

San Jose State University

From the Selected Works of Michelle DeCoux Hampton

August 19, 2011

Differences in Substance-related Risk Behavior Between Dual and Triple Diagnosed Severely Mentally Ill Adults

Michelle D. Hampton, *Samuel Merritt University*

Linda Chafetz, *University of California, San Francisco*

Carmen Portillo, *University of California, San Francisco*



Available at: <https://works.bepress.com/michelle-hampton/10/>



Differences in substance-related risk behavior between dual and triple diagnosed severely mentally ill adults

Journal:	<i>Mental Health and Substance Use</i>
Manuscript ID:	RMHS-2010-0035.R1
Manuscript Type:	Original Article
Keywords:	severe mental illness, substance use, HIV, HCV, dual diagnosis, triple diagnosis

SCHOLARONE™
Manuscripts

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Title: Differences in substance-related risk behavior between dual and triple diagnosed severely mentally ill adults

For Peer Review Only

Abstract:

Objectives: The purpose of this study was to determine if differences exist between adults with dual and triple diagnoses with regard to substance-related risk behaviors.

Methods: This secondary analysis was a cross-sectional study. There were 252 subjects with dual and triple diagnoses recruited from residential crisis programs in San Francisco. Using descriptive and logistic regression analyses, subjects in the two groups were compared with regard to demographic data, types of substances, and routes of administration used in the previous 30 days to determine risk for exposure and/or transmission of HIV/HCV. Results: When compared to the dual diagnosis group, subjects with triple diagnoses were four times more likely to have engaged in IDU ($p=.001$) and 2.6 times more likely to use amphetamines ($p=.05$). They also reported using more types of substances over the lifetime ($p<.0001$). But with regard to other risk behaviors such as alcohol use to intoxication and cocaine/crack use, there were no significant differences. Conclusion: Though many substance-related risk behaviors occurred in both groups, adults with triple diagnoses were more likely to engage in IDU, amphetamine use, and to use more types of substances over the lifetime. This information has the potential to inform interventions that might prevent/reduce substance-related risk in this population.

Key Words: severe mental illness, substance use, HIV, HCV

Introduction

Substance use disorders are highly prevalent among adults with schizophrenia, bipolar, and severe major depressive disorders, also known as severe mental illness (SMI). Among SMI adults in acute care settings, estimated rates of dual diagnosis range from 50-60% (Dixon, 1999; Levin & Hennessy, 2004). As a result, this population is at significant risk for the negative outcomes associated with substance use.

Of the many health risks associated with risky substance use behaviors among SMI adults, HIV (human immunodeficiency virus) and HCV (hepatitis C virus) have received increasing attention. Prevalence rates among SMI adults were reported to range between 1.7-5.0% for HIV and 19% for HCV (Rosenberg et al 2001); greatly exceeding the rates of 0.5% for HIV (McQuillan & Kruszon-Moran, 2008) and 1.6% for HCV (Armstrong, et al., 2006) in the general population.

Substance-related risk behaviors associated with HIV and HCV infection have been identified in a number of studies. Injection drug use (IDU) is a common method of direct transmission that was associated with both HIV (McKinnon & Cournois, 1998) and HCV (Butterfield, et al., 2004) in SMI populations. Studies by Osher et al and Strauss et al reported IDU rates of 17-20% among mental health consumers (Osher, et al., 2003; Strauss, Bosworth, Stechuchak, Meador, & Butterfield, 2006) that far exceeded the 0.17% rate reported for the general population (SAMSHA, 2009). In addition, another potential source of direct risk identified among this population for HCV infection was sniffing or snorting crack (S. D. Rosenberg, et al., 2001); likely related to sharing non-IDU paraphernalia (Tortu, McMahon, Pouget, & Hamid, 2004).

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Substance-related risk also includes sexual risk that occurs as a result of substance use. In a study of 150 SMI outpatients, Meade & Sikkema reported that increased substance use severity was associated with sex with multiple partners and sex trading for drugs, alcohol or money (Meade & Sikkema, 2007). Furthermore, when these behaviors occur within high-risk networks, the risk is increased. Wright & Gayman, reported that mental health consumers sexual networks are frequently formed in both inpatient and outpatient treatment settings. In their study of SMI adults in the Indiana Mental Health Services and HIV Risk Study (N=401), they reported that approximately 5-9% of used injection drugs, had partners who exchanged sex for goods or money, and/or were HIV positive (Wright & Gayman, 2005).

The term triple diagnosis refers to individuals who have a diagnosis of HIV in the context of a dual diagnosis (MacPhee & Douaihy, 2005). For the purposes of this study, triple diagnosis will also include those with HCV. Not only do these infections share substance-related risk factors, co-infection was also reported in 1.7% of SMI adults and found to be associated with ongoing substance use (S. D. Rosenberg, Drake, Brunette, Wolford, & Marsh, 2005).

While it is well established that SMI adults engage in high-risk behaviors, it is unknown if there are differences in the type of substance-related risk behaviors in which adults with dual and triple diagnoses engage. The purpose of this study was to examine substance use behaviors between both groups and to compare them with regard to the types of substances and routes of administration used in the past 30 days.

Methods

Design and Sample

1
2
3 This cross-sectional study, approved by the University of California, San
4
5
6 Francisco institutional review board, was based on a secondary analysis of data collected
7
8 in the “Clinical Trial of Wellness Training” between 2001 and 2004 (Chafetz, White,
9
10 Collins-Bride, Cooper, & Nickens, 2008). This study was a randomized controlled trial
11
12 that tested a health promotion intervention. Since this cross-sectional analysis examined
13
14 the participants at enrollment only, the intervention was not considered as an outcome or
15
16 covariate.
17
18

19
20 Written informed consent was obtained for each participant upon recruitment
21
22 from each of four crisis residential programs (CRPs) operated by Progress Foundation, a
23
24 psychosocial rehabilitation organization providing a range of residential treatment
25
26 programs (Chafetz, White, Collins-Bride, & Nickens, 2004). CRPs provide short-term
27
28 (typically ≤ 14 days) voluntary residential treatment that serves as an alternative to
29
30 hospital care for individuals referred from crisis services or following inpatient
31
32 admission. Subjects were eligible for the study if they were 1) ≥ 18 years of age, 2)
33
34 admitted to a CRP, and 3) able to speak English. Further details on this study can be
35
36 found in Chafetz, et al (2008).
37
38
39

40
41 All 309 of the subjects in the clinical trial were eligible for inclusion in this study.
42
43 Subjects were excluded who: 1) denied any history of lifetime substance use (n=23, none
44
45 of whom reported HIV or HCV diagnoses) and spent \geq three weeks in the hospital in the
46
47 30 days prior to enrollment (n=34). The exclusions were made to ensure that the sample
48
49 represented SMI with previous histories of substance use that were not restricted from
50
51 use due to confinement.
52
53

54 55 **Data and Measurement** 56 57 58 59 60

1
2
3 Data were obtained from several sources. The majority of data was based on self-
4 report from baseline interviews that included selected items from standardized
5 instruments. Comprehensive health assessments completed at the CRPs as well as mental
6 health service utilization records were also utilized.
7
8
9
10
11

12 **Mental health service utilization records.** Mental health service utilization data
13 were used to establish eligibility for the study. County billing records were included in
14 subjects' clinical records and included all mental health services billed to the county
15 including outpatient, psychiatric emergency, and inpatient services. For most participants,
16 mental health service billing records (for San Francisco county) extended for a period
17 both before and after the time frame of this study. However, there was a subset of
18 participants whose mental health service billing records began with the residential
19 treatment admission at the time of their recruitment into the study.
20
21
22
23
24
25
26
27
28
29
30
31

32 To rule out the possibility of institutionalization in another county (and thus lack
33 of opportunity to use substances), this group of 50 was compared to the remaining 202
34 subjects with regard to use of five substances the 30 days prior to CRP admission:
35 alcohol use to intoxication, amphetamines, cocaine, heroin, and marijuana. There were
36 no significant differences between groups with regard to use of any substances except
37 amphetamines ($p=.006$) and marijuana ($p=.009$) of which the group of 50 (with no prior
38 mental health service billing data) exceeded the group of 202. As a result, no exclusions
39 were necessary based on this data.
40
41
42
43
44
45
46
47
48
49

50 **Clinical records.** CRP clinical records were the source of diagnostic
51 information. DSM-IV diagnoses reflecting the primary reason for admission were
52 collected and grouped into four categories: schizophrenia-spectrum disorders, bipolar
53
54
55
56
57
58
59
60

1
2
3 disorder, major depressive disorder, and other. The other category was small and
4
5 consisted of primary diagnoses of severe anxiety disorders [n=5], adjustment disorders
6
7 with severe substance abuse, mood, and anxiety symptoms [n=7], and substance-related
8
9 disorders with mood or psychotic symptoms [n=3]). After analyses revealed no
10
11 significant differences between bipolar, major depressive, and other disorders with regard
12
13 to socio-demographic variables and/or substance use outcomes, the three categories were
14
15 combined and the variable was dichotomized as “schizophrenia” and “non-
16
17 schizophrenia.”
18
19
20
21

22 HIV and HCV diagnoses were obtained from records of baseline health
23
24 assessments conducted by nurse practitioners and reflect self-reports and/or data from
25
26 prior clinical records. Assessments included thorough and systematic history and
27
28 physical examinations, but diagnoses were not confirmed with serological testing.
29
30
31

32 **Quality of life interview.** Descriptive data on a broad range of socio-
33
34 demographic characteristics were collected utilizing relevant items from the Lehman
35
36 Quality of Life Interview, brief version, I (Lehman, 2000). For the purposes of this
37
38 study, data regarding age (at the time of baseline interview), gender, and race as well as
39
40 items that were specific to high-risk groups of SMI adults, including being a victim of
41
42 violent crime, receipt of social security benefits, and homelessness were collected and
43
44 examined in bivariate analyses. Homelessness was determined by participants’ report of
45
46 usual housing, $\geq 50\%$ of the time, over the previous six months and was dichotomized as
47
48 homeless versus non-homeless (i.e. any housing, including but not limited to shelters,
49
50 hotels, and board and care homes). Age was analyzed as a continuous variable.
51
52
53
54
55
56
57
58
59
60

1
2
3 Reliability and validity of this instrument was demonstrated in a number of studies
4
5 (Lehman, 2000).
6
7

8 **Addiction severity index.** A portion of the Addiction Severity Index (ASI), lite
9
10 version, was used. It measured both lifetime and recent (past 30 days) substance use in
11
12 13 categories including: alcohol for any purpose, alcohol to intoxication, heroin,
14
15 methadone, other opiates or analgesics, barbiturates, other sedatives, cocaine/crack,
16
17 amphetamines or stimulants, marijuana, inhalants, hallucinogens, or any other drug
18
19 (McLellan, 2000).
20
21

22 For this study, data utilized included subject reports of the number of days of use
23
24 in the past 30 days for each substance category and this count was dichotomized into
25
26 either use or no use of that substance to indicate potential for exposure. Similarly,
27
28 administration routes (i.e. oral, injection, smoking, or nasal) for each substance category
29
30 used in the past 30 days were dichotomized as use or no use of that route. In addition, a
31
32 count of the number of substance categories used over the lifetime (these data were not
33
34 available for the previous 30 days) was calculated, i.e. a person who reported any lifetime
35
36 use of opiates, amphetamines, and marijuana would have a count of three.
37
38
39

40 The ASI is an instrument with established reliability and validity in similar
41
42 populations (Joyner, Wright, & Devine, 1996).
43
44

45 46 **Analysis** 47

48 The analysis was conducted using SPSS, version 11.0. Overall use of substances
49
50 and administration routes used within the sample population were examined. Variables
51
52 were selected based on factors significantly associated with substance use in the literature
53
54 and availability in this pre-existing data set. Subjects with triple diagnoses were
55
56
57
58
59
60

1
2
3 compared to those with dual diagnoses descriptively on socio-demographic and substance
4 use variables using chi-square and t-test analyses. Logistic regression models were
5 constructed to determine the likelihood of high risk substance use behaviors while
6 controlling for socio-demographic variables that were significant in bivariate analysis
7
8
9
10
11
12
13 (p=.05).

14 15 **Results**

16 17 **Demographic and Descriptive Data**

18
19
20 There were 252 subjects included in the analysis and all reported a lifetime
21 history of substance use in at least one of the categories assessed. The sample included
22 predominantly White (n=113, 44.8%) males (n=175, 69.4%) with a mean age of 38.1±9.8
23 years and a non-schizophrenia diagnosis (n=176, 69.8%). See Table 1 for the distribution
24 between dual and triple diagnosis groups.
25
26
27
28
29
30
31

32 Of the 252 subjects, 64 (25.4%) reported a diagnosis of either HIV or HCV (triple
33 diagnosis) and 188 were either disease free or unaware of infection (dual diagnosis).
34 Among the triple diagnosis group, 15 (6.0% of sample) reported a diagnosis of HIV only,
35 38 (15.1%) reported HCV only, and 11 (4.4%) reported co-infection with both HIV and
36 HCV.
37
38
39
40
41
42

43 The most frequently used substances and routes of administration reported over
44 the previous 30 days were examined for associations. The number of drugs used over the
45 lifetime was significantly higher among the triple diagnosis group with a mean of five
46 categories reported compared to 4 (p<.0001). Amphetamine use (p=.02) and IDU
47 (p=.002) were more frequently reported amongst the triple diagnosis group as well. Of
48 the 34 subjects who reported amphetamine use, 52.9% (n=18) reported injection as the
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 route of administration (not shown in table). (Although methadone use also appeared to
4 have a significant result, the total number of methadone users (n=9) was low and was
5 therefore excluded from subsequent analyses). There were no significant differences
6 between groups with regard to the use of alcohol to intoxication (34.6% vs. 31.3%),
7 cocaine/crack (23.9% vs. 31.3%), and marijuana (21.3% vs. 18.8%); nor with regard to
8 smoking (18.6% vs. 18.8% for crack) and nasal (6.9% vs. 7.8%) routes of administration.
9
10
11
12
13
14
15
16

17 **Substances Used in the Past 30 Days**

18
19 The five most frequently used substances and the lifetime number of drug types
20 used were entered simultaneously into a logistic regression model controlling for age and
21 race (see Table 2). Subjects in the triple diagnosis group were 2.6 times more likely to
22 have used amphetamines in the past 30 days than those in the dual diagnosis group
23 (p=.05) and to report using more types of drugs over the lifetime by a factor of 1.6
24 (p<.0001). Dual and triple diagnosis groups did not differ in their use of alcohol to
25 intoxication, heroin, cocaine/crack, or marijuana.
26
27
28
29
30
31
32
33
34
35

36 **Routes of Administration Used in the Past 30 Days**

37
38 In a second logistic regression analysis, all non-oral routes of administration were
39 entered simultaneously into the model controlling for age and race (see Table 2).
40
41 Subjects in the triple diagnosis group were 3.9 times more likely to report IDU in the past
42 30 days and were significantly older than the dual diagnosis group by a factor of 1.04
43 (p=.03). Use of the nasal route, smoking crack, or smoking other (non-nicotine)
44 substances in the past 30 days did not differ between groups.
45
46
47
48
49
50
51
52

53 **Discussion**

1
2
3 The results of this study demonstrated that adults with triple diagnoses engaged in
4 more substance-related risk behaviors than did those with dual diagnoses. Although
5 historical IDU would be expected, past 30-day IDU was nearly 4 times more likely to
6 have occurred among subjects with triple versus dual diagnoses. This highlights the risk
7 for transmission to others and the urgent need to increase efforts to address this risk
8 factor among adults with triple diagnosis.
9
10
11
12
13
14
15
16

17 Furthermore, amphetamine use was 2.6 times more likely to be reported among
18 the triple diagnosis group in this sample (>50% by injection). A recent study of newly
19 diagnosed HIV-positive young men found that methamphetamine use was associated
20 with significantly higher odds of using other substances such as alcohol, marijuana, and
21 cocaine/crack as well as reports of sex with anonymous partners (Hurt, et al., June 2010).
22 Therefore, use of this particular drug that increased from the years 2000-2005, increased
23 the potential for exposure in both the substance-related and sexual risk domains.
24
25
26
27
28
29
30
31
32
33

34 Subjects with triple diagnoses were also more likely to report significantly higher
35 numbers of drug types used over the lifetime and older age. These two factors could
36 indicate that over time, the severity of addiction increased and use patterns escalated to
37 include behaviors associated with higher risk such as IDU. Older age could also indicate
38 that there was more time for multiple exposures to occur, for subjects to develop
39 symptoms of HIV or HCV, and to seek treatment.
40
41
42
43
44
45
46
47

48 For other substance-related risk behaviors, there were no significant differences
49 between the dual and triple diagnosis groups. In particular, there were no significant
50 differences in alcohol use to intoxication and cocaine/crack use between groups. In
51 previous research, alcohol use was associated with higher risk of HIV among hospitalized
52
53
54
55
56
57
58
59
60

1
2
3 SMI (McKinnon & Cournos, 1998); and cocaine dependence was associated with HIV
4 risk behaviors such as sex trading (Meade, Graff, Griffin, & Weiss, 2008) not to mention
5 the direct HIV/HCV risk that can occur with sharing implements for snorting or smoking
6 crack (Tortu, et al., 2004). Therefore, it is important to provide preventive care to dually
7 diagnosed adults as well.
8
9

10
11
12
13
14
15 In the pool of potential subjects for this study, only 23 were excluded because
16 they reported no lifetime history of substance use. Additionally, none of these 23
17 potential subjects were diagnosed with HIV or HCV. Considering the data regarding the
18 high likelihood of IDU in the triple diagnosis group, it is logical to conclude that
19 substance-related risk might at least equal if not outweigh sexual risk in this population.
20
21 Nonetheless, HIV and HCV prevention studies among SMI adults have had a strong
22 focus on reducing sexual risk (Berkman, et al., 2007; Berkman, et al., 2005; Collins,
23 Geller, Miller, Toro, & Susser, 2001; Johnson-Masotti, Pinkerton, Kelly, & Stevenson,
24 2000; Padron, 2008; Pinkerton, Johnson-Masotti, Otto-Salaj, Stevenson, & Hoffmann,
25 2001; Sikkema, et al., 2007; Tate & Longo, 2000). Only two of the studies located in our
26 PubMed search (keywords: HIV, HCV, prevention, severe mental illness, schizophrenia,
27 and bipolar disorder) identified that substance use behavior change was a focus of
28 education or intervention (Padron, 2008; Sikkema, et al., 2007). These studies included
29 small samples (N=28 and N=53, respectively) and the results reported focused on
30 reduction of sexual risk behaviors.
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49

50
51 Currently, there is an absence of widely accepted evidence-based prevention
52 interventions developed specifically for the reduction of substance-related HIV and HCV
53 risk among SMI populations. The Compendium of Evidence-Based HIV Prevention
54
55
56
57
58
59
60

1
2
3 Interventions, first published in 1999, is a compilation of evidence-based behavioral
4 interventions that are categorized by the high-risk group for which the intervention was
5 developed: individuals who use substances, heterosexual adults, people living with
6 HIV/AIDS or HCV, etc. (CDC, 2009). Although there is no specific categorization for
7 SMI adults, the results of this study and previous research support the use of
8 interventions aimed at substance using groups and those for people living with
9 HIV/AIDS or HCV.
10
11
12
13
14
15
16
17
18
19

20 One example of a Compendium cited intervention is the “Healthy Living
21 Program” (Rotheram-Borus, et al., 2008). In this study, 270 HIV-positive homeless
22 individuals participated in an intensive intervention that was effective at reducing the
23 number of risky substance use as well as sexual behaviors. Other risk management
24 strategies falling within the harm reduction model (O’Hare, 2007) that might be effective
25 for this population include needle-syringe (exchange) programs. Although needle-
26 syringe programs are a resource that might have been accessed by subjects in this study,
27 more intensive outreach and education might be required to address the risk factors
28 associated with triple diagnoses. A study by Cao and Treolar (2006) reported that
29 methamphetamine users were less likely to utilize needle-syringe programs than were
30 subjects who used heroin (Cao & Treolar, 2006).
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45

46 Because crack/cocaine use was as likely to occur in the dual diagnosis as the triple
47 diagnosis group, augmenting needle-syringe programs with safe smoking and/or snorting
48 devices, could increase their effectiveness at reducing overall risk. In a Canadian study
49 by Leonard et al, an intervention was implemented to provide safer crack-smoking
50 paraphernalia to users. Not only was risk associated with smoking crack reduced, but
51
52
53
54
55
56
57
58
59
60

1
2
3 subjects also reported that they were less likely to inject drugs as a result of greater access
4
5 to safer smoking devices (Leonard, et al., 2008). Finally, Bravo et al, in their study of
6
7 900 heroin users in Spain, recommended utilizing education efforts to prevent the
8
9 initiation or transition to IDU before drug tolerance and social pressures influence IDU
10
11 adoption (Bravo, et al., 2003). These recommendations are a sample of the potential
12
13 components of an intervention that could potentially reduce substance-related risk
14
15 behaviors among SMI adults.
16
17
18

19
20 **Strengths and limitations.** This study was a secondary analysis of data from a
21
22 clinical trial that had effective recruitment rates (Hampton, White, & Chafetz, 2009) and
23
24 is representative of a treated community sample of SMI adults with dual diagnoses.
25
26 Substance use data as well as HIV and HCV diagnoses were self-reported. Because there
27
28 was no serologic confirmation of diagnoses, it is possible that HIV and HCV diagnoses
29
30 were underreported. It is also possible that substance-related risk behaviors were
31
32 underreported as well. Additionally, selection bias could have occurred considering
33
34 participants in the study were recruited for a clinical trial and there might be inherent
35
36 differences between subjects who agree to participate in a study versus those who
37
38 decline.
39
40
41
42

43
44 **Conclusion.** While there are certain substance-related risk behaviors that are
45
46 common to adults with dual and triple diagnoses, the results of this study indicate that
47
48 adults with triple diagnosis are significantly more likely to engage in amphetamine and
49
50 injection drug use. Interventions to reduce substance-related risk behaviors that have
51
52 demonstrated effectiveness include: intensive counseling, education, and harm reduction
53
54 strategies that might include continued use of needle exchange programs with specific
55
56
57
58
59
60

1
2
3 outreach to methamphetamine users and the addition of access to safe crack smoking
4
5 implements. Considering that with time, addiction severity and subsequently HIV and
6
7 HCV risk behaviors are likely to escalate, it is advisable to prioritize SMI adults as a
8
9 primary target for reduction of substance-related risk behaviors for the prevention of HIV
10
11 and HCV. Not only is the risk of initial exposure high, but also the risk for transmission
12
13 to others is a serious concern within, but by no means confined to, the SMI population.
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

References

- 1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
- Armstrong, G. L., Wasley, A., Simard, E. P., McQuillan, G. M., Kuhnert, W. L., & Alter, M. J. (2006). The prevalence of hepatitis C virus infection in the United States, 1999 through 2002. *Ann Intern Med*, *144*(10), 705-714.
- Berkman, A., Pilowsky, D. J., Zybert, P. A., Herman, D. B., Conover, S., Lemelle, S., et al. (2007). HIV prevention with severely mentally ill men: a randomised controlled trial. *AIDS Care*, *19*(5), 579-588.
- Berkman, A., Pilowsky, D. J., Zybert, P. A., Leu, C. S., Sohler, N., & Susser, E. (2005). The impact of substance dependence on HIV sexual risk-reduction among men with severe mental illness. *AIDS Care*, *17*(5), 635-639.
- Bravo, M. J., Barrio, G., de la Fuente, L., Royuela, L., Domingo, L., & Silva, T. (2003). Reasons for selecting an initial route of heroin administration and for subsequent transitions during a severe HIV epidemic. *Addiction*, *98*(6), 749-760.
- Butterfield, M. I., Bosworth, H. B., Stechuchak, K. M., Frothingham, R., Bastian, L. A., Meador, K. G., et al. (2004). Racial differences in hepatitis B and hepatitis C and associated risk behaviors in veterans with severe mental illness. *J Natl Med Assoc*, *96*(1), 43-52.
- Cao, W., & Treloar, C. (2006). Comparison of needle and syringe programme attendees and non-attendees from a high drug-using area in Sydney, New South Wales. *Drug Alcohol Rev*, *25*(5), 439-444.
- Centers for Disease Control (CDC) US Department of Health and Human Services (August 24, 2009). *Compendium of HIV prevention and interventions with*

- 1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
- evidence of effectiveness*. Atlanta, GA. Retrieved from
<http://www.cdc.gov/hiv/topics/research/prs/evidence-based-interventions.htm>.
- Chafetz, L., White, M., Collins-Bride, G., Cooper, B. A., & Nickens, J. (2008). Clinical trial of wellness training: health promotion for severely mentally ill adults. *J Nerv Ment Dis*, 196(6), 475-483.
- Chafetz, L., White, M.C., Collins-Bride, G., & Nickens, J. (2004). The poor general health of the severely mentally ill: Impact of schizophrenic diagnosis. *Community Mental Health Journal*, Publication pending.
- Collins, P. Y., Geller, P. A., Miller, S., Toro, P., & Susser, E. S. (2001). Ourselves, our bodies, our realities: an HIV prevention intervention for women with severe mental illness. *J Urban Health*, 78(1), 162-175.
- Dixon, L. (1999). Dual diagnosis of substance abuse in schizophrenia: prevalence and impact on outcomes. *Schizophr Res*, 35 Suppl, S93-100.
- Hampton, M. D., White, M. C., & Chafetz, L. (2009). Eligibility, recruitment, and retention of African Americans with severe mental illness in community research. *Community Ment Health J*, 45(2), 137-143.
- Hurt, CB, Torrone, E, Green, K, Foust, E, Leone, P, & Hightow-Weidman, L (June 2010). Methamphetamine use among newly diagnosed HIV-positive young men in North Carolina, United States, from 2000-2005. *PLoS One*, 5(6), e11314.
- Johnson-Masotti, A. P., Pinkerton, S. D., Kelly, J. A., & Stevenson, L. Y. (2000). Cost-effectiveness of an HIV risk reduction intervention for adults with severe mental illness. *AIDS Care*, 12(3), 321-332.

- 1
2
3 Joyner, L. M., Wright, J. D., & Devine, J. A. (1996). Reliability and validity of the
4
5 addiction severity index among homeless substance misusers. *Subst Use Misuse*,
6
7 *31*(6), 729-751.
8
9
- 10 Lehman, A. F. (2000). The quality of life interview *Handbook of Psychiatric Measures*
11
12 (First ed., pp. 138-140). Washington, D.C.: American Psychiatric Association.
13
14
- 15 Leonard, L., DeRubeis, E., Pelude, L., Medd, E., Birkett, N., & Seto, J. (2008). "I inject
16
17 less as I have easier access to pipes": injecting, and sharing of crack-smoking
18
19 materials, decline as safer crack-smoking resources are distributed. *Int J Drug*
20
21 *Policy*, *19*(3), 255-264.
22
23
- 24 Levin, F. R., & Hennessy, G. (2004). Bipolar disorder and substance abuse. *Biol*
25
26 *Psychiatry*, *56*(10), 738-748.
27
28
- 29 MacPhee, E. R., & Douaihy, A. (2005). Triple diagnosis: an overview. *Focus*, *20*(3), 4-7.
30
31
- 32 McKinnon, K., & Cournos, F. (1998). HIV infection linked to substance use among
33
34 hospitalized patients with severe mental illness. *Psychiatr Serv*, *49*(10), 1269.
35
36
- 37 McLellan, A.T. (2000). Addiction Severity Index (ASI) *Handbook of Psychiatric*
38
39 *Measures* (1st ed., pp. 472-474). Washington, D.C.: American Psychiatric
40
41 Association.
42
43
- 44 McQuillan, GM, & Kruszon-Moran, D (2008). *HIV infection in the United States*
45
46 *household population aged 18-49 years: Results from 1999-2006*. NCHS data
47
48 brief no. 4. Hyattsville, MD: National Center for Health Statistics.
49
50
- 51 Meade, C. S., Graff, F. S., Griffin, M. L., & Weiss, R. D. (2008). HIV risk behavior
52
53 among patients with co-occurring bipolar and substance use disorders:
54
55 associations with mania and drug abuse. *Drug Alcohol Depend*, *92*(1-3), 296-300.
56
57
58
59
60

- 1
2
3 Meade, C. S., & Sikkema, K. J. (2007). Psychiatric and psychosocial correlates of sexual
4 risk behavior among adults with severe mental illness. *Community Ment Health J*,
5
6 43(2), 153-169.
7
8
9
10 O'Hare, P. (2007). Merseyside, the first harm reduction conferences, and the early history
11 of harm reduction. *Int J Drug Policy*, 18(2), 141-144.
12
13
14
15 Osher, F. C., Goldberg, R. W., McNary, S. W., Swartz, M. S., Essock, S. M., Butterfield,
16 M. I., et al. (2003). Substance abuse and the transmission of hepatitis C among
17 persons with severe mental illness. *Psychiatr Serv*, 54(6), 842-847.
18
19
20
21
22 Padron, J. M. (2008). HIV/AIDS/STD/HCV, Coinfection, Seroprevalence and Education
23 in Severe Mental Illness: Health Education Pilot. *Psychiatr Q*, 79(4), 331-342.
24
25
26
27 Pinkerton, S. D., Johnson-Masotti, A. P., Otto-Salaj, L. L., Stevenson, L. Y., &
28 Hoffmann, R. G. (2001). Cost-effectiveness of an HIV prevention intervention for
29 mentally ill adults. *Ment Health Serv Res*, 3(1), 45-55.
30
31
32
33
34 Rosenberg, S. D., Drake, R. E., Brunette, M. F., Wolford, G. L., & Marsh, B. J. (2005).
35 Hepatitis C virus and HIV co-infection in people with severe mental illness and
36 substance use disorders. *Aids*, 19 Suppl 3, S26-33.
37
38
39
40
41 Rosenberg, S. D., Goodman, L. A., Osher, F. C., Swartz, M. S., Essock, S. M.,
42 Butterfield, M. I., et al. (2001). Prevalence of HIV, hepatitis B, and hepatitis C in
43 people with severe mental illness. *Am J Public Health*, 91(1), 31-37.
44
45
46
47
48 Rotheram-Borus, M. J., Desmond, K., Comulada, W. S., Arnold, E. M., Johnson, M., &
49 Trial Group, H. L. (2008). Reducing Risky Sexual Behavior and Substance Use
50 Among Currently and Formerly Homeless Adults Living With HIV. *Am J Public*
51
52
53
54
55
56
57
58
59
60

- 1
2
3 Sikkema, K. J., Meade, C. S., Doughty-Berry, J. D., Zimmerman, S. O., Kloos, B., &
4
5 Snow, D. L. (2007). Community-level HIV prevention for persons with severe
6
7 mental illness living in supportive housing programs: a pilot intervention study. *J*
8
9 *Prev Interv Community*, 33(1-2), 121-135.
- 10
11
12 Substance Abuse and Mental Health Services Administration (SAMSHA), Office of
13
14 Applied Studies. (October 29, 2009). *The NSDUH Report: Injection Drug Use*
15
16 *and Related Risk Behaviors*. Rockville, MD.
- 17
18
19
20 Strauss, J. L., Bosworth, H. B., Stechuchak, K. M., Meador, K. M., & Butterfield, M. I.
21
22 (2006). Knowledge and risks of human immunodeficiency virus transmission
23
24 among veterans with severe mental illness. *Mil Med*, 171(4), 325-330.
- 25
26
27 Tate, F. B., & Longo, D. A. (2000). HIV/AIDS prevention: a model for educating the
28
29 inpatient psychiatric population. *AIDS Patient Care STDS*, 14(6), 325-331.
- 30
31
32 Tortu, S., McMahon, J. M., Pouget, E. R., & Hamid, R. (2004). Sharing of noninjection
33
34 drug-use implements as a risk factor for hepatitis C. *Subst Use Misuse*, 39(2),
35
36 211-224.
- 37
38
39 Wright, E. R., & Gayman, M. (2005). Sexual networks and HIV risk of people with
40
41 severe mental illness in institutional and community-based care. *AIDS Behav*,
42
43 9(3), 341-353.
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Table 1. Descriptive Data: Socio-demographic and Substance Use Variables

Variable	Dual Diagnosis (n=188) n(%)	Triple Diagnosis* (n=64) n(%)	χ^2	p
SOCIO-DEMOGRAPHICS				
Gender			3.05	.08
Male	125(66.5)	50(78.1)		
Female	63(33.5)	14(21.9)		
Diagnosis			1.84	.18
Schizophrenia	61(32.4)	15(23.4)		
Non-schizophrenia (Bipolar, Major Depression, other)	127(67.6)	49(76.6)		
Homeless			.01	.92
Yes	66(35.1)	22(34.4)		
No	122(64.9)	42(65.6)		
Victim of violence past 6 months			.57	.45
Yes	56(29.9)	16(25.0)		
No	131(70.1)	48(75.0)		
Race			10.59	.03
White	78(41.5)	35(54.7)		
African American	43(22.9)	18(28.1)		
Latino	13(6.9)	5(7.8)		
Asian/ Pacific Islander	10(5.3)	0(0)		
Other	44(23.4)	6(9.4)		
**Mean Age (S.D.)	37.4±10.3	40.1±8.0	n/a	.04
SUBSTANCE-RELATED RISK BEHAVIORS				
**Mean Number of Drugs (Lifetime)	4.0±1.6	5.0±1.4	n/a	<.0001
30 DAY SUBSTANCE USE				
Alcohol to intoxication			.24	.63
No	123(65.4)	44(68.8)		
Yes	65(34.6)	20(31.3)		
Heroin			1.24	.33
No	180(95.7)	59(92.2)		
Yes	8(4.3)	5(7.8)		
Methadone			8.39	.01
No	185(98.4)	58(90.6)		
Yes	3(1.6)	6(9.4)		
Cocaine/crack			1.33	.25
No	143(76.1)	44(68.8)		
Yes	45(23.9)	20(31.3)		
Amphetamines			5.17	.02
No	168(89.4)	50(78.1)		
Yes	20(10.6)	14(21.9)		
Marijuana			.19	.67
No	148(78.7)	52(81.3)		
Yes	40(21.3)	12(18.8)		
30 DAY ROUTE OF ADMINISTRATION				
IDU*** last 30 days			9.86	.002
No	172(91.5)	49(76.6)		
Yes	16(8.5)	15(23.4)		
Smoking last 30 days(non-crack, non-nicotine)			.005	.94
No	152(80.9)	52(81.3)		
Yes	36(19.1)	12(18.8)		
Smoking last 30 days (crack)			.001	.98
No	153(81.4)	52(81.3)		
Yes	35(18.6)	12(18.8)		
Nasal use last 30 days			.06	.78
No	175(93.1)	59(92.2)		
Yes	13(6.9)	5(7.8)		

*Includes HIV and/or HCV diagnoses; **t-test used; ***IDU=injection drug use

Table 2. *Substances and Routes of Administration Used in the Past 30 Days by Adults with Dual and Triple Diagnoses

Independent Variable	**Adj. Odds Ratio	95% CI	p
SUBSTANCES USED			
Alcohol to intoxication last 30	.58	.27-1.24	.16
Heroin last 30	1.04	.26-4.14	.96
Cocaine/crack last 30	1.47	.69-3.12	.32
Amphetamines last 30	2.60	1.02-6.67	.05
Marijuana use last 30	.55	.23-1.32	.12
Number of drugs over lifetime	1.60	1.28-2.01	<.0001
<i>Age</i>	1.03	.99-1.07	.10
Race			
White (reference)			.18
AA	.95	.45-1.98	.88
Latino	.62	.18-2.13	.45
Asian	.001	.000-3.06E+12	.70
Other	.33	.12-.88	.02
ROUTES OF ADMINISTRATION			
IDU last 30 days *	3.90	1.67-9.04	.001
Smoking route (other than crack or nicotine)*	1.07	.46-2.45	.88
Smoking route (crack) last 30*	1.16	.52-2.59	.72
Nasal route last 30*	.95	.29-3.16	.94
<i>Age</i>	1.04	1.00-1.07	.03
Race			
White (reference)			.26
AA	.95	.46-1.94	.88
Latino	.77	.23-2.55	.67
Asian	.001	.000-5.19E+09	.70
Other	.29	.11-.78	.03

*Reference category: dual diagnosis

**Adjusted by race and age

Continuous variable(s) are in italics.