>	W	X/W	Y/W	Z/W	W/W

Note that the diagonal entries of the table all must necessarily be 1, and that the value of entry I,J is the reciprocal of the value in entry J,I. In light of these structural facts, the visual congestion will be minimized by showing only those entries in the table that are >1. A ratio that is >2 has been used as a rule of thumb for reporting Shannon-Jensen divergence ratios as significant.

## **Network Completion Strategy**

Because the RDS recruitment chains represent a sampling of a network by a “random walk”, but provide only limited information about the structure of the overall network from which the RDS recruitment network was drawn, the research team gathered information from study participants about their participation in social networks of methamphetamine use and distribution. By matching participants’ descriptions of their network contacts, it becomes possible to supplement the RDS recruitment network, or partially complete the underlying network, by inferring common links between participants (internal matching), and common third party links (external matching). This data is used for analyses to be included in the study team’s upcoming National Institute of Justice report, and that are outside the scope of this dissertation.

## **Qualitative Analysis**

Analysis of qualitative data was done using the DevonThink Pro software. The DevonThink Pro software represents an improvement over older software because it facilitates systematic analysis of qualitative data by offering a variety of tools for uncovering and exploring the data beyond coding and searching functions and automates a great deal of the coding and indexing of data, which was formerly a very labor intensive process. Qualitative coding and indexing of qualitative content accommodates the complexity of open-ended responses to interview questions. The DevonThink Pro software's coding and indexing systems are flexible and accommodate recoding segments of text during the analysis process. This software employs powerful artificial-intelligence based coding and automatic semantically-based indexing of all data entered, with powerful features to facilitate correction, editing and expansion of the initial generated indexing. As the qualitative answers recorded in the text fields of the study database are supplemented by selective transcription of the recorded audio interviews, the autoindexing and subsequent editing and expansion of the initially generated indexing continue in an iterative process, facilitating the integrated management of all data relating to each study participant.

## RESULTS

### *Introduction*

In this section, study results are offered with regard to selected issues.

Because markets occur in the context of consumption, the report begins, after an overview of the sample, by describing the consumption activities described by study participants, and then turns to a discussion of the market and the role of social networks in the market, and concludes with data concerning methamphetamine markets and violence, and interactions of methamphetamine markets with the criminal justice system:

- Recruiting and sample demographics
- Methamphetamine consumption and sex:
  - Quantitative results
  - Qualitative results
- Other aspects of methamphetamine consumption behavior:
  - Substitutability with cocaine
  - Mode of ingestion
  - Period of use
  - Concurrent use of other drugs
  - Dependence

#### Methamphetamine Markets

- Methamphetamine acquisition
- Technical organization of methamphetamine markets:  
Location of transactions
- Technical organization of methamphetamine markets: How were transactions arranged?

- Technical organization of methamphetamine markets: Packaging
- Technical organization of methamphetamine markets: Perceived quality
- Technical organization of methamphetamine markets: Problems with transactions
- Social organization of methamphetamine markets: Relationships with methamphetamine sources
- Social organization of methamphetamine markets: The role of “Dealers”
- Social organization of methamphetamine markets: Other non-concurrent drug use

#### The Methamphetamine Market And Social Networks

- Potential limitations of the network analysis
- Analyzing the network
- Network analytic measures employed
- Network variables significantly associated with methamphetamine market participation: Continuous variables
- Network variables significantly associated with methamphetamine market participation: Categorical variables
- Exponential Random Graph Methods analysis
- Methamphetamine markets and violence; and
- Methamphetamine markets and criminal justice.

In general, quantitative material on each topic is presented first, supplemented where useful by illustrative quotations and vignettes from study participants.

## ***Recruiting And Sample Demographics***

### **Recruiting**

In order to initiate the RDS sample chains (see discussion of RDS in the Methods section above), the research team placed 33 ads on craigslist.org from February 2008 (to recruit Formative Research interviewees) through September 2009 (to recruit RDS seeds to initiate new recruitment chains). This drew many, many phone calls to the toll-free number the research team set up and 105 emails from potential participants. The researchers scheduled more than 300 appointments over the data collection period, with many no-shows and repeated re-schedulings around potential participants' often busy schedules. The research team also regularly placed flyers on bulletin boards at local MSM-oriented organizations, although no participants were recruited as a result of these flyers. Seeds were also recruited through a local harm-reduction program's Crystal Meth Support Group, the members of which proved to be prolific recruiters.

Figure 1 shows the RDS referral tree. Of the 132 subjects interviewed, 28% (37 individuals) were seeds in the RDS process. Of these 37 seeds, 38% (14 individuals) produced referrals.

More than seventy persons attempted to participate in the study who were in fact not eligible, as far as could be determined after screening. It is possible that some of those who did not pass the screener were persons who had in fact used or distributed methamphetamine in the previous thirty days, but the research team preferred to adopt a conservative approach to eligibility screening, in order to maximize the chances of gathering factual information. Many of the non-eligible participants were crack users unable to imagine a drug with such

long-lasting effects, since the effects of crack are transitory. Examples of answers that failed the screener include would-be participants' claims to have bought methamphetamine in an "underground club" located at the corner of Crosby Street and 13<sup>th</sup> Street (Crosby Street does not run nearly that far north) and a report from a person claiming to have smoked an "eightball" (3.5 grams) and being high for almost two hours (rather than the expected two *days*).

The project was unable to make the original sample target of 200 participants; after 20 months of recruiting, it was necessary for logistical reasons to end recruiting. It is possible that additional participants might have changed the results below. Possible limitations introduced by sample recruitment are discussed in the Limitations sub-section of the Discussion section below.

Recruiting in this study was much slower than in most RDS studies, with 24 seeds recruiting no one, although most of these had expressed near certainty that their network contacts would participate. In follow-up interviews with unsuccessful recruiters, the reason most often cited for non-participation was fear that the research team was in fact part of a secret law enforcement data-gathering operation, rather than a legitimate research study. The next most frequently cited reason was that potential recruits were too busy. Figure 2 adds links between participants discovered in follow-up interviews, where participants disclosed that their recruiter knew someone they recruited, for example.

However, one unexpected reason given by unsuccessful recruiters after additional probing in follow-up interviews was that some of their network contacts were unwilling to join the study because they were uncomfortable with being

identified as MSM, more so than with being identified as illegal drug users and thus criminals. Given the importance of MSM activity in NYC methamphetamine markets, this unwillingness to be recruited because by so doing one might be “outed” as a participant in MSM activity might have influenced results; this is discussed this in the Limitations sub-section in the Discussion section below.

Because of issues arising from recruiting patterns and recent concerns about RDS analysis raised in evaluations, the present study presents results below analyzing all 132 study participants as a convenience sample, although RDS weightings and other RDS analysis results for all variables have been included in the Data Report Appendix.

## Sample Demographics

Almost all participants (91%) were men, with only 10 women and two transgender women (see Figure 3, the network by sex). Slightly more than half (54%) of participants were black, 23% were white, 20% were Hispanic and five persons were of other races (see Figure 4, the network by race). About half (49%) were MSM, 23% were MSM/W, 18% were MSW, 6 WSM, 4 WSM/W (see Figure 5, the network by sexual identity).

**Table 1 Sample demographics**

<b>Age</b>	<b>Count</b>	<b>%</b>
18-29	21	16
30-39	25	19
40-49	60	46
50-59	22	17
59+	3	2
<b>Race</b>		
Black	71	54
White	30	23
Hispanic	26	20
Other/Asian	5	4
<b>Sex</b>		
Male	120	91
Female	10	8
Transgender	2	2
<b>Sexual Identity</b>		
MSM	65	49
MSM/W	31	24
MSW	24	18
WSM	6	5
WSM/W	4	3
TG (M->F)	2	2
<b>Birthplace</b>		
NYC	54	41
Other US	64	49
Outside US	14	11

That study participants were predominantly male is not surprising, given that methamphetamine use in New York City seems predominantly tied to use among MSM as a sex drug. The first participant interviewed for the Formative

Research stage of the study, when asked if he'd ever encountered any women when buying methamphetamine, replied, "No, but I never see women anywhere I go," and clarified that he didn't mean he didn't notice women, but that he lived in an all-male sub-culture. No participants were recruited who were women who have sex exclusively with other women, although 4 of the 10 female participants were women who have sex with both men and women; participants agreed they'd heard little about use among women who have sex with women only: "Why would lesbians do crystal? Do they even *have sex?*" (white MSM).

**Table 2 Crosstab of sexual identity and race**

	MSM	MSM/W	MSW	WSM	WSM/W	TG (M>F)	Total
<b>Black</b>	39	18	10	2	0	2	71
<b>(% of n=132)</b>	30	14	8	2	-	2	
<b>White</b>	15	5	8	0	2	0	30
<b>(% of n=132)</b>	11	4	6	-	2	-	
<b>Hispanic</b>	10	8	5	2	1	0	26
<b>(% of n=132)</b>	8	6	4	2	>1	-	
<b>Other/Asian</b>	1	0	1	2	1	0	5
<b>(% of n=132)</b>	>1	-	>1	2	>1	-	
<b>Total</b>	65	31	24	6	4	2	132

As can be seen in Table 2 above, the largest single group in this study was black MSM, followed by black MSM/W, and white MSM. It would not be reasonable to conclude from this that black MSM make up the largest group of methamphetamine market participants in New York City; by all indications that is simply not true- all other indications including qualitative data gathered in the

present study<sup>6</sup>, agree that white MSM are the largest group of users. This is one reason only bivariate analyses are presented below, and no data on, for example, participant incomes, education, or employment status is presented: there is every reason to believe that our sample, in addition to being blacker than the overall methamphetamine market participant community, is also poorer, less educated, and less likely to be employed. The accounts of methamphetamine use and market participation presented below represent the data that the study team believes provides the most accurate picture of the market, based on all data gathered, after “triangulation” among the qualitative, quantitative and social network data.

For purposes of analysis below (with one exception), differences are reported on among three subpopulations:

- i. MSM: men who have sex with (only) men
- ii. MSM/W: men who have sex with men and women
- iii. Others, i.e. everyone else – including men who have sex only with women, women regardless of their sexual identity, and transgender persons.

The rationale for the Others category is that this category consists of all persons who do not engage in MSM sexual activity. The research team has adopted this typology because it is believed that the data indicate that the most important analytic distinction among members of the methamphetamine-using population in NYC is between those who use it as a sex drug in MSM activity (potentially, MSM

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<sup>6</sup> Black MSM agreed that white MSM are the largest subgroup.

and MSM/W), and those using the drug for other reasons or in other contexts. Initial analyses that binarized the study population by whether or not they participated in MSM sex (i.e., MSM and MSM/W constituted one analytic category, and all others (MSW, WSM, WSM/W, and Trans participants) constituted the other category), proved less analytically useful, as MSM/W often differ from MSM. Thus, the data below is presented according to the tripartite typology described above.

The data presented below also include analysis by race for some criminal justice variables, given that race is generally seen as a very important analytic category in US criminal justice research.

**Methamphetamine Consumption And Sex**

Because of the importance of sexual activity in methamphetamine use as discussed in both the previously published literature and the formative research in the present study, it is useful to begin by examining what participants reported about methamphetamine use and sex. While majorities of participants in all sub-populations said their use of methamphetamine was centered around sex, participants who engaged in MSM sex (MSM and MSM/W) also often said that their sexuality centered around their use of methamphetamine.

**Methamphetamine consumption and sex: Quantitative results**

MSM use is centered around weekend-long bouts of “chem sex”, with 91% of MSM reporting that their use of methamphetamine “is primarily around having sex”, v. 61% of MSM/W, and 56% of Others (see table 3a).

**Table 3a “Is your use of methamphetamine mostly around having sex or not?”**

			Yes	Total
	<b>Others</b>	Count	20	36
		%	56%	
	<b>MSM</b>	Count	58	64
		%	91%	
	<b>MSMW</b>	Count	19	31
		%	61%	
<b>Total</b>		Count	97	131
		% of Total	74%	100%

The likelihood that participants would answer that their use of methamphetamine was primarily around having sex was very significantly ( $p=0$ ,  $G= 0$ ) associated with sexual identity in bivariate analysis. Almost all (91%) MSM said their use was centered primarily around having sex, while 61% of MSM/W and 56% of Others said this.

Similarly, analysis of Shannon-Jensen divergence ratios among the subpopulations indicates that the MSM population is very different from the MSM/W and Others populations: they are much more likely to say their use is primarily around having sex (see Table 3b).

**Table 3b “Is your use of methamphetamine mostly around having sex or not?”, Shannon-Jensen ratios by sexual identity**

	Bigger	X	Y	Z	W
Smaller		0.0269758	0.0166714	0.0360389	0.0006731
X	0.0269758			1.3359743	
Y	0.0166714	1.6180912		2.1617282	
Z	0.0360389				
W	0.0006731	40.074048	24.766248	53.537897	

The majority (59%) of MSM participants reported they seldom or never have sex without using methamphetamine, while larger majorities of MSM/W and Others said the opposite (see Table 4a). Answering that one seldom or never has sex without using methamphetamine was significantly ( $p = .032$ ,  $G = .031$ ) associated with sexual identity in bivariate analysis.

**Table 4a Participants saying they never or seldom have sex without methamphetamine, by sexual identity**

				Total
	<b>Others</b>	Count	13	36
		%	36%	
	<b>MSM</b>	Count	38	64
		%	59%	
	<b>MSMW</b>	Count	11	30
		%	37%	
<b>Total</b>		Count	62	131
		% of Total	48%	100%

Analysis of Shannon-Jensen divergence ratios among the subpopulations indicates that the MSM population is very different from the MSM/W and Others populations (see Table 4b).

**Table 4b Participants saying they never or seldom have sex without methamphetamine, Shannon-Jensen ratios by sexual identity**

	Bigger	X	Y	Z	W
Smaller		0.0176028	0.0186161	0.033248	0.0058494
X	0.0176028		1.0575617	1.8887873	
Y	0.0186161			1.785983	
Z	0.033248				
W	0.0058494	3.0093393	3.182562	5.6840017	

Most MSM (57%) used methamphetamine with 80% or more of their sex partners (see Table 5a). The percentage of sex partners a participant used methamphetamine with was not significantly associated with sexual identity in bivariate analysis using a *p*-test (.061), but was significantly associated with sexual identity using a *G*-test (.04).

**Table 5a Percentage of past month sex partners participant used methamphetamine with, by sexual identity**

		0 to 20%	21 to 40%	41 to 60%	61 to 80%	81 to 100%	Total
<b>Others</b>	Count	10	1	5	2	16	34
	%	29%	3%	15%	6%	47%	100%
<b>MSM</b>	Count	2	4	12	9	36	63
	%	3%	6%	19%	14%	57%	100%
<b>MSMW</b>	Count	6	2	6	3	13	30
	%	20%	7%	20%	10%	43%	100%
<b>Total</b>	Count	18	7	23	14	65	127
	% of Total	14%	6%	18%	11%	51%	100%

Analysis of Shannon-Jensen divergence ratios among the subpopulations indicates that the MSM population is very different from the MSM/W and Others populations (see Table 5b). MSM are more likely to have used

methamphetamine with all or almost all partners during the past month than are MSM/W or Others.

**Table 5b Percentage of past month sex partners participant used methamphetamine with, Shannon-Jensen ratios by sexual identity**

	Bigger	X	Y	Z	W
Smaller		0.0176028	0.0186161	0.033248	0.0058494
X	0.0176028		1.0575617	1.8887873	
Y	0.0186161			1.785983	
Z	0.033248				
W	0.0058494	3.0093393	3.182562	5.6840017	

The number of past month sex partners was significantly ( $p = .001$ ,  $G = .002$ ) associated with sexual identity in bivariate analysis, with MSM and MSM/W having much larger numbers of partners than Others, and MSM/W having somewhat more partners than MSM. Almost half of Others had not had sex with more than one partner in the past month, where only 11% of MSM, and 16% of MSM/W, had only one partner.

**Table 6a Number of past month sex partners, by sexual identity**

		0-1	2-3	4-9	10 +	Total
<b>Others</b>	Count	17	11	5	3	36
	%	47%	31%	14%	8%	100%
<b>MSM</b>	Count	7	22	22	13	64
	%	11%	34%	34%	20%	100%
<b>MSMW</b>	Count	5	8	10	8	31
	%	16%	26%	32%	26%	100%
<b>Total</b>	Count	29	41	37	24	131
	% of Total	22%	31%	28%	18%	100%

Analysis of Shannon-Jensen divergence ratios among the subpopulations indicates that the Others population is very different from the MSM/W and MSM populations (see Table 6b).

**Table 6b Number of past month sex partners, Shannon-Jensen ratios by sexual identity**

	<b>Bigger</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>W</b>
<b>Smaller</b>		0.0032186	0.0394421	0.0421801	0.0361886
<b>X</b>	0.0032186		12.254497	13.105159	11.243646
<b>Y</b>	0.0394421			1.0694163	
<b>Z</b>	0.0421801				
<b>W</b>	0.0361886		1.0899042	1.1655614	

Many MSM (37%) made use of internet hookup sites (craigslist, manhunt, adam4adam) to seek “P’n’P” (“Party [use drugs] and Play [have sex]”) partners, and also sought partners through social networking with past and ongoing partners. Few MSM sought partners in any public place, including bars or clubs.

**Table 7a Participants who seek methamphetamine-using sex partners online, by sexual identity**

			<b>Total</b>
<b>Others</b>	Count	4	36
	%	11%	
<b>MSM</b>	Count	23	63
	%	37%	
<b>MSMW</b>	Count	9	31
	%	29%	
<b>Total</b>	Count	36	130
	% of Total	28%	100%

Although majorities of all groups said they did not seek methamphetamine-using sex partners on the internet, MSM (37%; see Table 7a) and MSM/W (28%) were more likely to do so than Others (11%). Internet methamphetamine-using partner-seeking was significantly ( $p= .025$ ,  $G= .016$ ) associated with sexual identity in bivariate analysis.

Analysis of Shannon-Jensen divergence ratios among the subpopulations indicates that the Others population is very different from the MSM/W and MSM

populations: MSM and MSM/W are much more likely than Others to seek partners online (see Table 7b).

**Table 7b Participants who seek methamphetamine-using sex partners online, Shannon-Jensen ratios by sexual identity**

	Bigger	X	Y	Z	W
Smaller		0.0013888	0.0169215	0.0201264	0.0111694
X	0.0013888		12.18461	14.492293	8.0426855
Y	0.0169215			1.1893933	
Z	0.0201264				
W	0.0111694		1.5149927	1.8019221	

### **Methamphetamine consumption and sex: qualitative results**

Many MSM and MSM/W said that it was essentially impossible to distinguish between their sex lives and their use of methamphetamine:

It's a metamorphosis – you all don't start that way, it morphs itself into an addiction, the crutch that it becomes is that you become unable to get excited about sex or interested without it. It's like watching porn. It's part of the act, as much as kissing and touching. (MSM)

Sex and meth is like the chicken and the egg, I wouldn't do it without the sex (MSM)

It makes you horny. Without it, seems like I have no sex drive. (MSM)

Because I don't have no sex drive, because I'm too tired. I don't care for sex without it, with crystal my sex drive is not dead, o yeah. (MSM)

My sex is primarily around using crystal, at first it was the other way around. (MSM/W)

I only do it because my boyfriend does it. Of course, if I broke up with him, I'd probably find another boyfriend who does that. (MSM)

I had a normal sex drive before coke and crystal, but now I can't have a normal relationship. (MSM)

If I want to have sex, I have to use crystal. (MSM/W)

One MSM commented that “After about 3 years of use my interest shifted, it was less oriented to sex”, although he never has sex without methamphetamine.

Some MSW, WSM and WSM/W expressed similar sexual responses to crystal use:

I’m in a steady relationship. If I get it [methamphetamine] I’m trying to have sex, my girl doesn’t do it, but she likes to have sex with me when I do. (MSW)

I do it for my boyfriend, for the relationship, you can’t drive a car without keys. (WSM/W)

I become antisocial and look at porn on-line and masturbate compulsively. (MSW)

However, many more said it had little effect or made them less interested in sex:

I feel like maybe more adventurous or it loosens me up, but not much effect, no major effect. (MSW)

I wish it would happen [sex while using crystal] but the reality is it never came up. (MSW)

I don’t like sex on crystal. I don’t have the sex drive that I have when I’m straight. (MSW)

I don’t really like being around too many people when I do that and I feel very awkward around females. (MSW)

Many MSM and MSM/W said they used methamphetamine during sex because of reasons related to self-esteem about appearance: “It makes me feel like a goddess.” (MSM); “It makes me feel more comfortable in my own skin” (MSM). One participant contrasted “drug gays” from “bar gays” and went on to say that the reason he preferred meeting men online was that “in gay bars, there’s too much S and M [usually an abbreviation for sado-masochism, of which he was an enthusiastic practitioner], you know, Stand and Model, with crystal it’s not

so much about looks” (MSM). Four more participants (all MSM) went on to make the exact same joke during the course of the study.

One central reason for use of methamphetamine during sex given by MSM and MSM/W was lowered inhibitions and a sense of greater freedom:

’Cause your inhibitions are lowered, you have more sex and I get freakier. (MSM)

It makes you lose your morals. It turns [heterosexual] guys gay and into intense bottoms [persons with a great desire for anal penetration]. (MSM/W)

When you're high you'll have sex with people you wouldn't ever have sex with otherwise. (MSM)

After crystal, there's no going back to the regular sex. The guys just don't act the same without it with it. They're more freaky [with crystal]. (MSM)

I'm a sex addict when I'm on crystal. My morals go out the window. It's a must-have thing. You have sex with people, with people you wouldn't normally have sex with. (MSM/W)

Dude, it brings the animal out in me. I smoke it, in 15 minutes I'm ready to go: “Who's first?” Three at one time, one, I don't care. I don't smoke crystal with my 2 steady partners. (MSM/W)

Another reason participants gave was that it made sex last much longer, making sexual encounters more worth the effort involved or more fulfilling because they were less ephemeral:

With all the websites these days, I can find someone to [have sex with] any time, right away. But half an hour later, they're walking out the door zipping up their fly, and then where am I? With tina [the most common term for methamphetamine in the MSM community, most likely derived from the typical practice of selling the drug by the sixteenth of an ounce or “teener”], once you start, you're in for the long haul, for a session [of sex]. (MSM)

Do you know how long it takes me to get ready for sex? If I want to have sex on the weekend, I stop eating Wednesday night. I give myself enemas all day Friday so I have a clean [anus for sex], never mind my hair or whatever. After all that, do you think I want to have sex last just half an hour, fifteen minutes? (MSM)

Sex workers<sup>7</sup> who catered to MSM sex markets said it was useful to them in their work:

I'm able to perform [with sex work "dates"] it makes me more freakier; it's either that or be a contortionist. (MSM)

Sometimes I don't have a choice, the client wants me to be on the same level with them. (MSM)

'Cause it's like a stimulant. It's like a sex booster, makes your sex drive a whole lot better. You can keep going and go from partner to partner without resting. It's better than Viagra and it's actually cheaper, \$10 [worth of crystal] will last 2-3 days, where a Viagra lasts way less for more money. (MSM/W)

I depend on crystal for sex work to get my head in that frame. (MSM)

My dates like it, I wouldn't spend my own money on it. (MSM)

One MSM sex-worker said he could only obtain crystal through his customers: "I want to find a way to get it without a [sex-work] date, but I don't know how to buy it." (MSM)

Although the interviewers did not ask participants any questions about their HIV status or condom use in this criminal justice study of methamphetamine markets, 34 participants spontaneously self-identified as HIV positive. Of those 34, 18 were MSM, 11 were MSM/W, and one was transgender. One participant said that "crystal makes my mind clearer, so condoms are going to be used"

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<sup>7</sup> 30 participants disclosed doing sex work in the recent past: 18 MSM, 5 MSM/W, 4 MSW, 2 WSM/W, and 1 TG.

(MSM); other participants said the opposite, that crystal use made them less likely to use condoms.

### **Eroticized injection**

Four of the six MSM injectors reported on an interesting phenomenon, apparently hitherto unreported in the drug abuse or harm reduction literature: eroticized injection practices among some crystal-using MSM:

For some guys, shooting up is a fetish... I first found out about this when I was online [video-]chatting with this guy in Germany and he wanted me to shoot up so he could watch and [masturbate]. (MSM)

I always inject, usually it's during sex or right before, there's a point where I want to feel like I'm being controlled or controlling them and the drugs help with that... someone had tapes of a guy slamming [that we watched]. (MSM)

For me, it's a fetish. Years ago, people would get squeamish when you would shoot up in front of them, now they like it. When I shoot up, I get hard. (MSM)

Further investigation as to eroticized injection online revealed that these participants were not alone in their behavior (however rare this behavior may be; it has been observed that the Internet fosters the development of micro-subcultures by connecting people who otherwise would have been isolated). One participant provided the name of a Google News group, "Gay Chem Slammers" (<http://groups.google.com/group/gaychemslammers>; the group has subsequently become a private "members only" newsgroup). The group's description says it is for "Gay men who like hardcore party favors. Guys slamming tina, crystal meth, and other chems." This newsgroup featured an extensive archive of user-posted "slam vids" of men (either naked or in fetish attire) injecting and then masturbating or having sex. Another site mentioned by participants was the

“Chem Slammers” subsite on a site devoted to “barebacking” which featured some of the same videos, as well as additional similar videos, and a forum devoted to discussion of sado-masochistic “chem sex” among self-described “pigs”, including use of Nazi, “White Power”, and Satanist imagery as fetish stimuli, and also including discussion of deliberately “breeding” others with HIV through sexual activity. Google searches on “chem slammer” and similar terms turned up many other sites devoted to injection of methamphetamine as a sexual fetish.

The eroticization of injection within this small sub-sub-culture may be a reaction against “safe sex” anti-HIV campaigns, as “chem pigs” embrace a transgressive litany of the forbidden in a nihilistic semiotic collage, sharing syringes during condomless group sadomasochistic sex in Nazi/biker leather gear, systematically violating every taboo of both mainstream culture and a mainstream gay culture which deplores crystal use and unsafe sex. The inversion of mainstream values and embrace of the forbidden and transgressive is reminiscent of the 1970s punk culture’s simultaneous rebellion against both the mainstream and the hippie counterculture (Hebdige 1979).

## ***Other Aspects Of Methamphetamine Consumption Behavior***

### **Substitutability with cocaine**

One issue with regard to consumption with important implications for market structure is the degree to which participants considered methamphetamine and cocaine to be similar substances and the degree to which they would be willing to substitute one for the other if their preferred substance was not available. Almost all participants agreed that one difference between the two was that the methamphetamine high is much longer lasting, producing less of a desire to repeat use soon after initial use as a consequence, and almost all agreed that this was one advantage of methamphetamine use over cocaine or, especially, crack use. However, MSM participants almost universally said the two substances were completely different because cocaine, while it might have some sexual effects, simply did not produce the overwhelming and long-term sexual response central to why they used methamphetamine:

They're totally different. Don't send a boy to do a man's job. I never heard of anyone doing cocaine and wanting to have sex. (MSM)

They're totally different because coke gives me an "I'm fiending" [wanting more drugs right away, like a "dope fiend"] thing. Crystal doesn't have me fiending. I'm like, "I've gotta get me a date, I've gotta get me a boy." Even the ugliest thing looks cute to you. You're fiending for sex, not drugs [on methamphetamine]. (MSM)

When I first did tina, I was doing it like coke, setting up shot after shot, and it's the opposite of coke sexually. With coke you couldn't get it up with a crane. They're diametric opposites. (MSM)

They're totally different. Coke is a high you can go out and party and dance with and it would numb me for sex. With crystal, I get a rush for sex and want to have sex. It gets me more freaky [sexually]. (MSM)

Non-MSM study participants, on the other hand, often spoke of methamphetamine as cheaper or better than crack or cocaine (or, sometimes, the crack or cocaine currently available), not as a qualitatively different kind of drug:

I use it for like a better crack high and then there's the sex element. (MSW)

Coke you just have to shoot it and shoot it because the rush doesn't last. There's no use to shooting coke. The crystal you're up more, more, more [for a long time]. It's that crazy rush, that's why [I do methamphetamine], but it makes me pick my skin. They both cause a sense of euphoria, energy. The difference is the meth high is longer and the crash is not as severe. I'm not fiending wanting to go stealing things to get more. (MSW)

[Methamphetamine] lasts longer and you don't have to spend so much money. The [immediate] rush lasts for 20 minutes, [the overall high] lasts longer. It's a better high. Nowadays, the crack is garbage, that's why a lot of people are going to tina. You can't get [good crack] unless you have a real good connect [source]. (MSM/W)

It's about the same, but crystal give you a better feeling in [sic] and lasts longer. (MSW)

## Mode of ingestion

Mode of ingestion was not significantly associated with sexual identity in bivariate analysis (see Table 8a). Most participants (67%) smoked methamphetamine, with sniffing the second most prevalent consumption method. The popularity of sniffing varied by sexual identity, with MSM/W more likely to sniff (32%) than Others (22%) or MSM (18%). Injection was rare among all groups (8%), and slightly higher among MSM (10%; see discussion of injection of methamphetamine as a sexual fetish among a small subculture of MSM in the section on Methamphetamine Consumption and Sex above) and lower among MSM/W (3%). Only MSM reported any other means of ingestion besides smoking, sniffing or injection, with 5% reporting rectal ingestion of methamphetamine solution, usually done with a syringe with the needle removed, and known as “boofing” or “booty bumps”. The MSM who preferred this mode of ingestion all identified as “bottoms” (men who prefer a receptive anal sex role) and said that “boofing” greatly increased their desire for, and enjoyment of, prolonged anal penetration.

**Table 8a Mode of ingestion, by sexual identity**

		Inject	Other	Smoke	Sniff	Total
<b>Others</b>	Count	3	0	25	8	36
	%	8%	0%	69%	22%	100%
<b>MSM</b>	Count	6	3	42	11	62
	%	10%	5%	68%	18%	100%
<b>MSMW</b>	Count	1	0	20	10	31
	%	3%	0%	65%	32%	100%
<b>Total</b>	Count	10	3	87	29	129
	% of Total	8%	2%	67%	23%	100%

Analysis of Shannon-Jensen divergence ratios among the subpopulations indicates that the MSM population is different from the MSM/W and Others populations: they are the least likely to sniff, and more likely to inject or ingest the drug by “Other” means (see Table 8b).

**Table 8b Mode of ingestion, Shannon-Jensen ratios by sexual identity**

	<b>Bigger</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>W</b>
<b>Smaller</b>		0.0157423	0.0049671	0.0079751	0.0048266
<b>X</b>	0.0157423				
<b>Y</b>	0.0049671	3.169281		1.6055804	
<b>Z</b>	0.0079751	1.9739161			
<b>W</b>	0.0048266	3.2615575	1.0291159	1.6523284	

### Period of use

Period of use was not significantly associated with sexual identity in bivariate analysis with this categorical variable (see Table 9). MSM were less likely than other groups to use for more than two days at a time, but also less likely to use for fewer than 6 hours. MSM were most likely to use for periods of more than 24 but fewer than 48 hours; this is consistent with the accounts of prolonged bouts of sexual activity typically taking place on the weekends that MSM participants described in response to qualitative questions about periods and timing of use.

**Table 9 Period of use, by sexual identity**

		Fewer than 6 hours	6-12 hours	12-18 hours	18-24 hours	1-2 days	Over 2 days	Total
<b>Others</b>	Count	7	5	3	3	8	9	35
	%	20%	14%	9%	9%	23%	26%	
<b>MSM</b>	Count	5	9	6	11	20	12	63
	%	8%	14%	10%	18%	32%	19%	
<b>MSMW</b>	Count	3	5	1	6	7	9	31
	%	19%	16%	3%	19%	27%	29%	
<b>Total</b>	Count	15	19	10	20	35	30	129
	% of Total	12%	15%	8%	16%	27%	23%	100.0%

Analysis of Shannon-Jensen divergence ratios among the subpopulations indicates that the MSM and MSM/W are most similar; the Others population is different. Here, the ratios are <2, and thus the differences are not large.

### Concurrent use of other drugs

Most participants did not use any other drugs when they were using methamphetamine (see Table 10), although they were prolific users of other drugs at other times (see discussion of non-concurrent drug use below). Many participants (43%) drank alcohol sometimes while using methamphetamine, with a third smoking cannabis while using methamphetamine. Significant numbers (21%) reported that they preferred to use the drug without any other substances to complicate or alter the high. There was little variance in concurrent use of other drugs by sexual identity.

**Table 10 Concurrent use of other drugs**

	Count	%
<b>Alcohol</b>	57	43
<b>Cannabis</b>	43	33
<b>GHB</b>	7	5
<b>Heroin</b>	3	2
<b>Cocaine/crack</b>	11	8
<b>Nothing else</b>	21	16

## Dependence

Participants' self evaluation as to whether or not they were dependant (however they might choose to define that term) on methamphetamine at present was not significantly associated with sexual identity in bivariate analysis. A majority of MSM/W said they were not dependent, while MSM were almost evenly divided; those who are neither MSM nor MSM/W were slightly more likely than not to answer that they considered themselves dependant on methamphetamine use at present (see Table 11a).

**Table 11a Dependence, by sexual identity**

			Total
<b>Others</b>	Count	19	36
	%	53%	
<b>MSM</b>	Count	31	63
	%	49%	
<b>MSMW</b>	Count	12	30
	%	40%	
<b>Total</b>	Count	62	129
	% of Total	48%	100%

Analysis of Shannon-Jensen divergence ratios among the subpopulations indicates that the MSM/W population is very different from the MSM and Others populations: they are by far the least likely to consider themselves dependent on methamphetamine use (see Table 11b).

**Table 11b Dependence, Shannon-Jensen ratios by sexual identity**

	Bigger	X	Y	Z	W
Smaller		0.0018624	0.0009467	0.0002816	0.0035864
X	0.0018624				1.9256557
Y	0.0009467	1.9673204			3.7883817
Z	0.0002816	6.6137836	3.3618233		12.73587
W	0.0035864				

**Methamphetamine Markets**

**Methamphetamine acquisition**

The frequency of methamphetamine acquisition was not significantly associated with sexual identity in bivariate analysis. Majorities of participants in all groups had acquired methamphetamine from 1-4 times in the last thirty days (see Table 12; participants had to have acquired methamphetamine at least once in the past thirty days to be eligible to participate in the study).

**Table 12 Past month methamphetamine purchases, by sexual identity**

		1-4	5-9	10-19	20-29	≥30	Total
<b>Others</b>	Count	24	6	3	1	2	36
	%	67%	17%	8%	3%	6%	
<b>MSM</b>	Count	41	12	9	2	1	65
	%	63%	19%	14%	3%	2%	
<b>MSMW</b>	Count	18	5	3	3	1	30
	%	60%	17%	10%	10%	3%	
<b>Total</b>	Count	83	23	15	6	4	131
	% of Total	63%	18%	12%	5%	3%	100%

Shannon-Jensen divergence ratios between all subpopulations were all

<2.

**Technical organization of methamphetamine markets: Location of transactions**

Most transactions occurred in private locations, with sales from the supplier’s home most common (37%), delivery to the purchaser second most common (35%), another supplier-controlled location (17%) third most common. Sales in public locations, such as on the street (7%) or in bars and clubs (5%), were rare. There was little variation by sexual identity in locations of transactions (see Table 13a).

**Table 13a Location of last transaction, by sexual identity**

		Bar/Club	Delivery	Other	Street	Supplier home	Total
<b>Others</b>	Count	2	9	7	3	15	36
	%	6%	25%	19%	8%	42%	
<b>MSM</b>	Count	2	23	12	4	24	65
	%	3%	35%	19%	6%	37%	
<b>MSMW</b>	Count	2	14	3	2	10	31
	%	7%	45%	10%	7%	32%	
<b>Total</b>	Count	6	46	22	9	49	132
	% of Total	5%	35%	17%	7%	37%	100%

Analysis of Shannon-Jensen divergence ratios among the subpopulations indicates that the MSM/W population is different from the MSM and Others populations (see Table 13b); note they are the most likely to buy via delivery.

**Table 13b Location of last transaction, Shannon-Jensen ratios by sexual identity**

	Bigger	X	Y	Z	W
Smaller		0.006208	0.0046647	0.0034891	0.0117226
X	0.006208				1.8883047
Y	0.0046647	1.3308409			2.5130331
Z	0.0034891	1.7792542	1.3369398		3.359774
W	0.0117226				

**Technical organization of methamphetamine markets: How were transactions arranged?**

The very large majority (78%) of transactions are arranged by cellphone (see Table 14a). MSM are slightly more likely to report a source who hangs out in a public place, while Others are somewhat more likely to report a source who hangs out in a public place. There is no significant association between sexual identity and location of transactions.

**Table 14a How last transaction was arranged, by sexual identity**

		(s)he hangs out in private	(s)he hangs out in public	Cellphone	Other	Total
<b>Others</b>	Count	4	2	29	1	36
	%	11%	6%	81%	2.8%	100%
<b>MSM</b>	Count	5	8	48	4	65
	%	8%	12%	74%	6%	100%
<b>MSMW</b>	Count	3	2	26	0	31
	%	10%	7%	84%	0%	100%
<b>Total</b>	Count	12	12	103	5	132
	% of Total	9%	9%	78%	4%	100%

Analysis of Shannon-Jensen divergence ratios among the subpopulations indicates that the MSM population is different from the MSM/W and Others populations (see Table 14b). This reflects that MSM show a different pattern with regard to the roughly 20% of all transactions not arranged by cellphone: MSM are more likely in this case to report contacts who hang out in public places, while MSM/W and Others are more likely to report contacts who hang out in private places.

**Table 14b How last transaction was arranged, Shannon-Jensen ratios by sexual identity**

	<b>Bigger</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>W</b>
<b>Smaller</b>		0.0121623	0.0023489	0.005147	0.0042943
<b>X</b>	0.0121623				
<b>Y</b>	0.0023489	<i>5.1779501</i>		<i>2.191263</i>	<i>1.8282602</i>
<b>Z</b>	0.005147	<i>2.362998</i>			
<b>W</b>	0.0042943	<i>2.8321736</i>		<i>1.198551</i>	

### Technical organization of methamphetamine markets: Packaging

There is not great variation in methamphetamine packaging (see Table 15). A majority of purchasers bought their drugs in plastic Ziploc-type bags among all groups; Others were more likely to get their drugs in glassine bags like those in which heroin is sold in New York City (Wendel and Curtis 2000). No participants reported any distinctive packaging, logos, or “brand names” associated with any particular type of methamphetamine or source of the drug. Sexual identity was independent of packaging type at last transaction.

**Table 15 Packaging of methamphetamine at last transaction, by sexual identity**

			Foil	Glassine	None	Other	Plastic Ziploc	Total
3-category Sex ID	<b>Others</b>	Count	5	5	4	3	18	35
		%	14%	14%	11%	9%	51%	
	<b>MSM</b>	Count	7	0	6	10	42	65
		%	11%	0%	9%	15%	65%	
	<b>MSMW</b>	Count	1	2	3	3	22	31
		%	3%	7%	10%	10%	71%	
<b>Total</b>		Count	13	7	13	16	82	131
		% of Total	10%	5%	10%	12%	63%	100%

Shannon-Jensen divergence ratios between all subpopulations were all <2.

**Technical organization of methamphetamine markets: Perceived quality**

Perceived quality of the drug obtained varies by sexual identity (see Table 16). MSM (82%) and MSM/W (84%) were more likely than Others (64%) to report that the quality of their last purchase was “Good” or “Excellent”; no MSM reported that their last purchase was of “Poor” quality.

**Table 16 Self-report quality of last transaction, by sexual identity**

		Poor	Fair	Good	Excellent	Total
<b>Others</b>	Count	1	12	12	11	36
	%	3%	33%	33%	31%	
<b>MSM</b>	Count	0	12	32	21	65
	%	0%	19%	49%	32%	
<b>MSMW</b>	Count	2	3	14	12	31
	%	7%	10%	45%	39%	
<b>Total</b>	Count	3	27	58	44	132
	% of Total	3%	21%	44%	33%	100%

Shannon-Jensen divergence ratios between all subpopulations were all <2.

## Technical organization of methamphetamine markets: Problems with transactions

About half of all transactions were concluded with no problems across all groups (see Table 17a), with MSM slightly more likely to report problems in the course of the last transaction. The problems were primarily delays, not an inability to conclude the transaction.

**Table 17a Problems in course of last transaction, by sexual identity**

		No	Total
<b>Others</b>	Count	19	36
	%	53%	
<b>MSM</b>	Count	28	64
	%	44%	
<b>MSMW</b>	Count	15	30
	%	50%	
<b>Total</b>	Count	62	130
	% of Total	48%	100%

Analysis of Shannon-Jensen divergence ratios among the subpopulations indicates that MSM and MSM/W are most similar; the Others population is different (see Table 17b).

**Table 17b Problems in course of last transaction, Shannon-Jensen ratios by sexual identity**

		X	Y	Z	W
<b>Smaller</b>	<b>Bigger</b>	0.0001149	0.0010958	0.0005651	0.0001704
<b>X</b>	0.0001149				
<b>Y</b>	0.0010958				
<b>Z</b>	0.0005651		1.9392807		
<b>W</b>	0.0001704		6.4308359	3.3160934	

## Social organization of methamphetamine markets: Relationships with methamphetamine sources

About half of MSM (49%) got high and had sex with the person who supplied them with methamphetamine in the immediate aftermath of their last transaction. Sexual identity was independent of the social interactions surrounding the last transaction (see Table 18).

**Table 18 Interaction with provider at last transaction, by sexual identity**

		Get it and go	Got high and had sex	Got high together	Had sex	Socialize but not use	Total
<b>Others</b>	Count	13	12	8	0	3	36
	%	36%	33%	22%	0%	8%	
<b>MSM</b>	Count	20	32	11	1	1	65
	%	31%	49%	17%	2%	2%	
<b>MSMW</b>	Count	15	10	6	0	0	31
	%	48%	32%	19%	0%	0%	
<b>Total</b>	Count	48	54	25	1	4	132
	% of Total	36%	41%	19%	1%	3%	100%

Shannon-Jensen divergence ratios between all subpopulations were all <2.

## Social organization of methamphetamine markets: The role of “Dealers”

About half of all methamphetamine transactions among all groups involved getting the drug from someone the participant did not consider to be a dealer; majorities of both MSM and Others reported getting the drug from someone who was not a “dealer”, but rather from friends, sex partners, and other persons who were not perceived by participants as “dealers”, although they performed that role— supplying drugs— and presumably would be chargeable with distribution offenses as a result (see Table 19a).

**Table 19a Was the source of last transaction a “dealer”?, by sexual identity**

		Yes	Total
<b>Others</b>	Count	15	35
	%	43%	100%
<b>MSM</b>	Count	26	65
	%	40%	100%
<b>MSMW</b>	Count	16	31
	%	52%	100%
<b>Total</b>	Count	57	131
	% of Total	44%	100%

Analysis of Shannon-Jensen divergence ratios among the subpopulations indicates that Others and MSM are most similar; the MSM/W population is different: a small majority do purchase directly from dealers (see Table 19b).

**Table 19b “Was the source of last transaction a “dealer”?”, Shannon-Jensen ratios by sexual identity**

	Bigger	X	Y	Z	W
Smaller		0.0029496	5.217E-05	0.0001882	0.0016507
X	0.0029496				
Y	5.22E-05				
Z	0.0001882	15.676538			8.7731834
W	0.0016507	1.78687			

Almost everyone in all groups said their dealer was reliable: if they contacted him/her, they were pretty certain a transaction would take place more or less as planned (see Table 20a). Participants know an average of one dealer, although this number is skewed by the many who know no dealers and obtain methamphetamine solely through network contacts, and, on the other hand, by a small number of participants who know many dealers.

**Table 20a “Is your dealer reliable?”, by sexual identity**

		Yes	Total
<b>Others</b>	Count	18	19
	%	95%	
<b>MSM</b>	Count	38	40
	%	95%	
<b>MSMW</b>	Count	18	21
	%	86%	
<b>Total</b>	Count	74	80
	% of Total	93%	100%

Analysis of Shannon-Jansen divergence ratios among the subpopulations indicates that Others and MSM are most similar; the MSM/W population is different (see Table 20b).

**Table 20b “Is your dealer reliable?”, Shannon-Jensen ratios by sexual identity**

	Bigger	X	Y	Z	W
Smaller		0.0176028	0.0186161	0.033248	0.0058494
X	0.0176028		1.0575617	1.8887873	
Y	0.0186161			1.785983	
Z	0.033248				
W	0.0058494	3.0093393	3.182562	5.6840017	

67% report that their dealer sometimes sold other drugs as well as methamphetamine: 21 also sold cannabis, 12 sold ecstasy, 17 sold cocaine, 8 sold crack, 3 sold heroin, 6 sold GHB. Other drugs mentioned by participants included Viagra, Vicodin, Oxycontin and psilocybin mushrooms. Of course, given that more than one participant could be describing the same dealer, it is difficult to estimate the extent to which dealers in the methamphetamine market sell other substances other than to say it appears to be common, probably reflecting the fact that methamphetamine in New York City is a comparably unpopular drug with limited and uncertain wholesale availability. Distributors may be hedging by selling other substances that are both more popular and more easily available. Most likely, of course, availability and popularity are highly related, unless sanctions on the market are very effective.

**Social organization of methamphetamine markets: Other non-concurrent drug use**

Methamphetamine users in the sample were prolific users of other drugs, in addition to their methamphetamine use (see Table 21). In the discussion of concurrent drug use in the section on Methamphetamine Consumption above, drugs used at the same time as methamphetamine were discussed; here drugs used by participants in the last year, even if not used concurrently with methamphetamine, are discussed. Other non-concurrent drug use was not significantly associated with sexual identity in bivariate analysis, except in the case of ketamine ( $p=.05$ ,  $G=.013$ ). The very high levels of use of other drugs by most participants indicate that their participation in methamphetamine markets are not their only contacts with illicit drug markets.

**Table 21, Non-concurrent past year use of other drugs, by sexual identity**

		<b>Cocaine</b>	<b>Crack</b>	<b>Heroin</b>	<b>Ecstasy</b>	<b>Ketamine</b>	<b>Cannabis</b>
<b>Others</b>	Count	26	8	8	8	0	27
	%	72%	22%	22%	22%	0%	75%
<b>MSM</b>	Count	47	11	11	22	9	51
	%	72%	17%	17%	34%	14%	79%
<b>MSMW</b>	Count	20	8	8	10	2	23
	%	65%	26%	26%	32%	7%	74%
<b>Total</b>	Count	93	27	27	40	11	101
	% of Total	71%	21%	21%	30%	8%	77%

### **Accounts from “dealers”**

The research team was only able to interview three persons who were willing to self-identify as being current or past methamphetamine dealers in addition to being users. They represent three different aspects of the market: one dealer, a white MSM, worked in a socially-bonded (Curtis and Wendel 2000) dyad selling exclusively to MSM; another dealer, a Hispanic MSM/W, acted as a middleman when he provided methamphetamine to guests at his regular MSM sex parties (parties which drew both MSM and MSM/W guests, but no women); the third dealer, a black freelance/franchise (Curtis and Wendel 2007) dealer provided pre-packaged methamphetamine to a network of fellow users who were heterosexual or had sex with persons of both sexes.

The white MSM discusses his business, which was a part-time supplement to a legitimate business:

I worked for my ex-lover and ex-boss [at a legitimate arts business]. He is a dealer too. I've known him for years, he was my boyfriend years ago... Normally we delivered. I was a runner for him for a few years. I took care of about 10 steady customers, all white gay men. We sold by weight, the price depends on the customer and the amount, but around \$200 a gram. A new customer had to be an existing customer's sex partner and you had to show your penis or have sex with me, you [perform oral sex on me], I [perform oral sex on you]. Why would I want to sell you drugs if I didn't want to have sex with you?

This MSM distributor explicitly cited the closed sexual network nature of the MSM market as a security measure against law enforcement: "... I don't think the police are going to [perform oral sex on me] to arrest me for drugs!" The

methamphetamine they sold came from a variety of sources, but primarily from a MSM “cook” running a small-scale lab in suburban New Jersey<sup>8</sup>.

The MSM/W sex party promoter<sup>9</sup> mentioned above has weekly weekend-long sex parties where men use drugs and have sex. This participant self-identified as HIV positive, and explained that his HIV status entitles him to housing from the New York State HIV AIDS Services Administration (HASA); the sex parties are held in his HASA-provided apartment, or that of an associate; they rotate from apartment to apartment to avoid attracting too much attention to their activities. He describes how this all works: “At my sex parties, the dealer makes three deliveries of eight or nine bags [\$20 bags] per delivery a night for 2-3 nights each weekend. We also get krills [crack] and weed from the same guy. We go all weekend. The people I be using with, I'm not attracted to these people, I'm high, [I'm erect because of the drugs], let's go! Something about smoking, getting money, something about that turn me on [sexually] too.”

The freelance/franchise dealer is a black MSW low-level dealer, who gets fronted a few pre-packaged \$20 bags by a Puerto Rican distributor and “flips them the same day”, so he can pay his supplier. He mostly sells to finance his own use. Most of his customers are drawn from his network of acquaintances and their associates, most of whom are persons who do not participate in MSM sexual activity (Others). He finds new customers “because I knew they get high and they can't get it”.

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<sup>8</sup> This is the only account or indication of local production the study team found. Most participants had no idea of the source of the methamphetamine they used; those who claimed to know the source of the methamphetamine they consumed or distributed most often mentioned California as the source, often via express delivery services.

<sup>9</sup> He is the outlier in the purchase figures in the discussion section below.

Although participants were very willing to discuss in detail their methamphetamine buying behavior, they were much more reticent about discussing supplying others with methamphetamine. This was especially notable given that so many had obtained their last methamphetamine purchase through the secondary market (i.e., through someone they identified as not being a dealer). Participants also indicated that the majority of their methamphetamine-using network contacts would be willing to supply them with the drug, even though they were not dealers per se. It seems likely that some of this reticence in discussing supplying others was grounded in a lingering fear that this wasn't really a legitimate research project, but a law enforcement effort to trick people into confessing their crimes. Participants were apparently willing to "confess" to drug buying and use, but not to supplying others.

Often in conducting qualitative research on topics where there may be perceived social pressures to give socially desirable responses, participants will contrast their own virtuous norm-regarding behavior with the less-virtuous behavior of their peers: for example, *they* don't provide their friends with drugs, but their peers do. Whether this is in fact true, or whether discussing "those other people" provides a narrative frame through which participants can discuss their own behavior without fearing that their interviewer will think less of them<sup>10</sup> is a difficult question.

Because so few participants were willing to discuss supplying others in this secondary market (while making clear that they themselves often depended

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<sup>10</sup> Compare Maher's (1997) gradual realization that the "\$5 girls" universally excoriated by the Bushwick sex workers she studied were in fact all of them when sufficiently desperate.

on others to do just that), the research team did not engage in extensive quantitative analysis of participants' accounts of supplying others. See the Discussion section on the secondary market for more on this issue.

When interviewers asked participants to characterize the members of their social networks who use or distribute methamphetamine, it was found that the average study participant knows seven other methamphetamine users' phone numbers. MSM had many more methamphetamine-using contacts, with an average degree of 18 v. 5 for non-MSM. 60% of participant methamphetamine-using phone contacts would provide methamphetamine, even though they are not "dealers": 88% of male contacts, 11% of female contacts, and 1% of transgender contacts. Of participant network contacts that were male, 80% were MSM or MSM/W and 20% were men who do not have sex with other men. 48% of participant contacts were white, 26% were black, and 3% were Asian/Other race.

***Methamphetamine Markets and Violence***

No participants said they had been involved in any violence while selling or distributing methamphetamine. The MSM dealer quoted above described an incident where he was afraid he was about to be robbed or victimized while making a pickup from his supplier, "but nothing actually happened." Two participants disclosed that they had been robbed while selling methamphetamine. Both were black: one MSM and one transgender person.

Participants disclosed experiencing a total of seven incidents of violence that occurred while buying methamphetamine. Five said they had been robbed while buying: three MSM/W (two blacks and one Hispanic), one white MSW, one Other race WSM.

Very few participants owned weapons of any kind<sup>11</sup>. Weapon ownership was somewhat associated ( $p=.110$ ,  $G=.135$ ) with sexual identity in bivariate analysis, with Others more likely to own weapons (see Table 22a).

**Table 22a Weapons ownership, by sexual identity**

		Total
<b>Others</b>	Count	6
	%	17%
<b>MSM</b>	Count	3
	%	5%
<b>MSMW</b>	Count	2
	%	7%
<b>Total</b>	Count	11
	% of Total	9%

<sup>11</sup> Weapons owned by participants included two shotguns, a 9mm Glock semi-automatic pistol, a .38 revolver, two .22 pistols, "a revolver I got for three bags of crystal, one krill [bag of crack], and a blunt. I don't even know if the shit work", a machete, several knives, brass knuckles, and pepper spray.

Analysis of Shannon-Jensen divergence ratios among the subpopulations indicates that the Others population is very different from the MSM and MSM/W populations (see Table 22b). Although weapon ownership is rare among all subpopulations, Others are much more likely to be weapons owners.

**Table 22b Weapons ownership, Shannon-Jensen ratios by sexual identity**

	Bigger	X	Y	Z	W
Smaller		0.0004369	0.0076074	0.0088781	0.0055019
X	0.0004369		17.412482	20.321044	12.59319
Y	0.0076074			1.1670389	
Z	0.0088781				
W	0.0055019		1.3826904	1.6136534	

No MSM or MSM/W reported carrying a weapon; 14% of others did (see Table 23; see also Discussion section for more detail). Weapon carrying was very significantly associated with sexual identity ( $p=.001$ ,  $G=.001$ ).

**Table 23 Weapon carrying, by sexual identity**

		Total
<b>Others</b>	Count	5
	%	14%
<b>MSM</b>	Count	0
	%	0%
<b>MSMW</b>	Count	0
	%	0%
<b>Total</b>	Count	5
	% of Total	4%

Shannon-Jensen divergence ratios between all subpopulations were all <2.

### **Methamphetamine Markets and Criminal Justice**

Participants had very few contacts with law enforcement or the criminal justice system, especially given that all were current methamphetamine users and almost all were users of other illicit substances, three were self-identified methamphetamine dealers, 30 were sex workers, and many lived off various illicit “hustles”, such as “boosting” (shoplifting), “breaking bottles”<sup>12</sup> and other petty property crime.

Only four participants had been arrested for methamphetamine possession in the last year (see Table 24).

**Table 24 Past year methamphetamine possession arrests, by sexual identity**

		Total
<b>Others</b>	Count	1
	%	3%
<b>MSM</b>	Count	3
	%	5%
<b>MSMW</b>	Count	0
	%	0%
<b>Total</b>	Count	4
	% of Total	3%

No participants had been arrested for methamphetamine distribution in the past year. Only one participant (a MSM/W) had ever been arrested for methamphetamine distribution.

Participants had a lifetime total of 13 methamphetamine possession arrests for the entire sample (see Table 25); this should be seen in the context of their heavy drug use and frequent participation in methamphetamine acquisition

<sup>12</sup> This is a recently popular hustle where the hustler contrives to bump into an affluent tourist and drop a gift-wrapped bottle of expensive liquor, breaking it, setting up a demand that the mark compensate the hustler for the value of the broken “gift” (which is in fact a bottle from a bar garbage can refilled with tea or water and a small amount of liquor for the smell).

discussed above. There was no significant variation by subpopulation of any methamphetamine arrest measure.

**Table 25 Lifetime methamphetamine possession arrests, by sexual identity**

			Total
<b>Others</b>	Count	5	34
	%	15%	
<b>MSM</b>	Count	5	60
	%	9%	
<b>MSMW</b>	Count	3	31
	%	10%	
<b>Total</b>	Count	13	125
	% of Total	10%	

On average, about half (49%) of participants had ever been arrested for any other drug possession offence in their lives (see Table 26a).

**Table 26a Lifetime non-methamphetamine drug arrests, by sexual identity**

			Total
<b>Others</b>	Count	14	34
	%	41%	
<b>MSM</b>	Count	32	60
	%	53%	
<b>MSMW</b>	Count	15	31
	%	48%	
<b>Total</b>	Count	61	125
	% of Total	49%	

Sexual identity was not significantly associated with any of the arrest variables in bivariate analysis.

Shannon-Jensen divergence ratios were  $< 2$  with regard to all arrest variables, with one exception. With regard to lifetime other-drug arrests, analysis

of Shannon-Jensen divergence ratios among the subpopulations indicates that the Others population is different from the MSM and MSM/W populations (see Table 26b).

**Table 26b Lifetime non-methamphetamine drug arrests, by sexual identity**

	Bigger	X	Y	Z	W
Smaller		0.0005217	0.0023653	0.0031968	0.001139
X	0.0005217		4.5335538	6.1273973	2.1831982
Y	0.0023653			1.351566	
Z	0.0031968				
W	0.001139		2.0765654	2.8066152	

When the sample was divided by race, rather than sexual identity, there was no association ( $p=.72$ ,  $G=.59$ ) between race and methamphetamine possession arrests (see Table 27).

**Table 27 Lifetime methamphetamine possession arrests, by race**

		Total
<b>Black</b>	Count	8
	%	12%
<b>Hispanic</b>	Count	3
	%	13%
<b>Other/ Asian</b>	Count	0
	%	0%
<b>White</b>	Count	2
	%	7%
<b>Total</b>	Count	13
	% of Total	100%

Most black and Hispanic participants had been arrested for drug offenses other than methamphetamine possession at some point in their lives (see Table 28). Only about a third of white participants, and a fifth of Other/Asian participants had ever been arrested for such offenses. Lifetime other-drug arrests

were somewhat ( $p = .189$ ,  $G = .177$ ) associated with race, with black and Hispanic participants more likely than Other/Asian or white participants to have ever been arrested for drug offenses other than methamphetamine possession. Shannon-Jensen divergence ratios between all subpopulations were all  $< 2$  for lifetime other-drug arrests; the differences were not significant.

**Table 28 Lifetime non-methamphetamine drug arrests, by race**

			<b>Total</b>
<b>Black</b>	Count	38	69
	%	55%	
<b>Hispanic</b>	Count	12	23
	%	52%	
<b>Other/Asian</b>	Count	1	5
	%	20%	
<b>White</b>	Count	10	28
	%	36%	
<b>Total</b>	Count	61	125
	% of Total	49%	

The large majority of study participants said that neither police (see Table 29) nor other factors in the community (see Table 30) had prevented them from buying methamphetamine in the last year. Those that had experienced law enforcement activity preventing them from acquiring methamphetamine were unanimous that in every case the delay was only temporary and easily surmounted. No one reported that any factor connected with anything other than distributors had ever significantly delayed or impeded their efforts to acquire methamphetamine in the last year.

**Table 29 Police prevented me from buying methamphetamine in the past year, by sexual identity**

			Total
<b>Others</b>	Count	9	33
	%	27%	
<b>MSM</b>	Count	9	62
	%	15%	
<b>MSMW</b>	Count	5	31
	%	16%	
<b>Total</b>	Count	23	126
	% of Total	18%	100%

Few participants said that other factors (nosy neighbors, nightclub security or any other non-law enforcement factor that might prevent market activity) had prevented them from buying methamphetamine in the past year. Again, in every case, they were prevented only temporarily; the few who cited this as affecting their methamphetamine buying agreed the only effect was to temporarily delay their purchases.

**Table 30 Other factors in the community prevented me from buying methamphetamine in the past year, by sexual identity**

			Total
<b>Others</b>	Count	3	34
	%	9%	
<b>MSM</b>	Count	10	62
	%	16%	
<b>MSMW</b>	Count	5	30
	%	17%	
<b>Total</b>	Count	18	126
	% of Total	14%	100%

\*The modal answer here was "nosy neighbors" of dealer.

Shannon-Jensen divergence ratios between all subpopulations were all <2 for both variables concerning anything that might have prevented a participant from buying methamphetamine.

Participants were asked if police had confiscated methamphetamine from them without arresting them (see Table 31a). Few participants in any sub-group had experienced this. Differences among sub-populations were not significant in *p*- and *G*-values.

**Table 31a Police confiscated methamphetamine from me but did not arrest me in the past year, by sexual identity**

			Total
<b>Others</b>	Count	4	35
	%	11%	
<b>MSM</b>	Count	5	59
	%	9%	
<b>MSMW</b>	Count	1	29
	%	3%	
<b>Total</b>	Count	10	123
	% of Total	8%	100%

Here, analysis of Shannon-Jensen divergence ratios among the subpopulations indicates that the MSM/W sub-population is very different from the MSM and Others sub-populations (see Table 32b)- they are much less likely to report confiscation without arrest than the other two sub-population groups.

**Table 32b Police confiscated methamphetamine from me but did not arrest me in the past year, by sexual identity**

	Bigger	X	Y	Z	W
Smaller		0.0026018	0.0002225	0.0005112	0.0053309
X	0.0026018				2.0488931
Y	0.0002225	11.693864		2.2975065	23.959478
Z	0.0005112	5.0898068			10.42847
W	0.0053309				

## **DISCUSSION**

The following section discusses New York City methamphetamine market participants as users, buyers and sellers of methamphetamine, and the market behaviors of New York City methamphetamine market participants as users, buyers and sellers of methamphetamine. The integration of qualitative data and social network data has allowed the project to produce findings that will be valuable, it is hoped, in understanding and responding to problems caused by methamphetamine use and distribution.

### ***A Bifurcated Market***

The retail methamphetamine market in NYC is bifurcated between two largely separate sub-markets: a smaller market for “crank,” “speed” or “crystal meth” that overlaps with powder cocaine and crack markets, and a larger closed, sexual-network-based market among MSM around use of “tina” as a sex drug. Each of these two submarkets displays differing characteristics of both the social organization of the market and the technical organization of the market; see Table 33, summarizing some differences between the two submarkets.

#### **The “crank” market**

In the sub-market where “crank,” “speed” or “crystal meth” is seen as a more efficient, longer lasting alternative to powder cocaine or smoked “crack”

**Table 33 The bifurcated market for methamphetamine in New York City: Some differences between the two submarkets**

	<b>“Tina” market</b>	<b>“Crank” market</b>
<b>Submarket</b>	“Tina” is consumed as a sex drug, with no perceived substitutability of cocaine, among members of a socially-bonded network based on MSM “chem sex.”	“Crank” or “crystal meth” is seen as a more efficient, longer lasting alternative to cocaine or “crack” cocaine, with substitution between the two substances.
<b>Social organization of distribution</b>		
<b>Extent of secondary market</b>	Very large secondary market, with peer-to-peer supply a social norm, and large numbers of “semi-dealers”.	More limited secondary supply networks.
<b>Open/closed?</b>	To enter this market, a potential buyer must have had sex with an existing market participant or the seller.	This market is fairly porous, with sellers open to new customers.
<b>Degree of social organization</b>	Distributors in this market are typically user/dealers, with dealer/“runner” dyads also noted.	Sellers are freelancers, with both non-user sellers & user/dealers.
<b>Temporal aspects</b>	Most active from Thursday-Sunday in weekly cycles.	Daily market.
<b>Technical organization of distribution</b>		
<b>Sales units</b>	The typical price in this market is \$200-240/gram, with sales by weight: half-grams, grams, “teenagers” (1/16 oz.), “eightballs” (1/8 oz.).	This market is dominated by price-denominated sales, with “forty [\$40] bags” and “eighty [\$80] bags” the most commonly mentioned purchase units.
<b>Street markets</b>	The very limited street market is a MSM sex worker/dealer market in two heavily gay communities late at night.	Limited street markets overlap with traditional hard drug (heroin/cocaine) markets.
<b>Delivery markets</b>	This market is heavily delivery-based (see also below).	Some delivery sales.
<b>Public location indoor sales</b>	Rare.	Legitimate businesses with a “sideline,” sometimes. unknown to business owner; dance clubs.
<b>Private location indoor sales</b>	Dealer home sales. Underground sex clubs and parties.	Underground sex clubs and parties.

cocaine (with substitution between the substances<sup>13</sup>), sellers are freelancers, with both non-user sellers and user/dealers described by study participants. This market is fairly porous, with sellers open to new customers. This a very different configuration of the social organization of distribution than that observed in the MSM “tina” market. The technical organization of distribution also differs. This sub-market is dominated by price-denominated sales, with “forty [\$40] bags” and “eighty [\$80] bags” (of unknown weight) the most commonly mentioned purchase units, although participants also reported buying “twenties” (\$20 bags are the most common unit of sale in the retail cocaine market in New York City).

Participants in this sub-market described some limited street markets overlapping with traditional “hard drug” (heroin/cocaine/crack) market areas (Harlem and some predominantly black areas of Brooklyn long characterized by widespread semi-public street sales of heroin, cocaine and crack); participants in this sub-market also described some delivery sales and sales from private locations controlled by the seller, such as apartments and workplaces.

Some also described public or semi-public indoor location sales, for example legitimate retail businesses with a “sideline” business conducted by employees sometimes unknown to business owner, or sales in bars, dance clubs, and group sex locations, such as underground sex clubs and parties.

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<sup>13</sup> Even non-MSM methamphetamine users who are participants in the “crank” market almost universally agree that they can readily distinguish between the effects of methamphetamine and cocaine on axes other than simply the fact that the effects of methamphetamine last much longer than those of cocaine. One typical term employed to explain the distinction between the effects of the two substances is that methamphetamine has effects that are “cleaner” or produce less “paranoia”.

## The “tina” market

The larger of the two sub-markets is that catering to MSM in search of “party favors” for “chem sex.” In this market, “tina” is consumed as a *sui generis* sex drug, with no perceived substitutability of cocaine: “Don’t send a boy to do a man’s job.”

In this sub-market, the social organization of distribution is through networks of sex partners: to enter this market, a potential buyer must have had sex with an existing market participant, or, sometimes, the seller: “Why would I want to sell you drugs if I didn’t want to have sex with you?” Distributors in this market are typically user/dealers, with dealer/“runner” dyads also noted, distributing among members of a socially-bonded network based on MSM sexual activity.

The technical organization of distribution in this submarket is also correspondingly different from the non-MSM market. The typical price in this market appears to be \$200-240/gram, with sales by weight units almost exclusively: half-grams, grams, “teenagers” or “teeners” (1/16 ounce or 1.75 g), “eightballs” (1/8 ounce or 3.5 g). This market is delivery and indoor (dealer home) sales-based, and rooted in sexual networks among MSM. The very limited street market is a MSM sex worker/dealer market in two heavily gay communities in Manhattan (Chelsea and the West Village) late at night<sup>14</sup>. Unlike the non-MSM market, which revealed no discernable temporal cycles, this market has a definite temporal rhythm, existing from Thursday-Sunday in weekly cycles. This is

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<sup>14</sup> Some sources claim that methamphetamine is often available in strongly MSM-identified environments where law enforcement may be uncomfortable (Jacobs 2004, Osborne 2005).

because the market exists around the consumption pattern of participants in this submarket: 2-3 day “tweekend” marathon sex sessions, followed by “crashing” and recovery from the aftereffects.

### ***Sexual Behavior and Methamphetamine Use***

One of the greatest difficulties in conducting this study might be termed stigmatic stratigraphy: the MSM participants in this study primarily identify as gay, engage in behavior which has become very stigmatized within the mainstream gay/MSM community<sup>15</sup>, and are criminals because they buy and supply illegal drugs. Thus, they are subject to multiple layers of stigma, and formal and informal social sanctions.

As mentioned above in the Background and Significance section, there has been little discussion in either the scholarly or popular literature about the origins or background of use of methamphetamine by MSM, or about the sexualized pattern of consumption referred to as “chem sex.”

In discussing “the social construction of a gay drug”, Reback (1997) says that “[i]n the United States, gay identity is both implicitly and explicitly linked to sex. Consequently, communities that place a high priority on sexual functioning are clearly predisposed to embrace a drug that reportedly enhances sex. The identity, social networks, and institutions that mark a gay subculture have easily evolved to maintain and support the use of crystal within gay communities. The creation of social settings where crystal use is common--or, in some social

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<sup>15</sup> Although in gay communities “[c]rystal ... has come to be positively associated with sex” (Reback 1997); note Reback was writing before the extensive anti-methamphetamine public health campaigns of 2004-5.

situations, expected--serves to *normalize* [emphasis added] crystal in gay culture.”

Reback argues that one reason methamphetamine use became popular among MSM is that among many MSM “gay sex is also associated with other internal dynamics, such as internalized homophobia, guilt, and shame ... crystal use is a positive coping mechanism for dealing with negative internal messages, thus permitting gay sexuality without internal disapproval” (Reback 1997).

Reback argues that the “disinhibiting effects of meth” helped some men have sex with other men when they at one point were afraid to do so, and allowed others to engage in more extreme sexual acts: “The use of crystal methamphetamine reduces the amount of pain experienced by the receiver [during receptive anal intercourse], relaxes his sphincter, ... greatly increases both sexual partners’ desires to engage in anal penetration .... [and] increases the stamina of both partners and significantly delays orgasm. ... [M]en engaging in sex while using crystal methamphetamine tend to have longer, rougher sex that can last several hours or more” (Reback, 1997; see also Easton 2003).

Reback also argues that two additional factors must be taken into account in understanding the apparent increase in use of methamphetamine among MSM since the mid-1990s: the impact of both HIV and the Internet on MSM communities.

She discusses “the advantages of using crystal to manage certain AIDS-related conditions or effects ... as a form of self-medication ... to maintain a sense of physical or psychological normality” in the face of HIV, and says that

“the timing of crystal is perfect. The drug quells feelings of hopelessness and fits neatly into devastated gay communities. In this historical moment, when a gay identity is either directly or indirectly linked to HIV, one's sexual expression becomes infused with death.” (Reback 1997). Osborne (1997) says that the growth of methamphetamine as a “gay drug” was in part a reaction to public health campaigns urging “safe sex” on MSM: “The increased use of meth among MSMs in the 1990's-2000's was due, in part, to a singular focus on gay sex clubs, theatres, bars and bathhouses and their contribution to the spread of HIV/AIDS. Thus, MSM meth use in NYC went largely unnoticed until its use was widespread.”

The other decisive factor, Reback says, in the construction of methamphetamine as a “gay sex drug” was the widespread availability of the Internet and the advent of MSM-oriented “hook-up” sites. Prior to the Internet, the stigma often associated with MSM activity limited the places where MSM could gather and feel comfortable. Gay bars, bathhouses, sex-clubs, sex shops, and gay bookstores, however, were safe havens for men looking to meet other men looking for sex. Thus, these men were either meeting in establishments geared toward sex and/or drugs and alcohol (Bux 1996). MSM inhibited by public MSM environments such as gay bars or bathhouses are able to find both sex and drugs through “hook-up” sites without the potential awkwardness of face-to-face interactions (Reback 1997). These “under the radar” networks of men who met online, rather than in traditional MSM venues, facilitated the spread of sex and drug practices in MSM communities.

One MSM methamphetamine recovery website claims methamphetamine use became popular among MSM after ketamine was re-formulated to make it impossible to dry out in a microwave oven (<http://www.lifeormeth.com>, “Crystal Culture”, first Flash animation page). The same site alternatively claims that it was marketing campaigns for erectile dysfunction drugs that provided the catalyst for the spread of crystal use among MSM in the late 1990s, because Viagra offered a solution to the frequent problem of methamphetamine-induced impotence: “seemingly overnight Viagra transformed ‘Tina’ from a ‘trailer trash’ drug into the ultimate aphrodisiac. And with meth’s ability to melt away rational thought, suddenly, years of ingrained safe sex messages seemingly never existed” (<http://www.lifeormeth.com>, “Crystal And Aids”, first Flash animation page). This site goes on to claim that use of crystal was disseminated across the United States by usage at “circuit parties,” large, sexually-charged dance events held to raise money for anti-HIV efforts in the MSM community, which “provided the geographical network through which crystal, aided and abetted by Viagra, would explode into the new millennium.” The site claims that the use of “tina” was spread by dance club DJs who began playing a harder-edged, more abrasive style of music with faster tempos (referred to as “pots and pans” in the gay dance-music scene), replacing the “feel-good” sounds of ecstasy-fueled house music with the “cold negativity of banging, rhythmless noises and wailing diva vocals that blatantly promoted meth use; ‘I’m Addicted’, an angry, mantra-like homage to ‘Tina’, among them” (<http://www.lifeormeth.com>, “Pots And Pans”, Flash animation page under heading “Crystal Culture”).

Reback (1997) makes an important point about the social networks of the methamphetamine users she studied in Los Angeles that is very much in accord with the findings of the present study: “Social networks and sub-communities of crystal users are formed *across class and ethnic differences* [emphasis added]. The demographic patterns indicate that user groups tend to be formed around socioeconomic similarities rather than racial groups; however, these socioeconomically based sub-communities are fluid and easily expanded to include individuals outside of a particular sub-community when crystal and/or sex are factored into the equation. Thus ‘in-group/out-group’ distinctions were temporarily redefined around the use of crystal and activities associated with its use (e.g., sex, dancing, sex work).”

The MSM market for “tina” as a sex drug is unique in that one can only participate in this market by having sex with an existing market participant: the market is structured by participant sexual networks. This is clearly different from most drug markets or indeed markets for any kind of commodity, which are typically organized around profit- market participants are willing to enter into transactions with market entrants provided they are satisfied the new customer is legitimate, i.e. likely to pay, and in illicit markets, not affiliated with law enforcement, or in licit regulated markets, a permitted customer, i.e. a prescription holder in the case of controlled substances. In non-criminalized markets, partially parallel examples of socially-structured markets might include markets in Freemasonic or fraternal regalia only available to members of those organizations, or real-estate transactions conditioned on the social acceptability

of the potential buyer, such as co-op apartments where buyers must be approved by a board of residents, or anti-minority-buyer covenants on purchase in some post-World War II suburban developments. Clearly, these parallels are rather strained, which serves to underline the uniqueness of the configuration of the MSM methamphetamine market as a sex-partner network.

Within drug markets, one parallel would be Dorn et al.'s (1992) characterization of some drug markets as "trading charities": "those traffickers who, initially at least, are not primarily (and definitely not solely) financially motivated" (3):

The Trading Charity dealer ties involvement in the supply of drugs to a particular facet of their social life and to socializing within it. This may not amount to a full-blown ideology or world-view but it does mean that a goal of profit accumulation is subsidiary to, or strongly tempered by, a commitment to or enjoyment of the social and cultural aspects of using the drug and the context in which this is done. (10)

Note that Dorn et al. quote a "trading charity" ecstasy dealer who felt safer buying only from other gay contacts (9). While this market configuration might be considered as a mechanism for securing the market against infiltration by law enforcement, clearly this is not the reason the MSM methamphetamine market is organized in this way, but merely a serendipitous benefit of the sexually-networked market structure. The examples Dorn et al. (1992) give involve "ideological commitment" to cannabis and ecstasy use as social goods, in hippie and acid house sub-cultures (10).

The fact that MSM methamphetamine markets take place within a closed network of sexual partners poses difficulties for law enforcement in trying to take

action against the market, but also for participants within that market trying to stop use. As drug use becomes entwined with sexual activity, to the point that they become essentially the same thing (as many participants told us), the difficulties faced by all recovering drug users are magnified, as the user must now avoid not only drug use but also sex.

The extended network of secondary supply among MSM sex partners also resembles Dorn et al.'s typological category of a "mutual society": "a friendship or acquaintance based network of drug users, some of whom, some of the time, will supply drugs to others" (1992, 10). They distinguish a "mutual society" from a "trading charity" because dealers of the latter type supply their personal usage from sales stocks rather than buying through network contacts.

Even when dealers and sexual network secondary markets fail as sources of supply, participants described using online MSM dating/"hook-up" sites to find sources of crystal. Although the most popular and mainstream sites now generally ban use of most common methamphetamine-related slang in online profiles (references to "tina", "partying", "P'n'P"), participants described more subtle cues. For example, a preference for "long sessions" of sex would be a clue, as would capitalizing the letter "T" (for "tina") in the middle of words. Injectors said they could find fellow injectors by ads that promised to "get to the point" (syringe), offered "slamming" sex ("slam" is the usual term for "inject" in the MSM methamphetamine sub-culture), or capitalized the letter P (for "point") in the middle of words. Because of anti-crystal sentiment and harm-reduction and abstinence-based efforts to deal with methamphetamine use in the MSM

community, some of the dating/"hook-up" sites have allowed participants to use otherwise forbidden terms, provided they are prefaced by the word "no": "No P'n'P", e.g. Several participants told us phrases like "No P'n'P!" are often used on those sites as a code to indicate that the person was in fact interested in "partying"!

Studies estimate from 30% to 82% of MSM have sex with partners met online (Liau et al. 2006), and that use of the internet to meet sex partners has increased in recent years (Rietmeijer et al. 2009, Benotsch et al. 2002, McFarlane 2000). Some studies suggest that the anonymity and efficiency of online partner-shopping facilitates "party n' play" sex with methamphetamine and "barebacking" (condomless) sex (Wilson et al. 2008, Berg 2008, Blackwell 2008).

### ***Methamphetamine Consumption and Distribution Networks***

This section focuses on the overall organization of New York City retail methamphetamine markets. Because this report argues that this is essentially a market bifurcated into two distinct, largely separate sub-markets serving MSM seeking “tina” for use as a sex drug, and others (mostly non-MSM) seeking a better/more cost-efficient version of crack, with the market dominated by the former sub-market, the discussion in this section is based primarily on the observed features of the market among MSM, with additional comments as to the non-MSM market as appropriate, where particular aspects of that market are different from those in the MSM market.

The market for methamphetamine in New York City is clearly a “niche” market, catering to insider groups, as opposed to the much larger markets for substances like cannabis or cocaine. One analogy might be to the pre-crack era “freebase” scene, where knowledge of how to prepare cocaine for smoking was restricted to an insider “elite” coterie of users and dealers (Hamid 1992).

Study participants described a variety of methods employed by methamphetamine distributors, but most transactions they described were either delivery transactions or took place in the dealer’s home or at another private place controlled by the dealer.

The social organization of distribution observed in the study was consistent with a niche market. Almost all the distributors described by study participants appear to be freelancers, with a few MSM participants describing socially-bonded dyads of two men in a sexual relationship who sell together. The MSM dealer interviewed provides an example of this configuration. No

participants reported buying from the sort of large corporate-style distributors with many “runners” that are common in the retail cannabis trade in New York (Curtis et al. 2002).

The most striking characteristic of the methamphetamine market in New York City is the extent of the secondary market. While participants were reticent in discussing instances when they themselves supplied others with crystal, others were apparently more willing to do so. This may be because participants feared that the interview might not really be confidential and that disclosing supplying others would therefore be risky for legal reasons, or it may reflect participants’ self image as “not drug dealers” coloring their responses. Because participants were much more willing to discuss being supplied by others than supplying others themselves, the discussion of secondary markets is based primarily on participants’ accounts of being supplied by others as more accurately reflecting the reality of the market.

The MSM market for “tina” was much more characterized by secondary distribution than the non-MSM market for “crystal meth”/“crank.” This may be, in part, an artifact of the reality that this market is organized along sexual network lines—each new market participant must be the sex partner of an existing market participant—and that the social organization of consumption is around consumption during prolonged bouts of sexual activity, generally among dyads or small groups of men. Norms of reciprocity among sex partners may demand that partners take turns supplying drugs (unless the relationship is one where the parties have accepted their respective “sugar daddy” and “hustler” roles, with

accordingly different expectations of limited symmetry of supply). Intermittent availability of product among dealers may also lead different members of a dyad or group supplying “party favors” because they have access at a given time and others do not.

High levels of secondary distribution typically arise when dealers are reluctant to take on new customers despite demand among consumers; secondary distribution represents a market configuration working around the resultant network “bottlenecks” which would otherwise limit consumption, as those who are able to buy from the closed network of existing dealers supply their friends or associates who lack such contacts. In social network analysis terms, such a “bottlenecked” network is described as one offering high opportunities for *brokerage*, as network actors with access to desired flows (in this case, of methamphetamine) within the network take advantage of structural characteristics of the network. However, existing dealers’ reluctance to take on new customers would not create network bottlenecks if new dealers could easily enter the market to supply consumer demand. Thus, another inference that can be drawn from a market with high levels of secondary distribution is that there are high barriers to market entry.

In illegal markets, the typical barriers to entry are lack of supply, fear of violence from market competitors and fear of intervention by law enforcement agencies. In this case, it seems most reasonable to conclude that the major barrier to entry is lack of access to supplies of methamphetamine, rather than fear of violence from competitors, or sanctions by law enforcement. Data

collection in this study and a review of the pertinent literature reveal little evidence of any substantial amount of violence among distributors in the New York City methamphetamine market; this is consistent with both the social status of most market participants and the observed structure of distribution. Delivery markets and private indoor location markets typically make violence more costly than beneficial for distributors, particularly freelancers or dyads: their invisibility is their strength, protecting them from competitors and law enforcement alike; any competitive gains achievable by violence against competitors are far outweighed by this sacrifice. Of course, in a closed indoor/delivery market, distributors are likely to have limited contact with, or direct awareness of, their competitors. Similarly, there is little evidence that fear of law enforcement is a major barrier to market entry by potential new methamphetamine distributors. Retail methamphetamine markets in New York City receive only sporadic attention from Federal law enforcement, and next to none from the New York City Police Department.

Most of those interviewed did not know where the crystal they used came from. Of those who claimed some knowledge of the product's origins, the most commonly mentioned sources were New Jersey, San Francisco, and upstate New York; a few also believed that they knew of manufacturing in New York City. Of the two persons interviewed who were willing to answer questions about drug-selling, one said he had no idea where the methamphetamine he sold came from, while the other described going on runs to pick up crystal from the MSM "cook" in northern New Jersey. The fact that the study gathered some data about

methamphetamine production in areas near New York City does not necessarily indicate that most or even very much of the methamphetamine used in NYC is produced nearby—the only production sources that participants are likely to be familiar with are those that are nearby.

Many participants discussed their sources running out of product from time to time and having different batches of methamphetamine over time (characterized by different appearance, texture/crystal configuration and quality). No participants in either sub-market said that their source always had the same product over time. This is consistent with a market with multiple sources of supply of limited capacity, and seems to indicate that supplies of methamphetamine available in New York are produced in many small labs, rather than the “superlabs” described in some law enforcement sources. Of course, these data are equally compatible with multiple intermediary sources supplying products from a few production sources; the variations described could also be the result of dilution by intermediate distributors.

One characteristic distinguishing the two sub-markets is the differing views of participants as to whether or not cocaine or crack were equivalents of, or substitutable for, methamphetamine. MSM participants agree that “tina” is very different from cocaine or crack because of the intense sexual effects of “tina”, while MSM/W and Other participants were much more likely to see “crystal meth” as a cheaper or more cost-effective form of cocaine. Both groups agree that methamphetamine was better than cocaine or crack in that the longer lasting effects led to much less “geeking” or “fiending” for the next dose. Participants

also almost universally agreed that methamphetamine provided a longer-lasting initial “rush” on ingestion.

## Estimating the size of the New York City methamphetamine market

Estimating the size of a hidden population is a notoriously difficult business. One method for estimating the total size of the market would be by extrapolation from data as to levels of methamphetamine use among different user sub-populations as reported in secondary data. The federal Centers for Disease Control's National HIV Behavioral Surveillance study provides one basis for estimating the number of MSM market participants (see Table 34). An upper bound estimate of the number of past month methamphetamine users, assuming for the sake of the calculation that the much higher 2005 NHBS figures are a more accurate measure of use, might be calculated by taking the sum of 10% of the estimated combined MSM and MSM/W population of NYC (32,400 of 324,000; NYC DOHMH), and an estimate of numbers of users among non-MSM.

**Table 34 Amphetamine Use from the National HIV Behavioral Surveillance (NHBS) Study of MSM in New York City: 2004 versus 2008 (note NHBS MSM definition includes MSM/W)**

	2004 %	2008%	% change
<b>Past Year Methamphetamine Use</b>	13.5	5.8	-57.0%
<b>Use ≥1x/month</b>	10.6	0.6	-94.3%
<b>Use ≥1x/week</b>	3.1	0.0	-99.4%
<b>By age</b>			
<b>18-29</b>	11.1	4.0	-64.0%
<b>30-39</b>	17.7	9.3	-47.5%
<b>40+</b>	12.9	5.2	-59.7%
<b>By race</b>			
<b>Black</b>	12.5	4.1	-67.2%
<b>White</b>	16.5	7.6	-53.9%
<b>Hispanic</b>	12.7	5.7	-55.1%
<b>Other</b>	9.2	5.3	-42.4%
<b>By Interview Venue</b>			
<b>Bars</b>	17.8	6.9	-61.2%
<b>Other</b>	9.3	4.2	-54.8%
<b>By Sexual Orientation</b>			
<b>Gay</b>	15.5	5.7	-63.2%
<b>Bi</b>	6.5	5.7	-12.3%

(MSM1 figures from Koblin et al. 2007)

Estimating the number of users who are not MSM or MSM/W is more difficult. In the NSDUH (2009), in New York State, .12% report past year methamphetamine use. While past month use is not given in the state-by-state breakdowns of usage rates, nationally, past month use was about one third of past year use, so, assuming this also holds true in New York State (and City), it would mean that .04% of New Yorkers report having used methamphetamine in the past month. Doubling this figure to account for under-reporting of hard drug use on a household survey gives rates of .24% for past year use and .08% for past month use, or about 6,400 non-MSM past month users. These very rough calculations suggest that there are likely no more than 39,000 monthly users of methamphetamine in New York City.

Similarly, based on the same rates, it can be estimated that the number of casual (past year but not past month) users of methamphetamine is no more than 11,340 MSM and MSM/W combined, and 12,800 other New Yorkers, or a total of no more than about 24,000 who used methamphetamine in the past year but not the past month. Thus, it can be said that the overall number of methamphetamine users is likely to be fewer than 63,000.

According to the National HIV Behavioral Surveillance study<sup>16</sup>, which recruited MSM and MSM/W in MSM-oriented public venues in New York City, methamphetamine use declined considerably among MSM and MSM/W between the NHBS MSM I study in 2004 and the follow-up MSM II study in 2008, with past year use declining from 13% in 2004 to 5.8% in 2008 (see Table 34). Past month

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<sup>16</sup> Travis Wendel is the NYC Principal Investigator for this study.

and past week methamphetamine use declined dramatically, with past month use down 94% and past week use dropping to 0%. Among MSM/W, use declined only 12% from a much lower base, with use rates equal among MSM and MSM/W in 2008, where MSM use had been more than twice MSM/W use in 2004. The decline in reported use may be attributable to a decline in real use rates, sampling differences in the two studies, or a decline in reporting following the major public health campaigns around methamphetamine, sex and HIV risk that took place starting in 2005, which may have lead to NHBS participants under-reporting use out of social shame at disclosing to HIV researchers behavior that was outside the professed norms of MSM communities. Also, recall the participant in the present study who said that the “drug gays are totally different than the bar gays”: it may be that methamphetamine users are less likely to be found in bars and other public MSM-oriented establishments than in the past, either because of use of websites rather than bars for partner-seeking or because the campaigns against “tina” in the MSM community since 2005 have led methamphetamine users to avoid MSM-identified venues because their drug use has become stigmatized within elements of the MSM community that frequent such establishments.

*Total expenditures on methamphetamine by market participants*

If it is assumed that the participants in this study are typical of monthly users, and further assumed that all past year-but-not-past month users use twice annually at the same average rates of expenditure per episode as this study’s

participants, then 39,000<sup>17</sup> monthly users spending an average of \$17,000 each per year would be a \$633,000,000 per year market, and 24,000 casual users spending \$300 would add only about another \$7,000,000 annually (of course this is an artifact of assuming very low rates of use) for a total methamphetamine market size of about \$640,000,000 annually for NYC (see Table 35).

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<sup>17</sup> Based on the secondary data population estimate given above.

**Table 35 Estimated total expenditures on methamphetamine in the last year by all participants**

	<b>Include outlier*</b>	<b>Exclude outlier</b>
<b>All Study Participants</b>		
Total spent on last purchase by all 132 participants* (n=97 who paid for last methamphetamine they got- 35 did not, almost all of these being supplied by sex partners)	\$14,735	\$13,115
Average amount of last purchase	\$152	\$137
Acquisition events in the last year	8031	7979
<b>Total purchases** in the last year by study participants</b>	<b>\$2,238,353</b>	<b>\$1,791,700</b>
<b>MSM ONLY</b>		
Total spent on last purchase by all 65 MSM (+1MSM/W) participants (includes outlier purchase of \$1,620 by MSM/W for MSM sex party). 47 paid, 18 did not.	\$8,920	\$7,300
Average amount of last purchase	\$190	\$159
Acquisition events in the last year	4076	4024
<b>Total purchases** in the last year by MSM study participants</b>	<b>\$1,692,902</b>	<b>\$1,158,478</b>
<b>Percentage of study participant market represented by MSM</b>	<b>76%</b>	<b>65%</b>

\* Includes outlier purchase of \$1,620 by sex party promoter.

\*\*Calculated by multiplying average amount of last purchase by number of participant acquisitions.

### ***Methamphetamine Markets and Violence***

Participants reported almost no experience of violence connected with buying, selling or using methamphetamine. This is striking because the drug has often been connected in both the scholarly and popular literature with a propensity for violence, although of course the data was collected in a city that has led national trends in decreasing violence for many years.

The lack of violence in the experiences of the participants in the study may simply reflect the fact that violence has become very rare in New York City during the last decade, roughly the same time period over which methamphetamine became more available in the city. Further, methamphetamine distribution became established during a period when indoor sales and delivery sales replaced outdoor sales and other public and semi-public location sales as the predominant market formations in the technical organization of distribution in illicit drug markets in New York City (Curtis and Wendel 2000).

Emerging methamphetamine distributors in the MSM community may have thus emulated the distribution techniques they saw employed by distributors of other drugs used by their middle-class customers such as high-end cannabis, which was often sold by delivery services (Curtis et al. 2001; see also Sifaneck et al. 2006). These distribution techniques offer few rewards for violence, since in each case, indoor and delivery distributors depend on invisibility as a strategy to avoid the attention of would-be competitors, rather than force or a reputation for force (Curtis and Wendel 2007).

While this section is necessarily brief because participants had little to tell us about violence since they had experienced little of it, this absence of accounts

of violence in markets for a drug that has been so associated with violence is noteworthy.

### ***Methamphetamine Markets and Criminal Justice***

Another topic on which study participants had little to say was encounters with law enforcement, arrest and other criminal justice involvements. Study participants had comparatively few encounters with law enforcement, especially given their high levels of illicit drug use, since most were users of other illegal substances as well. The participants in the MSM “tina” subculture were of course protected from arrest by the closed nature of that market as a sexual network, and by the fact that almost all transactions took place in private locations; compare Sales and Murphy (2007), discussing middle-class sellers of ecstasy within social networks: “[t]he social class of drug sellers—in this case mostly white, male, middle class, educated, in school or employed, and housed—protected them from... exposure to criminal justice...” (944).

What few encounters with law enforcement study participants had experienced were almost entirely as a result of drug enforcement, and, in the case of sex workers, anti-prostitution activity by police.

However, the drug arrests study participants had experienced were seldom as a result of their use of methamphetamine.

Even aside from the fact that participants had few arrests resulting from their methamphetamine market participation, they also reported that it was very rare that law enforcement had any impact on their ability to get methamphetamine when they wanted it. When asked about difficulties or problems they had encountered the last three times they acquired methamphetamine, study participants were far more likely to give answers like “the dealer was too high to answer the phone” than to mention difficulties caused

by police or drug enforcement generally.

When asked explicitly about whether they had been prevented from buying or selling methamphetamine by law enforcement activity, 18% of participants answered that this had occurred. Almost as many (14%) answered that other things in the community besides law enforcement (e.g., the dealer's "nosy neighbors", or bouncers in a club) had prevented them from buying or selling methamphetamine. In every case, the preventive effect was temporary. None reported ever having been unable to find methamphetamine in the last year because it was unavailable due to drug enforcement activity.

Again, as in the discussion of violence above, this is a necessarily brief section because study participants had little to say about this topic, although participants certainly had more to say about the police and getting arrested than they had to say about violence. Once again, the fact that study participants, despite committing felonies on a regular basis, have little experience of arrest, or even of law enforcement making it harder for them to engage in drug transactions is noteworthy.

## LIMITATIONS

- This sample is almost certainly not representative of all participants in NYC methamphetamine markets with regard to *race* or *socioeconomic status*; the sample recruited almost certainly over-represents poorer black participants in the market, and under-represents more affluent white market participants, based on both the available literature and the accounts of study participants themselves.

This sample most likely is representative as to the *methamphetamine market participation*, and *methamphetamine consumption behaviors* participants described, with the caveat that it is logical to assume that study participants' comparatively impecunious status may lead them to purchase methamphetamine less often than more-affluent market participants are likely to do.

The over-representation of poorer market participants is typical of many drug-market studies, and is generally considered to be an artifact of the comparatively lesser attraction of financial incentives offered for study participation to more affluent drug users (Hamid et al. 1997; see also Semaan et al. 2008).

- Study participants were much more forthcoming about describing their market roles as receivers/buyers of methamphetamine than they were about describing their roles as providers of methamphetamine to others. It is almost certain that participants provide methamphetamine for others much more often than they were willing to disclose; this interpretation is in accord with the SNA findings described above, which posit a large population of “semi-dealers”.

## IMPLICATIONS OF FINDINGS AND SUGGESTIONS FOR FUTURE RESEARCH

- Public health service providers and treatment providers should be mindful that methamphetamine use is most often very connected with sexual behavior, especially among MSM. As persons seeking to discontinue methamphetamine use present for treatment, providers should enquire carefully into connections between use and sexual behavior, and implement treatment protocols that help recovering users work through the often difficult task of simultaneously changing their sexual behavior and ending their drug use, given that many participants in this study described the two as so entangled that it was impossible to distinguish their sexuality from their drug use.
- Policymakers and law enforcement strategists should consider the cost-effectiveness of interventions into MSM-based methamphetamine markets, given the closed sexual-network basis of these markets, and the fact that they apparently are associated with essentially no violence, and appear to have very limited effects on non-participants in the markets (see Curtis and Wendel 2007). Public-health-based interventions may be more effective than law enforcement in addressing the harms caused by these markets.
- Policymakers should consider whether it makes sense to re-examine current policing, sentencing, and other criminal justice policies that make a sharp distinction between “users” (subject to lesser sanctions and penalties) on the one hand, and “dealers” (subject to more severe (and often *much* more severe) penalties) on the other, based on the findings of this and other studies (see, e.g., Curtis et al. 2002, Duffy et al. 2008, Sales and Murphy 2007) that reveal that participants in the markets for many if not most illicit drugs typically perform both roles at different times. The greatly increased sanctions attached to the supplier/“dealer” role, when

which role is played in a given transaction may be largely a matter of happenstance, may serve simply to dramatically increase sanctions for what may be an essentially randomly-selected subset of users, with few of the deterrent or preventive effects on markets that are the reason for market interventions by law enforcement.

- Future research on methamphetamine markets should be mindful of the role of social networks in methamphetamine distribution, the fluidity with which market participants adopt and trade supplier and consumer roles, and the importance of sexual behavior in methamphetamine use. Conversely, future studies of MSM and MSM/W sexual behavior should be mindful of the importance of methamphetamine use in the sexuality of many MSM and MSM/W.



**APPENDICES TO “DYNAMICS OF RETAIL METHAMPHETAMINE MARKETS  
IN NEW YORK CITY”:**

**APPENDIX 1      STUDY INSTRUMENT**

**APPENDIX 2      SHANNON-JENSON DIVERGENCE AS A MEASURE OF  
INTER-GROUP DIFFERENCE**

**APPENDIX 1      STUDY INSTRUMENT**

*RDS coupon manager questions*

Coupon #

*[The following 7 questions are used to generate a unique ID for recruitment reimbursement purposes & to prevent sample duplication (“twins”)]*

First two letters of last name

First letter first name

First letter mother’s first name

Birth month

Birth year

Gender:

Male

Female

Trans

Ethnicity:

White

Black

Hispanic

Asian

Other

***Description, for recruitment reimbursement purposes & to prevent sample duplication (“twins”):***

Height:

[specify]

Weight:

[specify]

Hair

Blond(e)

Brown

Black

Salt & pepper

Grey  
Bleached  
Color not found in nature  
Shaves head

Eye color:

Blue  
Light Brown  
Brown  
Green  
Other

Other notable physical characteristics  
[specify]

Last digit of cellphone number:

Even  
Odd  
0-4  
5-9

Next to last digit:

Even  
Odd  
0-4  
5-9

Digit before that:

Even  
Odd  
0-4  
5-9

***Eligibility screener:***

In the last 30 days, did you obtain methamphetamine from someone else (whether you paid or not) or provide methamphetamine to anyone else (whether you got paid or not) or both?

Neither (*not eligible*)  
Obtain?  
Provide?  
Both?

*[Open-ended follow-up questions, based on data obtained in formative research, to screen for imposters seeking recruitment incentives: prices, packaging, mode of use, etc.]*

***If eligible:***

Birth location

[5 boroughs; 50 states; Other: (specify)]

Level of education:

Some HS

HS grad

Some college

BA

Some grad

Grad degree

Employed

Yes

No

Job(s)

[question prompt for audio for qualitative analysis]- includes extralegal work]

Income

**[brackets by year/week]**

How many hours weekly do you work?

1-10

11-20

21-30

31-40

41-50

51 or more

Lives

Battery-Canal

Canal-14

14-23

23-59

59-86

86-110

Above 110<sup>th</sup>

Bronx

Brooklyn

Queens

SI

LI

NJ  
Other

Hangs out Brooklyn/Bronx/Manhattan/Queens/SI/LI/NJ/Other? What neighborhoods?

[question prompt for audio for qualitative analysis]- includes extralegal work]

Drinks?

No  
Occasionally  
Almost every day  
Every day

Smokes cigarettes?

Yes  
No

Smokes cannabis?

No  
Occasionally  
Almost every day  
Every day

Cocaine use?

Yes  
No

If yes to cocaine use, which do you use more often?

cocaine  
methamphetamine

Other drug use [checkboxes & number fill-ins for "How often/year" for each]

Ecstasy  
GHB  
Ketamine  
Ritalin/Adderall  
LSD, other psychedelics  
Heroin  
Prescription opiates  
Valium or other benzos  
Xanax  
Other [specify]

Do you have sex with

Men

Women  
Both

In the last year, did you get services from Callen-Lorde Health Center?

Yes  
No

If yes, what services?

[question prompt for audio for qualitative analysis]

In the last year, did you get services from Gay Men's Health Crisis?

Yes  
No

If yes, what services?

[question prompt for audio for qualitative analysis]

In the last year, were you diagnosed as having gonorrhea?

Yes  
No

***RDS questions:***

Seed

Yes  
No

How do you know your recruiter?

Friend  
Acquaintance  
Family member  
Co-worker  
Someone I buy drugs from  
Someone I sell drugs to  
Sex partner  
Stranger  
Other [specify]

How many people whose cell number you know use methamphetamine?

How many people whose cell number you know provide methamphetamine for others, whether they are dealers or not?

*[For each of above questions:]*

Of those, number male?

Of those, number female?  
Number gay/MSM?  
Number not gay/MSM?  
Number White?  
Number Black?  
Number Hispanic?  
Number Asian?  
Number Other? (Specify)  
Number who use only?  
Number who use & provide for others?  
Number who provide for others only, no use?  
Number of those who provide for others who are dealers?

*Methamphetamine obtaining questions*

Number of episodes **obtaining last 30 days?**  
Number

Number of episodes **obtaining last year?**  
Number

*Last episode:*

When was the last time you got some methamphetamine?  
Last 24 hours  
More than a day, less than a week  
More than a week, less than two weeks  
A month ago  
More than a month ago

Is this source a dealer?  
Yes  
No

Quantity **obtained?**  
[specify]

Payment  
Cash  
Free

- Trade for goods
- Sex
- Other

Weight or dollar denomination?

- Weight
- Dollar denomination

**Obtained** for use or distribution?

- Use
- Distribution
- Both (used some, distributed some)

Location?

- Delivery
- Supplier's home
- Other supplier location
- Street
- Bar/club
- Other (specify)

How often have you **obtained** methamphetamine from him/her?

[question prompt for audio for qualitative analysis]

For how long?

[question prompt for audio for qualitative analysis]

Relationship with source:

- Drug supply/receive only
- Friend
- Someone i get high with
- Someone i get work with
- Business (not drugs)
- Sex partner
- Exchange partner
- Other (specify)

How do you contact the provider?

- Cellphone (his/hers)
- Beeper
- Home/office landline phone
- Meet in place where he/she hangs out (public locale)
- Meet in place where he/she hangs out (private locale)

Describe provider's method:

[question prompt for audio for qualitative analysis]

Was this a “get it & go” situation or did you hang out & socialize?

- “Get it & go”
- Socialized but no use
- Got high together
- Got high & had sex
- Had sex

How was the quality of this last product?

- Excellent
- Good
- Fair
- Poor
- I can’t tell the difference

Packaging if any?

- Plastic Ziploc
- Folded paper
- Glass bottle
- No packaging
- Other [specify]

If you know, did the provider prepare the product him/herself or get it from someone else?

- Prepared it
- Go from someone else
- Don’t know; suspect A
- Don’t know; suspect B

Have you ever provided methamphetamine to this provider?

- Yes
- No

Any problems?

- Yes [specify]
- No

Was this episode typical

- Yes
- No

*Previous episode:*

Same source as previous purchase?

- Yes
- No

What if anything was different?  
[question prompt for audio for qualitative analysis]]

*Episode before that:*

Same source as previous purchase?  
Yes  
No

What if anything was different?  
[question prompt for audio for qualitative analysis]

When was the last time before that you got something from a different source?  
[question prompt for audio for qualitative analysis]

Tell me about that  
[question prompt for audio for qualitative analysis]

***Consumer questions***

Do you normally sniff, smoke or inject methamphetamine?  
Sniff  
Smoke  
Inject  
Other [specify]

Mode of ingestion, last 3 episodes of use?  
[3 pulldowns of above]

Is the money that you spend on methamphetamine earned from a regular job?  
Yes  
No

Do you work when you use methamphetamine?  
Yes  
No

Do you have sex?  
Yes  
No

Do you get violent?  
Yes  
No

How long is a typical period of use for you?

Less than 6 hours  
6-12 hours  
12-18 hours  
18-24 hours  
1-2 days  
More than 2 days  
Daily/almost daily user

Why do you use methamphetamine?  
[question prompt for audio for qualitative analysis]

Is it your “drug of choice”?  
[question prompt for audio for qualitative analysis]

When you use methamphetamine, do you use other drugs at the same time?  
Never  
Very rarely  
Alcohol  
GHB  
Other {specify}

If you are a current or past cocaine user, how would you compare the two?  
[question prompt for audio for qualitative analysis]

If you are a current or past Ecstasy user, how would you compare the two?  
[question prompt for audio for qualitative analysis]

How do you manage your use? Do you set rules or ration yourself, for example?  
[question prompt for audio for qualitative analysis]

When are you most likely/unlikely to use methamphetamine?  
[question prompt for audio for qualitative analysis]

What do you do to counteract the effect of crashing?  
[question prompt for audio for qualitative analysis]

How long does it take you to recover?  
[question prompt for audio for qualitative analysis]

How has methamphetamine affected your relationship with your family and friends?  
[question prompt for audio for qualitative analysis]

How has methamphetamine affected your routine of work?  
[question prompt for audio for qualitative analysis]

How has methamphetamine affected taking care of your needs?  
[question prompt for audio for qualitative analysis]

Would you say you are dependent on methamphetamine use?  
Yes  
No

Have you been in the past?  
Yes  
No

Has methamphetamine use let you to engage in other illegal behaviors to make money, get drugs or avoid the police?  
Yes  
No

How many people are in your use circle or network?  
Number

How many if any are MSM/non-MSM?  
Number

On average how long have you known them?  
[question prompt for audio for qualitative analysis]

How did you meet these people?  
[question prompt for audio for qualitative analysis]

Do you have regular using partners?  
Yes  
No

How many people do you typically use the drug with?  
Number

How would you describe most of the people in your use network? (close friend, friend, fuck-buddy, acquaintance)  
[question prompt for audio for qualitative analysis]

What level of trust do you have with these people?  
[question prompt for audio for qualitative analysis]

Have other users stolen from or otherwise taken advantage of you?  
Yes  
No

How do you/did you find your dealer?

[question prompt for audio for qualitative analysis]

How long have you known your dealer?

[question prompt for audio for qualitative analysis]

Is this provider reliable? (i.e., always/sometimes holding, prompt/late, answers phone/doesn't answer phone, etc.)

Yes

No [specify; question prompt for audio for qualitative analysis]

Does the person you get methamphetamine from sell any other things?

Yes

No

What? [*checkboxes*]

Cannabis

Cocaine

Ecstasy

Pharmaceuticals

Other [specify]

How many dealers do you currently have access to?

Number

Tell me about the last dealer you knew before your current source

[question prompt for audio for qualitative analysis]

### ***Providing for others questions***

In the last 30 days, have you provided methamphetamine for anyone else, whether you made money or not (for example, splitting a bag with someone or hooking up a friend)?

Yes

No

How often?

Number

Number of episodes in the last year?

Number

*Last episode:*

When was the last time you provided or got some methamphetamine for someone else?

Last 24 hours

More than a day, less than a week

More than a week, less than two weeks  
A month ago  
More than a month ago

Quantity?

[question prompt for audio for qualitative analysis]

Payment

Cash  
Free  
Trade for goods  
Sex  
Other

Weight or dollar denomination?

Weight  
Dollar denomination

Location?

Delivery  
Supplier's home  
Other supplier location  
Street  
Bar/club  
Other (specify)

Relationship with receiver

Drug supply/receive only  
Friend  
Someone i get high with  
Someone i get work with  
Business (not drugs)  
Sex partner  
Exchange partner  
Other (specify)

How did receiver contact you?

Cellphone (mine)  
Beeper  
Home/office landline phone  
Meet in place where I hang out (public locale)  
Meet in place where I hang out (private locale)

Describe method:

[question prompt for audio for qualitative analysis]

Was this a “get it & go” situation or did you hang out & socialize?

“Get it & go”

Socialized but no use

Got high together

Got high & had sex

Had sex

How was the quality of this last product?

Excellent

Good

Fair

Poor

I can't tell the difference

Packaging if any?

Plastic Ziploc

Folded paper

Glass bottle

No packaging

Other [specify]

Have you ever obtained methamphetamine from the receiver?

Yes

No

Any problems?

Yes [specify]

No

Was this episode typical?

Yes [specify]

No

*Previous episode*

*Same as above, plus:*

Same receiver as previous distribution?

Yes [specify]

No

*Episode before that:*

*Same as above*

*[If all three previous episodes were sales for cash, follow up with seller module here]*

***Seller module [all answers here for audio/qualitative analysis & subsequent coding]***

Do you consider yourself a dealer?

Do you think others think of you that way?

How often do you provide methamphetamine for cash?

How long have you been doing this? How did you start?

Did you ever do this anywhere else besides NYC? Where?

Do you currently cook methamphetamine? Have you ever?

Do you have a regular supplier?

Do you shop around for the best deal?

What quantities do you typically get? Cost? How often? How much do you pay?

Do you pay when get the supply or after you have sold it?

Do you test purity when purchasing? How?

Do you cut/dilute before selling? How?

How do you store your product?

Do you sell by weight or dollar denomination?

Do you prepackage your product or weigh each sale individually?

If you know, where does the product you sell originate?

Is your source a dealer? Ethnicity/cultural identity? MSM/non-MSM?

Do you sell any other drugs?

Do you charge everyone the same amount? How much, or range and reasons?

Do you give credit?

How many customers do you have? Who are they? Ethnicity? Class? MSM/non-

MSM?

How do you meet new customers, if at all?

Do you work with others? If yes, how do you know them? Relationship?

Usual selling method? Has this changed? If so, why?

Are you concerned about security from robbery? If so, what do you do about that?

Are you concerned about getting arrested when you're selling? If so, what do you do about that?

What do you spend your money on?

***Market change questions [all answers here for audio/qualitative analysis & subsequent coding]***

Are there any new groups of buyers or sellers that you have noticed in the recent past?

Are there any new ways of buying or using the drug that you have encountered in the recent past?

***Criminal justice/crime questions [all yes/no, except "where" & "describe"]***

Have you been arrested for methamphetamine possession:

Ever?

Last year?

Last 30 days?

Where?

Have you been arrested for methamphetamine distribution:

Ever?

Last year?

Last 30 days?

Where?

Have you been arrested for other drug offenses:

Ever?

Last year?

Last 30 days?

Where?

Have you been arrested for other reasons:

Ever?

Last year?

Last 30 days?

Where?

Have the police prevented you from buying or selling?

Ever?

Last year?

Last 30 days?

Where?

Have the police confiscated your drugs?

Ever?

Last year?

Last 30 days?

Where?

Have neighbors or other community residents prevented you from buying or selling methamphetamine? Ever?

Last year?

Last 30 days?

Where?

Weapons: Do you:

Own?

No

Yes (specify)

Carry?

No

Yes (specify)

Carry when selling?

No

Yes (specify)

Using?

No

Yes (specify)

Have you been robbed while selling?

Ever?

Last year?

Last 30 days?

(Describe; question prompt for audio for qualitative analysis)

Have you been robbed while buying?

Ever?

Last year?

Last 30 days?

Where?

(Describe; question prompt for audio for qualitative analysis)

Have you been involved in any violence when selling?

Ever?

Last year?

Last 30 days?

(Describe; question prompt for audio for qualitative analysis)

Have you been involved in any violence when buying?

Ever?

Last year?

Last 30 days?

(Describe; question prompt for audio for qualitative analysis)

***Sex network questions***

How many sex partners have you had in the last year?

Last 30 days?

How many did you use methamphetamine with: Last year?

Last 30 days?

Is your meth use primarily around having sex?

Yes

No

How often do you have sex without using meth?

Never

Seldom

About half the time

More often than not

Seldom/never have sex during meth use

How does meth use change sex?

[question prompt for audio for qualitative analysis]

Do you seek methamphetamine-using sex partners on the internet?

Yes

No

Through other means?

Yes

No

If yes to either:

We meet for sex, each supplies drugs (non-exchange)

I supply drugs for my partners

my partners supply drugs for me

Other (specify)

### ***Random sampling from ego network***

Earlier, you told me you know X people who use methamphetamine or provide it for others (whether or not money or other payment changes hands) whose cell number you know.

*[If number is 5 or fewer, attempt to get matching/follow-up data n all; if number is greater, Participant is given list of first names in rough inverse order of frequency in the US population, with names beginning with the same first letter & which occur with approximately the same frequency clustered so as to obscure from the interviewer what name is actually being chosen]*

I'd like you to look at this list of names, until you find the name of one of those people. Then I'd like you to answer a series of questions about that person.

[Matching question module]

OK, I'd like you to find another person in the list

*[Reiterate until five network members are elicited]*

*Nature of relationship:*

Relationship to market

Obtains only

Obtains & provides for others

Provides for others only

Relationship:

Drug supply/receive only

Friend  
Someone i get high with  
Someone i get work with  
Business (not drugs)  
Sex partner  
Exchange partner  
Other (specify)

If drug supply/receive only:  
I get from him/her  
He/she gets from me  
Both

If sex partner:  
Married/live together  
Other long-term relationship  
Dating  
Casual partner  
Internet partner

If exchange partner:  
Commercial exchange partner- I pay  
Commercial exchange partner- he/she pays  
Drug exchange partner- I supply  
Drug exchange partner- he/she supplies  
Other

***Other network data (2 questions, each with matching follow-ups)***

Now I want to ask you about the person you personally get it from, whether that's a dealer or not. I'd like you to answer a series of questions about that person.

[Matching question module]

Is this person a dealer or someone who just hooks other people up?

Dealer  
Someone who hooks up others

Now I'd like to ask you to think about the person you'd call to find a new source if your regular sources all had nothing available. I'd like you to answer a series of questions about that person.

[Matching question module]

**Matching Question module:**

Last digit of cellphone number:  
Even

Odd  
0-4  
5-9

Next to last digit:

Even  
Odd  
0-4  
5-9

Digit before that:

Even  
Odd  
0-4  
5-9

Is the person:

Male  
Female  
Trans

Does the person have sex with

Men  
Women  
Both  
Don't know

Race:

White  
Black  
Hispanic  
Asian  
Other

Age:

Under 20  
20s  
30s  
40s  
50s  
60 or older

Use/sell:

Uses only  
Uses & hooks up others  
Uses & sells

Sells only  
Other

Height:

5'4" or less  
5'4"-5'8"  
5'7"-5'11"  
5'10-6'2"  
6'1'-6'4"  
6'4" & taller

Weight:

125 or less  
125-145  
135-155  
145-165  
155-175  
165-185  
175-195  
185-205  
195-225  
205-225  
225 or more

Lives:

Battery-Canal  
Canal-14  
14-23  
23-59  
59-86  
86-110  
Above 110<sup>th</sup>  
Bronx  
Brooklyn  
Queens  
SI  
LI  
NJ  
Other  
Don't know

Hair color:

Blond(e)  
Brown  
Black  
Salt & pepper

Grey  
Bleached  
Color not found in nature  
Shaves head

Eye color:

Blue  
Light Brown  
Brown  
Green  
Other

Other notable physical characteristics  
[specify]

## Follow-Up interview

How many did P recruit?

- One
- Two
- Three

[Import refusal data from RDSCM]

Do any of the people you recruited know your recruiter?

- No
- One does
- Two do
- All three do

[As appropriate:]

Which one/which two?

- Number
- Number

Do any of the people you recruited know each other?

- No
- All know each other
- Other [specify]

When we did the last interview, I asked you some questions about people you know.

Were any of the people you recruited among those people you told me about then?

- No
- One: Number
- Two: Numbers
- Three: Numbers
- Four: Numbers
- Five: Numbers
- Six: Numbers
- Seven: Numbers

Do you have any new sources of methamphetamine since our initial interview?

- Yes
- No
- Yes, but I haven't gotten anything from new source yet

[If Yes: followup as needed, up to 3 new sources]

Is this source a dealer?

Yes  
No

Quantity **obtained**?  
[specify]

Payment  
Cash  
Free  
Trade for goods  
Sex  
Other

Weight or dollar denomination?  
Weight  
Dollar denomination

**Obtained** for use or distribution?  
Use  
Distribution  
Both (used some, distributed some)

Location?  
Delivery  
Supplier's home  
Other supplier location  
Street  
Bar/club  
Other (specify)

How often have you **obtained** methamphetamine from him/her?  
[question prompt for audio for qualitative analysis]

For how long?  
[question prompt for audio for qualitative analysis]

Relationship with source:  
Drug supply/receive only  
Friend  
Someone i get high with  
Someone i get work with  
Business (not drugs)  
Sex partner  
Exchange partner  
Other (specify)

How do you contact the provider?

Cellphone (his/hers)

Beeper

Home/office landline phone

Meet in place where he/she hangs out (public locale)

Meet in place where he/she hangs out (private locale)

Describe provider's method:

[question prompt for audio for qualitative analysis]

Was this a "get it & go" situation or did you hang out & socialize?

"Get it & go"

Socialized but no use

Got high together

Got high & had sex

Had sex

How was the quality of this last product?

Excellent

Good

Fair

Poor

I can't tell the difference

Packaging if any?

Plastic Ziploc

Folded paper

Glass bottle

No packaging

Other [specify]

If you know, did the provider prepare the product him/herself or get it from someone else?

Prepared it

Go from someone else

Don't know; suspect A

Don't know; suspect B

Have you ever provided methamphetamine to this provider?

Yes

No

Any problems?

Yes [specify]

No

Has your use of methamphetamine changed since our first interview?  
[question prompt for audio for qualitative analysis]

What else has changed since we last talked?  
[question prompt for audio for qualitative analysis]

### **Constructed Variables, by Dataset (*italicized*)**

#### ***MethRoster***

**AgeCat** = Categorical Age (Categorical, String)

18-29

30-39

40 plus

#### ***Obtaining***

**SexualID** = Sexual Identity (Categorical, Numeric)

0 = MSM

1 = MSMW

2 = MSW

3 = WSM

4 = WSMW

5 = TSM

**SexID3** = 3-Category Sexual Identity (Categorical, String)

MSM

MSMW

Everyone Else

**MSM** = Subject Identifies as MSM (Binary, Numeric)

1 = MSM

0 = Non-MSM (Note: includes MSMW, and all subjects not identifying as strictly MSM)

**MSMW** = Subject Identifies as MSMW (Binary, Numeric)

1 = MSMW

0 = Non-MSMW (Note: includes MSM, and all subjects not identifying as strictly MSMW)

**MSMandMSMW** = Subject Identifies as MSM or MSMW (Binary, Numeric)

1 = MSM or MSMW

0 = Not MSM or MSMW

**Everyone Else** = Subject Identifies as MSW, WSM, WSMW, or TSM (Binary, Numeric)

1 = "Everyone Else," i.e., MSW, WSM, WSMW, TSM  
0 = MSM or MSMW

**MSM1** = Same variable as MSM, but missing data.

**MSM2** = Same variable as Everyone Else, but missing data.

**EveryoneElseOld** = Same variable as Everyone Else, but missing data.

**MSM3** = Subjects Identifying as MSM, MSWM, or TSM (Binary, Numeric)  
(Note: This variable contains missing data.)

1 = MSM, MSMW, or TSM  
0 = Not MSM, MSMW, or TSM

**Race** = Subject's Reported Race (Categorical, Numeric)

1 = White  
2 = African-American  
3 = Hispanic or Latino/a  
4 = Other Race

**WhereGotRecode** = Condensed "Where Subject Got Meth at Last Transaction"  
(Categorical, String)

Bar/Club  
Delivery  
Other  
Street  
Supplier Home

**RelationshipToSourceRecode** = Condensed "Relationship to Source at Last  
Transaction" (Categorical, String)

Drug Transaction Only  
Exchange Partner  
Friend  
I Get High With  
Other  
Sex Partner

**DrugTransOnly** = Last Transaction Revolved Around Drug Only (Binary,  
Numeric)

1 = Yes  
0 = No

**HowContactedRecode** = Condensed "How Contacted Source at Last  
Transaction" (Categorical, String)

(s)he hangs out in priv.  
(s)he hangs out in public

Cellphone  
Other

**QualityClean** = Cleaned Version of "Quality of Meth at Last Transaction"  
(Categorical, String)

Poor  
Fair  
Good  
Excellent

**Quality Scale** = Scale Version of "Quality of Meth at Last Transaction" (Scale)

1 = Poor  
2 = Fair  
3 = Good  
4 = Excellent

**PackingRecode** = Condensed Version of "Packaging of Meth at Last Transaction" (Categorical, String)

Foil  
Glassine  
No Packaging  
Other  
Plastic Ziplock

**ObtainedDaily** = Subject Obtained Meth Daily (Binary, Numeric)

1 = Yes  
0 = No

**ObtainedWeekly** = Subject Obtained Meth Weekly (Binary, Numeric)

1 = Yes  
0 = No

**Obtained30 Cat** = Number of Days Subject Obtained Meth in Past Month  
(Categorical, Numeric)

1 = 1-4 Days  
2 = 5-9 Days  
3 = 10-19 Days  
4 = 20-29 Days  
5 = 30 Plus Days

**SpentLastTransaction** = Amount in Dollars Subject Spent on Meth at Last Transaction (Continuous, Numeric)

**SpentLastCat** = Amount in Dollars Subject Spent on Meth at Last Transaction  
(Categorical, Numeric)

1 = 0-59

2 = 60-119  
3 = 120-239  
4 = 240-359  
5 = 360 plus

**SpentLastTransaction2** = Recoded " Amount in Dollars Subject Spent on Meth at Last Transaction" (Categorical, Numeric)

1 = 119 and Under  
2 = 120-239  
3 = 240-359  
4 = 360 and Over

### ***Consumer***

(Note: Variables **SexualID**, **SexID3**, **MSM**, **MSMW**, **MSMandMSMW**, **EveryoneElse**, **MSM1**, **MSM2**, **EveryoneElseOld**, **MSM3**, and **Race** detailed above.)

**UsuallyTakeHowClean** = Cleaned Version of "UsuallyTakeHowClean" (Categorical, String)

Inject  
Other  
Smoke  
Sniff

**WorkWhileUsingClean** = Cleaned Version of "WorkWhileUsing" (Binary, String)

Yes  
No

**PeriodOfUseClean** = Cleaned Version of "Typical Period of Use" (Categorical, String)

Over 2 Days  
1-2 Days  
12-18 Hours  
18-24 Hours  
6-12 Hours  
Less than 6 Hours

**Gender** = Subject's Reported Gender (Categorical, Numeric)

0 = Male  
1 = Female  
2 = Transgender

**White** = Subject Reported "White" Race (Binary, Numeric)

1 = Yes  
0 = No

**Black** = Subject Reported "Black" Race (Binary, Numeric)

1 = Yes

0 = No

**Hispanic** = Subject Reported "Hispanic" Race (Binary, Numeric)

1 = Yes

0 = No

**Other** = Subject Reported "Other" Race (Binary, Numeric)

1 = Yes

0 = No

**Smoke** = Subject Reported Smoking as Usual Route of Meth Administration  
(Binary, Numeric)

1 = Yes

0 = No

**Sniff** = Subject Reported Sniffing as Usual Route of Meth Administration  
(Binary, Numeric)

1 = Yes

0 = No

**Inject** = Subject Reported Injecting as Usual Route of Meth Administration  
(Binary, Numeric)

1 = Yes

0 = No

**OtherAdmin** = Subject Reported Other as Usual Route of Meth Administration  
(Binary, Numeric)

1 = Yes

0 = No

**UseMoneyRecode** = Numeric Version of "UseMoneyFromJob" (Binary,  
Numeric)

1 = Yes

0 = No

**WorkWhileUsingRecode** = Numeric Version of "WorkWhileUsing" (Binary,  
Numeric)

1 = Yes

0 = No

**HaveSexRecode** = Numeric Version of "HaveSex" (Binary, Numeric)

1 = Yes

0 = No

**GetViolentRecode** = Numeric Version of "GetViolent" (Binary, Numeric)

1 = Yes

0 = No

**DependentRecode** = Numeric Version of "Dependent" (Binary, Numeric)

1 = Yes

0 = No

**RegularPartnersRecode** = Numeric Version of "RegularPartners" (Binary, Numeric)

1 = Yes

0 = No

**IllegalBehavRecode** = Numeric Version of "IllegalBehaviors" (Binary, Numeric)

1 = Yes

0 = No

**StolenAdvantageRecode** = Numeric Version of "StolenAdvantage" (Binary, Numeric)

1 = Yes

0 = No

**PeriodofUseCat** = Numeric Version of "PeriodOfUseClean" (Categorical, Numeric)

1 = Less Than 6 Hours

2 = 6-12 Hours

3 = 12-18 Hours

4 = 18-24 Hours

5 = 1-2 Days

6 = Over 2 Days

**HowManyUseWithCat** = Categorical Version of "HowManyUseWith" (Categorical, Numeric)

1 = 0

2 = 1

3 = 2-4

4 = 5-9

5 = 10 Plus

**PeriodOfUseCat** = Recode of PeriodOfUseCat (Categorical, String)

12-24 Hours

24-48 Hours

48 Hours and Over

Less Than 12 Hours

## ***Criminal Justice***

(Note: Variables **SexualID**, **SexID3**, **MSM**, **MSMW**, **MSMandMSMW**, **Gender**, **EveryoneElse**, **MSM1**, **MSM2**, **EveryoneElseOld**, **MSM3**, and **Race** detailed above.)

**ArrestedPossessionRC** = Numeric Recode of Arrested Possession (Binary, Numeric)  
1 = Yes  
0 = No

## ***Network***

(Note: Variables **SexualID**, **SexID3**, **MSM**, **MSMW**, **MSMandMSMW**, **Gender**, **EveryoneElse**, **MSM1**, **MSM2**, **EveryoneElseOld**, **MSM3**, and **Race** detailed above.)

**PropUseProvide** = Proportion of Users (in Subject's Network) Who Also Provide (Continuous, Numeric)

**PropProvDealers** = Proportion of Providers (in Subject's Network) Who Are Dealers (Continuous, Numeric)

**SeldomSexWoMeth** = Subject Reports (S)he Seldom or Rarely Has Sex Without Meth (Binary, String)  
Yes  
No

## ***Providing***

(Note: Variables **SexualID**, **SexID3**, **MSM**, **MSMW**, **MSMandMSMW**, **Gender**, **EveryoneElse**, **MSM1**, **MSM2**, **EveryoneElseOld**, **MSM3**, and **Race** detailed above.)

**WhereProvidedRecode** = Condensed Version of "WhereProvided" (Categorical, String)  
Bar/Club  
Delivery  
Other  
Street  
Supplier Home

**RelationshipProvidedRecode** = Condensed Version of "RelationshipProvided" (Categorical, String)  
Drug Transaction Only

Exchange Partner  
Friend  
I Get High With  
Other  
Sex Partner

**HowContactedProvidedRecode** = Condensed Version of  
"HowContactedProvided" (Categorical, String)

(s)he hangs out in priv.  
(s)he hangs out in public  
Cellphone  
Online  
Other

**ProvidedDaily** = Subject Provided Meth Daily (Binary, Numeric)

1 = Yes  
0 = No

**ProvidedWeekly** = Subject Provided Meth Weekly (Binary, Numeric)

1 = Yes  
0 = No

***Egonet***

**RoleClean** = Cleaned Version of "Role" (Categorical, String)

Obtain and Provide  
Obtain Only  
Provide Only

**APPENDIX 2      SHANNON-JENSON DIVERGENCE AS A MEASURE OF  
INTER-GROUP DIFFERENCE**

The Shannon-Jensen Divergence of two distributions is the difference between the entropy of the average distribution, and the average of the entropies of the individual distributions.

EXAMPLE.

For example, suppose we have the probability distribution P of a fair coin:  $P(\text{heads})=0.5$ ,  $P(\text{tails})=0.5$ . Suppose Q is the distribution for a coin which is biased 5% towards heads:  $Q(\text{heads})=0.525$ ,  $Q(\text{tails})=0.475$ . What is the Shannon-Jensen divergence of between P and Q?

The (base 2) entropy of P is  $H(P) = [-0.5 * \log_2(0.5)] + [-0.5 * \log_2(0.5)] = 1$

Likewise,  $H(Q) = [-0.525 * \log_2(0.525)] + [-0.475 * \log_2(0.475)] = 0.998196$

The average of these two entropies  $(H(P) + H(Q))/2$  is 0.999549

The average distribution  $A = (P+Q)/2$  is given by  $A(\text{heads})= 0.5125$ ,  $A(\text{tails})= 0.4875$ .

Now  $H(A) = [-0.5125 * \log_2(0.5125)] + [-0.4875 * \log_2(0.4875)] = 0.999549$

The difference between  $H(A)$  and  $(H(P) + H(Q))/2$  is by definition, the Jensen-Shannon divergence, of P and Q. This evaluates to: 0.000451

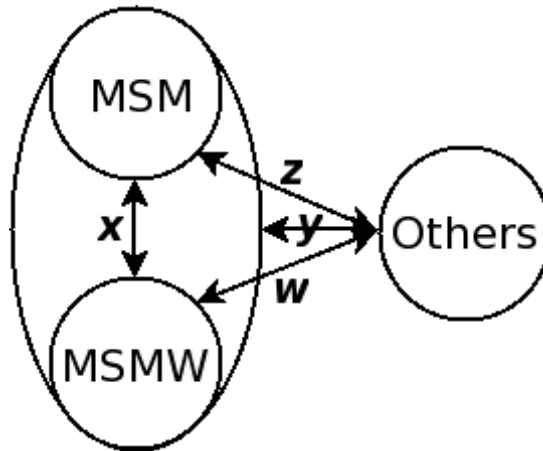
NOTE: All the calculations above were done using log base 2. If they had been done using base 10, the computed numbers would be lower by a multiplicative factor of  $\log_2(10)$ , which is 3.321928. Thus, in base 10 computations, the difference between  $H(A)$  and  $(H(P) + H(Q))/2$  is by definition, the Jensen-Shannon divergence, which evaluates to:  $0.000451/3.321928$  which is **0.000136**.

In our analyses, all Shannon-Jensen distances are computed using base 10. Two distributions are said to be significantly different, if their Shannon-Jensen distance exceeds **0.000136** (see the above example).

In our analyses, for each variable, we shall consider three subpopulations:

- (i) MSM: men who have sex with (only) men
- (ii) MSMW: men who have sex with men and women
- (iii) Others, i.e. everyone else – including men who have sex only with women, women regardless of their sexual identity, and transgender persons.
- (iv) The union of sets (i) and (ii).

Between these four sets, we compute the four Shannen-Jensen distances depicted in the following diagram.



**X** represents the distance of the variable distributions manifested by the MSM and MSMW populations.

**Z** represents the distance of the variable distributions manifested by the MSM and Others populations.

**W** represents the distance of the variable distribution manifested by the MSMW and Others populations.

**Y** represents the distance of the variable distribution manifested by the MSM+MSMW and Others populations.

When any of these quantities approach 0, the corresponding pair of distributions become identical.

To help evaluate the significance of these numbers, we construct a ratio table, in which the (row I, column J) entry has the quotient of the variable associated with row I and the variable associated with column J:

	<b>Bigger</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>W</b>
<b>Smaller</b>		X	Y	Z	W
<b>X</b>	X	X/X	Y/X	Z/X	W/X
<b>Y</b>	Y	X/Y	Y/Y	Z/Y	W/Y
<b>Z</b>	Z	X/Z	Y/Z	Z/Z	W/Z
<b>W</b>	W	X/W	Y/W	Z/W	W/W

Note that the diagonal entries of the table all must necessarily be 1, and that the value of entry I,J is the reciprocal of the value in entry J,I. In light of these structural facts, we will minimize the visual congestion by showing only those entries in the table that are >1.

Below is an example of a real table of such distances for the variable

**PrescriptionYN.**

<b>Smaller</b>		0.0002535	0.0008485	0.0005661	0.0015757
<b>X</b>	0.0002535		3.3464542	2.2326931	6.214621
<b>Y</b>	0.0008485				1.8570764
<b>Z</b>	0.0005661		1.498842		2.7834641
<b>W</b>	0.0015757				

Geometrically, one of three possible cases may arise in regarding the relationships of the quantities X,Z, and W. These are:

- **Case 1: MSM and MSMW are most similar, the Others population is different.**  
 $X < Z$  and  $X < W$ , or equivalently  $Z/X > 1$  and  $W/X > 1$
- **Case 2: Others and MSMW are most similar, the MSM population is different.**

$W < X$  and  $W < Z$ , or equivalently  $X/W > 1$  and  $Z/W > 1$

- **Case 3: Others and MSM are most similar, the MSMW population is different.**

$Z < X$  and  $Z < W$ , or equivalently  $X/Z > 1$  and  $W/Z > 1$

Let us now see how we can identify these cases from patterns of values in the corresponding ratio tables. Since the cases are defined in terms of quantities X, Z, and W, they do not concern Y, and we have emphasized this by shading the row and column of Y in red.

- **Identifying Case 1: MSM and MSMW are most similar, the Others population is different.**

$X < Z$  and  $X < W$ , or equivalently  $Z/X > 1$  and  $W/X > 1$

Two different ratio tables can give rise to this (since the relationship of Z to W is unspecified).

	Bigger	X	Y	Z	W
Smaller		X val	Y val	Z val	W val
X	X val			####	####
Y	Y val				
Z	Z val				
W	W val			****	
CASE 1A					

	Bigger	X	Y	Z	W
Smaller		X val	Y val	Z val	W val
X	X val			####	####
Y	Y val				
Z	Z val				****
W	W val				
CASE 1B					

**Identifying Case 2: Others and MSMW are most similar, the MSM population is different.**

$W < X$  and  $W < Z$ , or equivalently  $X/W > 1$  and  $Z/W > 1$

Two different ratio tables can give rise to this (since the relationship of Z to X is unspecified).

	Bigger	X	Y	Z	W
Smaller		####	####	####	####
X	X val			****	
Y	Y val				
Z	Z val				
W	W val	####		####	

CASE 2A

	Bigger	X	Y	Z	W
Smaller		X val	Y val	Z val	W val
X	X val				
Y	Y val				
Z	Z val	****			
W	W val	####		####	

CASE 2B

**Identifying Case 3: Others and MSM are most similar, the MSMW population is different.**

$$Z < X \text{ and } Z < W, \text{ or equivalently } X/Z > 1 \text{ and } W/Z > 1$$

Two different ratio tables can give rise to this (since the relationship of X to W is unspecified)

	Bigger	X	Y	Z	W
Smaller		X val	Y val	Z val	W val
X	X val				
Y	Y val				
Z	Z val	####			####
W	W val	****			

CASE 3A

	Bigger	X	Y	Z	W
Smaller		X val	Y val	Z val	W val
X	X val				****
Y	Y val				
Z	Z val	####			####
W	W val				

CASE 3B

The earlier concrete example of **PrescriptionYN** ratio table, is now seen to fall clearly into Case 1B.

Smaller		0.0002535	0.0008485	0.0005661	0.0015757
X	0.0002535		3.3464542	2.2326931	6.214621
Y	0.0008485				1.8570764
Z	0.0005661		1.498842		2.7834641
W	0.0015757				

From this we conclude that in the study of **PrescriptionYN**, the MSM and MSMW are most similar, while the Others population is different.

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