



Update Report #24

**Comorbid
Conditions:
Intersecting
Needs Among
the
CHAIN Cohort**

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C.H.A.I.N. REPORT

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Introduction

From a medical perspective, HIV and AIDS are often considered conduits to other diseases that can threaten an individual. By compromising a person's immune system, HIV makes an individual vulnerable to such AIDS-defining illnesses as Kaposi's sarcoma, candidiasis, or pneumocystis carinii pneumonia. In addition to such conditions, which are the result of HIV-related immunosuppression, other problems often coexist with HIV/AIDS. Traditionally, medical providers have characterized such coexisting conditions as "comorbidities." Among individuals who have suffered a stroke, hypertension may exist as a comorbidity; similarly, among individuals with lung cancer, a chronic pulmonary condition such as emphysema may exist as a comorbidity. In treating patients, medical providers consider the ways that such coexisting clinical conditions complicate or accelerate the progression of a disease, while health planners consider the implications for increased needs for services.

If we adopt a broader perspective, though, HIV/AIDS is associated with a number of social as well as clinical comorbidities. Poverty, substance use, mental illness, and unstable housing are among the problems that often plague those living with HIV/AIDS, and as such, pose as much of a "comorbidity" as do clinical expressions of disease. This report is the first in a series of CHAIN reports examining the epidemiology of several clinical and social comorbidities among the CHAIN study group, the relationship of such comorbidities to access and receipt of medical care among people living with HIV/AIDS in New York City, and the impact of such comorbidities on comprehensive health and human service systems. In particular, we will be looking at five selected comorbidities – tuberculosis (TB), sexually transmitted diseases (STDs), substance use, very poor mental health (as evidenced by very low mental health scores on a standardized self-report, and which are correlated highly with psychiatric symptomatology), and unstable housing¹. In addition to these distinct comorbidities, we also explore three "clusters" of comorbidities which have been identified by local policymakers, providers, and people living with HIV/AIDS – the dual diagnosis of substance use and mental

¹ These five comorbidities have been identified by the federal Health Resources and Services Administration HIV/AIDS Bureau in a companion research project in which CHAIN is participating

illness; the “multiply diagnosed individual” who is affected by substance use, mental illness, and unstable housing; and the unstably-housed substance user.

Clearly, both social and clinical comorbidities have independent effects on an individual apart from HIV. An individual with unstable housing has a need for housing services regardless of his or her HIV serostatus. On the other hand, there may be a synergistic effect of HIV and comorbidities. Among HIV-infected individuals the disability, illness, or chaos resulting from such comorbidities may be magnified, making both housing needs and medical needs more acute. An individual with such complex needs, it can safely be assumed, would need a comprehensive care system capable of handling these intertwined demands.

Using the representative client-level CHAIN data, we will begin by estimating the overall prevalence of these social and clinical comorbidities in New York City. In this report we have conducted analyses of these specific comorbidities and the comorbid clusters to see if they are more prevalent among certain subgroups. The groups we have looked at include individuals whose differences are based on **sociodemographic** characteristics (gender, age, race/ethnicity, education, and borough), **health** characteristics (year of HIV diagnosis, CD4+ count, recent opportunistic infection), **risk** characteristics (living in a high poverty community, HIV risk behavior, unstable housing, substance use, and mental illness), and **medical care** characteristics (continuity of medical care provider; adequacy of HIV medical care; and type of medical provider agency, such as private physician, clinic-based, hospital-based, etc.).

In summary, this report will (1) consider ways of measuring comorbidities, (2) explore trends in comorbidities over time, (3) observe whether there are pockets of individuals with persistent or intractable comorbidities, and (4) identify differences in the prevalence of these specific comorbidities among various groups.

Key Findings

- C Overall, all of the comorbidities under investigation showed a general decline over time among members of the CHAIN cohort, but when measured by their **persistence** across time there were substantial numbers of individuals with comorbidities that persisted for at least two or three consecutive waves of interviewing (approximately a year and a half).
- C The social comorbidities of unstable housing, drug use, and mental illness were more persistent – thus more “entrenched” or possibly untreated – than the clinical comorbidities of STDs or TB.
- C Certain groups of individuals were far more likely to have specific *persistent* social comorbidities. For example, men, drug users, and residents of the Bronx and Manhattan were all more likely to have persistent problems with unstable housing. Likewise, individuals with recent opportunistic infections were more likely to have persistent problems with mental health. Among the most consistent findings was the pairing of drug use and unstable housing, which were very highly correlated.
- C There were significant associations between specific self-reported comorbidities at each wave and the likelihood that an individual entered into primary HIV medical care that met minimum practice guidelines, or that an individual maintained such a level of medical care at consecutive interviews. At various interview waves, either substance use or unstable housing (or both simultaneously) was associated with not entering, or not maintaining minimal primary medical care. There was no relationship found, though, between the type of medical provider reported by CHAIN participants and various persistent comorbidities.

Background & Methodology

The Chain Survey and Data

The Community Health Advisory and Information Network (CHAIN) Study is a longitudinal survey of persons living with HIV, conducted as part of the evaluation activities of New York City’s HIV Health and Human Services Planning Council. Its purpose is to provide systematic data from the perspective of HIV-positive adults about their needs for health and human services, their encounters with the full continuum of HIV services, and their physical, mental, and social well being.

The study began collecting data in October 1994. Individuals were recruited into the study using a sampling strategy that yielded a representative group of HIV-positive adults in care

in New York City in 1994. Waves 5 and 6 are generally similar to the proportion of living adult

Table 1. Comparison of Epidemiological Data with CHAIN Data

	Surviving AIDS Cases, NYC†	CHAIN: Wave 5	CHAIN: Wave 6
	1998	1998	1999
n	40,014	652	495
MALE	29,900	376	286
<i>Non-Hispanic White</i>	28%	19%	21%
<i>Non-Hispanic Black</i>	38%	54%	54%
<i>Hispanic</i>	33%	26%	24%
<i>Other</i>	1%	2%	1%
FEMALE	10,114	276	209
<i>Non-Hispanic White</i>	12%	5%	6%
<i>Non-Hispanic Black</i>	53%	64%	67%
<i>Hispanic</i>	34%	30%	27%
<i>Other</i>	1%	1%	1%

† Source: NYC DOH Office of AIDS Surveillance, "Estimates of Persons Living with AIDS in NYC." NYC data includes 221 adolescents, as compared to CHAIN adults, but those numbers are too few to change the proportions.

AIDS cases in 1998, although black respondents comprise a greater percentage of the CHAIN cohort than are represented by living AIDS cases in 1998, and Latino and white respondents are under represented. Some of the differences may be attributed to the changing AIDS epidemic in New York City and the differences between the population of individuals at more advanced stages of the disease (NYC's living AIDS cases) and those at all stages of HIV-positivity (the CHAIN cohort). A more refined analyses of the CHAIN cohort can be found in The Cohort Comparison Report (Update Report #18, May 1999).

Since their original interview in 1994-1995 individuals in the study have been re-interviewed six times, at six to twelve month intervals. Very few individuals have refused to

participate in follow-up interviews; most of the individuals lost to follow up have been due to death from AIDS-related causes. In the two-hour long interviews, participants are asked about: (1) their encounters with the health care delivery system, (2) their need for services, (3) their access, utilization and satisfaction with health and social services, (4) key sociodemographic characteristics, (5) informal caregiving from friends, family and volunteers, and (6) their quality of life with respect to health status, psychological and social functioning. A number of items have been added over the years related to antiretroviral therapies, specific medical care services, viral load levels, and other topics of interest to policymakers, planners, providers, and clients on the Planning Council.

CHAIN sample design and participant recruitment

At its inception in 1994, the CHAIN Project pursued a recruitment procedure designed to yield a broadly representative sample of people living with HIV in New York City. Study recruitment was conducted collaboratively with 43 randomly selected agencies, stratified to represent roughly equal numbers of medical care and social service sites as well as sites that were and were not recipients of Ryan White Title I grants. At 30 sites, staff contacted a random sample of respondents. The names of respondents who indicated an interest in participating were turned over to CHAIN staff for interviews. An open enrollment procedure was implemented at the remaining 13 agencies. All eligible respondents present on a small number of recruitment days were invited by agency providers and CHAIN staff to participate in the CHAIN study. Interviews were then scheduled with interested respondents. A total of 648 individuals recruited from participating agencies completed baseline interviews. The agency-based sample was supplemented with 52 interviews conducted with HIV-positive individuals with little or no connection to medical and social services. These individuals were contacted at outreach sites and through nominations from CHAIN participants. More detailed information on sampling strategy and recruitment may be obtained upon request from MHRA (CHAIN Technical Report #1).

The research team has conducted six waves of interviews since the original recruitment

(a seventh wave of interviewing is currently being conducted), allowing for an interval of approximately six to twelve months between interviews. At each successive wave of interviews a small number of study participants were lost to follow-up. The research team has used a number of resources and strategies to recontact or confirm the status of individuals lost to follow-up, and occasionally an individual who has been lost to follow-up in an earlier wave is recontacted and interviewed at a subsequent wave.

In 1998, the HIV Planning Council asked the Columbia research team to recruit additional participants into the CHAIN study. In consultation with MHRA, the NYC Department of Health, and the HIV Planning Council, the researchers returned to the original 43 agencies for assistance in recruiting individuals more newly diagnosed with HIV. The primary objective of this strategy was to explore changes in the characteristics and experiences of New York's HIV-positive population since the original CHAIN participants were recruited. Of the 22 agencies that participated in the refresher effort, 19 recruited a random sample of respondents and 3 agencies conducted an open enrollment, using strategies identical to those employed at the first wave. A total of 253 individuals were recruited into the "refresher" cohort using these strategies. In addition to this agency-based group, fourteen individuals were added to the study who were unconnected to HIV health or human services (see Briefing Paper #1, *The Unconnected Revisited*, August 1999). In sum, a total of 267 refresher respondents were added to the CHAIN cohort resulting in a total sample of 652 participants at the fifth round of interviews. More detailed information about the sampling strategy, recruitment, and comparability of the refreshed cohort may be obtained from *The Cohort Comparison Report* (Update Report #18).

Table 2 illustrates the response and ineligibility rates in between the fifth and sixth waves of interviewing. Of 652 individuals who completed the Wave 5 interview, 30 were ineligible; among the 622 eligible individuals at the sixth wave, 495 (80%) were interviewed. This is similar to previous waves' response rates, which have varied from 78% to 90%. As often happens with the first follow-up efforts in a longitudinal study, we experienced greater attrition due, in part, to individuals in the refresher cohort who were lost to first follow-up.

Table 2. Current CHAIN Cohort: Wave 6 Response Rates

Interviewed at Wave 5	652	
Ineligible at Wave 6	30	5%
	<i>Deceased</i>	18 3%
	<i>Moved out of NYC</i>	9 1%
	<i>Mentally or physically unable</i>	2 <1%
	<i>HIV-negative</i>	1 <1%
Eligible for Wave 6 Interview	622	95%
Interviewed at Wave 6	495	80%
	<i>From original cohort (1994-1995)</i>	301 61%
	<i>From refresher cohort (1998)</i>	194 39%

Measuring Comorbidity

All CHAIN interviews are conducted in person by trained, community-based interviewers. Interview topics include sociodemographic characteristics, the full range of experiences with access and use of medical and social services, and quality of life. At each interview, CHAIN participants are asked to report on their recent medical history, including their CD4+ and viral load counts, experiences of opportunistic infections (including TB and STDs), and their current problems and needs for services. Table 3 illustrates the CHAIN questions used to measure the comorbidities reported in this analysis.

In constructing a measure of persistence, several strategies were explored. In the first model, a comorbidity was considered to be “persistent” when it was present at a minimum of three consecutive interviews (see Tables A-2A in the Appendix). This analysis was restricted to the 301 participants from the original CHAIN cohort who were interviewed at the sixth wave of interviewing, since the refresher cohort had not had an opportunity to report more than two waves of data.

The second approach considered a comorbidity to be persistent if it was present at two or more consecutive interviews or at any three interviews. This approach allowed us to

Table 3. Measurement of Comorbidities

COMORBIDITY	SURVEY QUESTION(S) / MEASURES
<i>TB</i>	Has a doctor or other medical provider told you since our last interview that you had tuberculosis – an active TB infection, and not just told you that you have a positive TB test
<i>STD</i>	1. Has a doctor or other medical provider told you since our last interview that you had herpes or genital herpes, OR 2. Has a doctor or other medical provider told you since our last interview that you had an STD, such as syphilis or gonorrhea ²
<i>Current drug use</i>	Based on problem drug use in past 6 months, measured as problem alcohol use, or any cocaine, crack, or heroin use
<i>Low mental health</i>	Less than 37.0 on the mental components summary scale, a portion of the Medical Outcomes Scale. This score is highly correlated with clinically diagnostic evidence of psychiatric symptomatology
<i>Unstably housed</i>	Current unstable housing, or any episode of unstable housing in past six months. “Unstable” includes doubled up with a friend or relative, in an SRO of “welfare hotel,” in drug treatment housing, in a shelter, on the street, in jail or in prison
<i>Dual diagnosis</i>	Current drug use + Low mental health
<i>Unstably housed drug user</i>	Current drug use + Unstably housed
<i>Multiply Diagnosed (MDI)</i>	Current drug use + Low mental health + Unstably housed

include individuals who were part of the refresher cohort, and increased the number of people in the analysis from 301 to 495 (the total number of individuals interviewed at the sixth wave, regardless of whether they were part of the original or the refresher cohorts). Since this second approach lowered the standard for “persistent comorbidity” we examined the differences between the two strategies. Table 4 illustrates the comparison. As expected, the two-wave model includes a slightly greater number of people with persistent comorbidities and permits subgroup analyses that might not be possible with the smaller sample of 301 individuals. Furthermore, the two-wave strategy includes both individuals recruited in 1994-1995 and those recruited into the study in 1998, so that it provides a group that includes those more recently diagnosed with HIV (and also newer to the HIV health and human services system). On the

² This second component of STDs was added as of the fifth interview wave; prior to that the only STD specified was herpes simplex

basis of this analysis

Table 4. Comparing Strategies for Measuring Comorbidity Persistence

	“Two-wave” persistence	“Three-wave” persistence
Sample size	495	301
<i>Most persistent comorbidities</i>	Low mental health (29%) Drug use (26%) Unstable housing (23%)	Drug use (24%) Low mental health (20%)
<i>Intermittent but frequent comorbidities (mentioned more than once)</i>	Low mental health (34%) Drug use (30%) Unstable housing (28%)	Low mental health (46%) Drug use (45%) Unstable housing (39%)

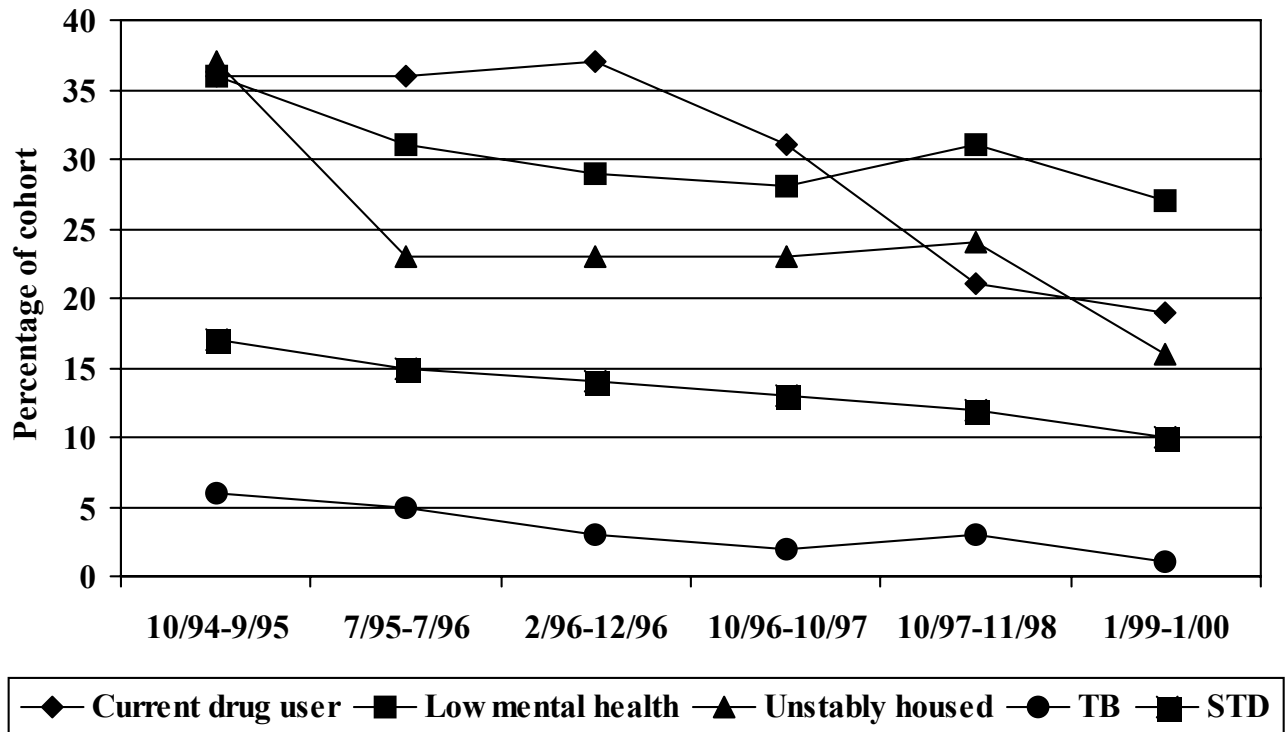
we decided to use the “two-wave” model of persistence for all of our subgroup analyses. As should be evident from Table 4, regardless of which approach is used when one compares the persistence comorbidities across the two models there are similar findings. The same social comorbidities of poor mental health, drug use, and unstable housing are reported “persistently,” notwithstanding whether persistence is defined as two consecutive interviews or three consecutive interviews.

Results

Trends in Comorbidities

As Figure 1 below illustrates, there has been a slight decline in the number of individuals who report a given comorbidity at any interview wave. Despite this decline, though, there remains a substantial proportion of the CHAIN cohort who report comorbidities that persist beyond a single interview period (or, phrased another way, who report a consistent problem or issue for a period longer than one year). Table A-2B in the Appendix illustrates how persistent these comorbidities are. Over one-quarter of all CHAIN participants interviewed at the sixth wave reported persistent problems with drug use or had persistently low mental health scores. Nearly as many, 23%, reported experiencing unstable housing conditions at more than two consecutive interviews. It is also noteworthy that the social comorbidities (drug use, low mental health, and unstable housing) are far more persistent – and also far more prevalent – than the clinical comorbidities of TB and STDs.

Figure 1. Trends in Comorbidities, NYC CHAIN Data



We conducted a “bias” analysis of the comorbidities (see Table A-7 in the Appendix) in order to examine whether the decrease in comorbidities was due to actual declines or to individuals who may have been lost to follow-up. Although there are several instances in which we have lost a significant number of individuals with a given comorbidity (those who were unstably housed between waves 1 and 2 and between waves 5 and 6), for the most part there are no significant differences between individuals with a particular comorbidity who remained in the cohort and those with the same comorbidity who were lost to follow-up.

We also conducted a correlation analysis (*data not shown*) to determine how strong a relationship exists among the different comorbidities. The most pronounced correlations were found between individuals who had ever reported unstable housing and drug use, between low

mental health scores and drug use, between low mental health scores and STDs, and between low mental health scores and unstable housing. The strong correlations support the notion that comorbidities are related to one another, and likely cluster together in very predictable ways. As with all the analyses we conducted regarding comorbidities, we cannot determine whether one thing *causes*, or even predates, another. Many of these instabilities or problems may have been present in an individual's life prior to becoming HIV-positive; on the other hand, it is equally possible that HIV has led to circumstances -- such as a reduced capacity to work -- that in turn have led to poorer mental health or an inability to maintain stable housing. Regardless of which came first, however, the clustering of comorbidities in addition to HIV suggests that individuals' health and social service needs are complex. A CHAIN report on the impact of ancillary services (Update Report 30) illustrated how the provision of services that address these intertwining social comorbidities increased individuals' access and retention to appropriate medical care.

Group Differences in Comorbidities

Certain groups exhibit a greater number of social and clinical comorbidities, based on their self-reports. Tables A-3A through A-3F in the Appendix show the results of a series of analyses exploring various group differences in the reporting of comorbidities. Among the findings from these tables are that:

- C Men are more likely than women to report persistent drug use, persistent unstable housing, and persistent problems with dual diagnosis and being unstably housed drug users;
- C Individuals who were diagnosed with HIV prior to 1995 were more likely to report persistent drug use and poorer mental health (for a further exploration of cohort differences, see The Cohort Comparison Report, Update Report #18);
- C Residents of the Bronx and Manhattan were more likely than residents of other boroughs to report unstable housing and the combined comorbidity of being unstably housed drug users. (A further analysis of this point is warranted, since it is possible that individuals with unstable housing or substance use problems may seek services in the Bronx and Manhattan, thus inflating the number of individuals reporting these problems in those two boroughs.)

The above findings represent how individuals within certain groups change over time (this is **intra**-individual, changes that occur within a given individual). We also examined group differences at each wave of interviewing. These measure snapshots of various groups at different points in time. These types of analyses do not look at how an individual changes over time, but rather at the distribution of comorbidities among specific groups at a given moment in time. The summary results of this group analysis are illustrated in Table A-4 in the Appendix. Whereas some of the group differences correspond to those experienced by individuals over time, some of the group differences only surface when each interview wave is analyzed separately. This difference between groups and individuals suggests that some comorbidities affect groups at a given moment, and may be episodic, whereas other comorbidities affect individuals with certain characteristics, and these comorbidities persist within these individuals over time.

At virtually every interview wave, individuals with poorer mental health were more likely to report STDs. Similarly, at every interview wave individuals who reported a recent opportunistic infection also scored very low on the mental health scale. In such a case, although the findings are strongly significant, it is unknown what the temporal association is between the two events: whether experiencing an opportunistic infection leads to poorer mental health, or whether poorer mental health lowers the body's resistance to opportunistic infections. One of the more consistent findings, as with the analysis of persistent comorbidities, is the relationship between substance use and unstable housing. At every wave of interviews, individuals who reported substance use were significantly more likely to also report unstable housing than were former substance users or individuals who never reported problem drug use.

Medical Care and Comorbidities

As illustrated in Table A-5 in the Appendix, two social comorbidities in particular are consistently associated with not entering into appropriate medical care or not maintaining

appropriate medical care.³ Either current substance use or unstable housing are significantly associated at each wave with not entering or maintaining appropriate medical care. We also examined whether the organizational site of an individual's primary medical care (e.g., public hospital, voluntary hospital, clinic or health center, private physician, or in a drug treatment program) was associated with persistent comorbidities (*data not shown*). None of the comorbidities was significantly more prevalent at one provider type than another.

Discussion

This report is the first in a series of CHAIN Reports to examine the role of comorbidities among the participants in the CHAIN project. Much as the series of reports on Ancillary Services focuses on the impact of **services** in influencing outcomes, these reports will focus on **needs**. Our first task has been to describe comorbidities. This report has advanced several strategies for measuring comorbidities and considering their "persistence." This measure of persistence is integral to understanding how comorbidities affect an individual over time, since these social problems (unstable housing, drug use, and mental illness) are often chronic and persistent, and a persistent problem may require far different treatment than an acute, or episodic one.

The next report on comorbidities will examine patterns of treatment – first by identifying ways of measuring whether a comorbid condition has been "treated," and then by considering whether there is a period of time between the report of a comorbidity and the receipt of treatment. Finally, we will consider how treating specific comorbidities affects several specific outcomes – entry and continuity in medical care, and utilization of specific services (such as hospitalization or emergency room visits).

Whatever phrase is applied to these needs – social comorbidity, social condition, or determinants of health – it is evident that there is a complex interaction among these needs. What remains to be examined is the consequence of such comorbidities on both the affected individuals and on the system of health and human services.

³ "Appropriate medical care" is predicated on self-reports involving the number of visits made to a primary medical provider, reports of receipt of blood tests and physical exams, and also reports of receipt of antiretroviral therapy for individuals with CD4+ counts below 500 mm³. This measure was derived after consultation with the NYS AIDS Institute and reference to [book tk]. See Table A-6 in the Appendix for the complete algorithm

APPENDIX

Table A-1.	Comorbidities, by Wave of Interview
Table A-2A.	The Three-Wave Model of Persistent Comorbidity
Table A-2B.	Two-wave Model of Persistent Comorbidity
Table A-3A & B.	Trends in Comorbidity Clusters: SOCIODEMOGRAPHIC Differences
Table A-3C & D.	Trends in Comorbidity Clusters: HEALTH Differences
Table A-3E & F.	Trends in Comorbidity Clusters: RISK Differences
Table A-4.	Groups Experiencing a Comorbidity
Table A-5.	Comorbidities associated with NOT ENTERING appropriate medical care, or NOT RETAINING appropriate medical care
Table A-6.	Criteria for Determining Appropriate HIV Medical Care
Table A-7.	Bias Table of Comorbidities, by Wave of Interview

Methodological note: Throughout the tables that follow, tests of significance have been applied. A significant finding, denoted by an asterisk, means that there are differences among the categories within that specific group. By convention, the asterisk has been placed in the first (left-most) column in which a value for that group appears.

Table A-1. Comorbidities, by Wave of Interview, NYC CHAIN data 1994-1999 (percentages)

	WAVE 1	WAVE 2	WAVE 3	WAVE 4	WAVE 5	WAVE 6
Period covered	10/94 - 9/95	7/95 - 7/96	2/96 - 12/96	10/96 - 10/97	10/97 - 11/98	11/98 - 1/00
n	700	568	480	420	652	495
<i>TB</i>	6	5	3	2	3	<1%
<i>STD</i>	17	15	14	13	12	1
<i>Current drug user</i>	36	36	37	31	21	19
<i>Very low mental health</i>	36	31	29	28	31	27
<i>Unstably housed</i>	37	23	23	23	24	16
<i>Dual diagnosis</i>	14	13	13	12	9	7
<i>Unstably housed drug users</i>	19	12	13	1	9	6
<i>Multiply diagnosed</i>	6	4	2	3	2	1

Table A-2A. The Three-Wave Model of Persistent Comorbidity, NYC CHAIN data, Wave 6 Survivors from the Original 1994 Cohort (row percentages),

Group (n = 301)	Persistent	Intermittent & frequent	Infrequent expression	Never
<i>TB</i>	1	3	1	87
<i>STD</i>	7	27	13	54
<i>Current drug user</i>	24	21	12	44
<i>Low mental health</i>	20	26	20	35
<i>Unstably housed</i>	12	27	2	42
<i>Dually diagnosed</i>	8	1	16	66
<i>Unstably housed current drug users</i>	4	13	15	68
<i>Multiply diagnosed</i>	1	3	7	89

Model A: Three-wave persistence

“Persistent” = comorbidity present at a minimum of 3 consecutive waves

“Intermittent” = comorbidity at three non-consecutive waves or two waves only”

“Infrequent” = comorbidity present at only one interview

“Never” = comorbidity never present

Table A-2B. Two-wave Model of Persistent Comorbidity, NYC CHAIN data, All Wave 6 Respondents (row percentages),

Group (n = 495)	Persistent	Intermittent & frequent	Infrequent expression	Never
<i>TB</i>	2	1	7	91
<i>STD</i>	12	1	14	65
<i>Current drug user</i>	26	4	12	58
<i>Low mental health</i>	29	5	22	44
<i>Unstably housed</i>	23	5	2	52
<i>Dually diagnosed</i>	9	3	13	76
<i>Unstably housed current drug users</i>	8	3	11	78
<i>Multiply diagnosed</i>	2	<1%	5	93

Model B: Two-wave persistence

“Persistent” = comorbidity present at a minimum of 2 consecutive waves, or min of 3 waves

“Intermittent” = comorbidity at two non-consecutive waves ”

“Infrequent” = comorbidity present at only one interview

“Never” = comorbidity never present

Table A-3A. Trends in Comorbidity Clusters: SOCIODEMOGRAPHIC Differences, NYC CHAIN data (row percentages)

		Dually diagnosed				Unstably housed drug users				Multiply diagnosed individuals			
	n	Persistent	Freq	Less Freq	Never	Persistent	Freq	Less Freq	Never	Persistent	Freq	Less Freq	Never
TOTAL	495	9%	3%	13%	76%	8%	3%	11%	78%	2%	<1%	5%	93%
GENDER													
<i>Male</i>	286	1	0	15	71	1***	1	14	71	2	0	1	91
<i>Female</i>	209	7	0	1	82	5	0	1	87	1	0	0	96
RACE/ETHNICITY													
<i>White</i>	71	1*	1	15	69	8	0	13	75	1	0	1	92
<i>Black</i>	293	6	0	13	79	8	0	11	78	1	0	0	94
<i>Latino</i>	126	15	0	1	71	8	0	11	78	3	0	1	91
BOROUGH													
<i>Bronx</i>	165	11*	0	13	73	1**	0	12	76	4	0	0	92
<i>Brooklyn</i>	101	7	0	8	84	3	0	1	86	0	0	1	95
<i>Manhattan</i>	131	1	0	21	66	15	1	1	71	3	0	1	89
<i>Queens</i>	54	11	0	4	81	0	0	22	76	0	0	0	96
<i>Staten Island</i>	43	0	1	9	84	2	1	1	86	0	0	0	98
EDUCATION													
<i>Less than HS</i>	221	1	0	13	74	9	0	1	78	3	0	1	9
<i>More than HS</i>	274	8	0	12	77	7	0	12	77	1	0	0	95
AGE GROUP													
<i>20-34</i>	79	11	0	1	77	9	0	16	72	3	0	1	91
<i>35-49</i>	325	9	0	14	73	8	0	11	76	2	0	0	93
<i>50+</i>	91	5	0	1	82	7	0	1	82	1	0	1	92

* p <.05

** p<.01

*** p<.001

Table A-3B. Trends in Comorbidities: SOCIODEMOGRAPHIC Differences, NYC CHAIN data (row percentages)

		Current Drug User				Low Mental Health				Unstable Housing			
	n	Persistent	Freq	Less Freq	Never	Persistent	Freq	Less Freq	Never	Persistent	Freq	Less Freq	Never
TOTAL	495	26%	4%	12%	58%	29%	5%	22%	44%	23%	5%	20%	52%
GENDER													
<i>Male</i>	286	32	1	12	51	29%*	1	22	41	28%***	1	21	44
<i>Female</i>	209	18	0	13	67	3	0	21	47	16	0	18	62
RACE/ETHNICITY													
<i>White</i>	71	31	0	2	48	42	1	18	3	18	0	3	48
<i>Black</i>	293	23	0	13	6	22	0	23	52	22	1	19	52
<i>Latino</i>	126	3	1	7	58	4	1	22	32	25	0	18	55
BOROUGH													
<i>Bronx</i>	165	3	0	8	59	3	0	24	42	28%**	1	24	42
<i>Brooklyn</i>	101	2	0	15	62	26	1	18	5	13	1	23	59
<i>Manhattan</i>	131	32	1	17	46	33	1	21	42	31	1	15	49
<i>Queens</i>	54	22	0	11	63	31	0	24	43	15	1	19	61
<i>Staten Island</i>	43	14	1	9	72	21	12	21	47	1	1	14	7
EDUCATION													
<i>Less than HS</i>	221	26	0	13	59	31	0	22	43	21	1	2	52
<i>More than HS</i>	274	26	1	12	57	28	1	21	44	24	0	2	52
AGE GROUP													
<i>20-34</i>	79	28	0	13	57	27	0	19	51	29	0	18	51
<i>35-49</i>	325	26	1	13	56	3	1	25	4	22	1	22	5
<i>50+</i>	91	23	0	9	66	31	0	13	53	2	0	16	62

* p <.05

** p<.01

*** p<.001

Table A-3C. Trends in Comorbidity Clusters: HEALTH Differences, NYC CHAIN data (row percentages)

		Dually diagnosed				Unstably housed drug users				Multiply diagnosed individuals			
	n	Persistent	Freq	Less Freq	Never	Persistent	Freq	Less Freq	Never	Persistent	Freq	Less Freq	Never
TOTAL	495	9%	3%	13%	76%	8%	3%	11%	78%	2%	<1%	5%	93%
YEAR OF HIV DIAGNOSIS													
<i>1981-1991</i>	188	15	0	14	67	11	0	16	69	4	0	1	91
<i>1992-1995</i>	213	7	0	13	77	8	0	1	79	1	0	1	92
<i>1996-1998</i>	94	2	0	1	88	2	0	1	91	0	0	0	98
T-CELL COUNT													
<i>Above 500 CD4+ mm³</i>	160	8	0	13	78	8	0	11	76	3	0	1	93
<i>Below 500 CD4+ mm³</i>	335	9	0	13	75	8	0	11	78	2	0	1	93
RECENT OPPORTUNISTIC INFECTION													
<i>Yes</i>	149	8***	0	1	8	7*	1	17	71	3	0	1	9
<i>No</i>	346	1	1	19	65	9	0	1	8	2	0	0	94

* p <.05

** p<.01

*** p<.001

Table A-3D. Trends in Comorbidities: HEALTH Differences, NYC CHAIN data (row percentages)

		Current Drug User				Low Mental Health				Unstable Housing			
	n	Persistent	Freq	Less Freq	Never	Persistent	Freq	Less Freq	Never	Persistent	Freq	Less Freq	Never
TOTAL	495	26%	4%	12%	58%	29%	5%	22%	44%	23%	5%	20%	52%
YEAR OF HIV DIAGNOSIS													
<i>1981-1991</i>	188	37	1	1	46	35	1	16	4	28	1	21	44
<i>1992-1995</i>	213	24	0	14	59	31	0	26	39	23	1	17	54
<i>1996-1998</i>	94	9	0	14	78	16	0	22	62	12	0	24	64
T-CELL COUNT													
<i>Above 500 CD4+ mm³</i>	160	24	1	13	58	23	0	26	46	23*	1	16	51
<i>Below 500 CD4+ mm³</i>	335	27	0	12	58	33	1	19	43	23	0	22	52
RECENT OPPORTUNISTIC INFECTION													
<i>Yes</i>	149	28	1	15	52	46***	1	22	26	25*	0	28	44
<i>No</i>	346	25	0	11	6	23	1	21	51	22	1	17	55

* p <.05

** p<.01

*** p<.001

Table A-3E. Trends in Comorbidity Clusters: RISK Differences, NYC CHAIN data (row percentages)

		Dually diagnosed				Unstably housed drug users				Multiply diagnosed individuals			
	n	Persistent	Freq	Less Freq	Never	Persistent	Freq	Less Freq	Never	Persistent	Freq	Less Freq	Never
TOTAL	495	9%	3%	13%	76%	8%	3%	11%	78%	2%	<1%	5%	93%
COMMUNITY CHARACTERISTICS													
<i>Over 40% poverty</i>	363	9	0	12	76	6	0	12	79	1	0	1	94
<i>Less than 40% poverty</i>	122	11	0	15	73	13	0	11	74	4	0	1	9
HIV RISK CHARACTERISTICS													
<i>MSM</i>	95	6***	0	47	73	6	1	14	75	na	na	na	na
<i>PDU</i>	188	15	0	16	66	13	0	15	68	na	na	na	na
<i>MSM + PDU</i>	52	15	0	13	67	15	0	1	73	na	na	na	na
<i>Other</i>	160	1	0	6	91	1	0	1	93	na	na	na	na
HOUSING													
<i>Stably housed</i>	415	8	0	13	76	na	na	na	na	na	na	na	na
<i>Doubled up</i>	27	7	11	11	7	na	na	na	na	na	na	na	na
<i>Unstably housed</i>	53	15	0	11	72	na	na	na	na	na	na	na	na
MENTAL HEALTH SUMMARY SCORE													
<i>Very low MH score (<37.00)</i>	132	na	na	na	na	8*	1	17	7	na	na	na	na
<i>Not low MH score (>37.01)</i>	362	na	na	na	na	8	0	1	8	na	na	na	na

* p <.05

** p<.01

*** p<.001

Table A-3F. Trends in Comorbidities: RISK Differences, NYC CHAIN data (row percentages)

		Current Drug User				Low Mental Health				Unstable Housing			
	n	Persistent	Freq	Less Freq	Never	Persistent	Freq	Less Freq	Never	Persistent	Freq	Less Freq	Never
TOTAL	495	26%	4%	12%	58%	29%	5%	22%	44%	23%	5%	20%	52%
COMMUNITY CHARACTERISTICS													
<i>Over 40% poverty</i>	122	3	0	1	57	29	1	21	44	32*	1	18	44
<i>Less than 40% poverty</i>	363	25	0	14	58	31	0	23	43	19	1	21	55
HIV RISK CHARACTERISTICS													
<i>MSM</i>	95	28***	1	17	49	31***	12	22	36	31***	0	25	43
<i>PDU</i>	188	37	1	12	46	37	0	2	38	26	1	2	48
<i>MSM + PDU</i>	52	37	0	13	46	37	0	19	4	27	1	25	38
<i>Other</i>	160	9	0	9	8	18	0	24	56	13	1	16	66
DRUG USE													
<i>Never used</i>	90	na	na	na	na	19**	0	19	58	6***	0	2	72
<i>Former drug user</i>	313	na	na	na	na	28	1	23	44	23	1	2	52
<i>Current drug user</i>	92	na	na	na	na	45	1	21	29	39	1	21	33
HOUSING													
<i>Stably housed</i>	415	24*	0	12	6	3	1	21	44	na	na	na	na
<i>Doubled up</i>	27	26	11	19	44	37	11	19	33	na	na	na	na
<i>Unstably housed</i>	53	43	0	11	45	25	0	25	47	na	na	na	na
MENTAL HEALTH SUMMARY SCORE													
<i>Very low MH score (<37.00)</i>	132	3	1	17	48	na	na	na	na	26	0	24	46
<i>Not low MH score (>37.01)</i>	362	25	0	11	61	na	na	na	na	22	1	19	54

* p <.05

** p<.01

*** p<.001

Table A-4. Groups Experiencing a Comorbidity, by Wave (NYC CHAIN data 1994-1999)

	WAVE 1	WAVE 2	WAVE 3	WAVE 4	WAVE 5	WAVE 6
Period covered (n)	10/94 - 9/95 (700)	7/95 - 7/96 (568)	2/96 - 12/96 (480)	10/96 - 10/97 (420)	10/97 - 11/98 (652)	11/98 - 1/00 (495)
<i>TB</i>	Less than HS*	Black* Less than HS** High pov area** Current drug*			HIV dx 96-98***	
<i>STD⁴</i>	Latino* Low Tcell**	Low mcs**	Female* Recent OI*** Low mcs**	White/Latino* Low mcs**	Low mcs* Female*	White/Latino* Early HIV dx** Low tcell** Current drug** Low mcs***, Fem*
<i>Current drug user</i>	High pov area** HIV dx 92-95* Unstable hous***	Male* Less than HS** High pov area* Unstable hous***	Male* Bx/Man/Qu* Less than HS* Unstable hous***	Male* Unstable hous*** Low mcs**	Male* High pov area*** Early HIV dx* Unstable hous*** Low mcs**	Male*** Recent OI* Unstable hous*** Low mcs*
<i>Very low mental health</i>	White/Latino** Recent OI**	Latino*** Recent OI**	White/Latino*** Recent OI*	Recent OI*** Current drug**	Female* White/Latino*** Recent OI*** Current drug* Unstable housing*	White/Latino*** Low tcell* Recent OI*** Current drug*
<i>Unstably housed</i>	Black/Latino* Bx/Man** High pov area* Current drug*** HIV dx 92-95* Less HS***	High pov area*** HIV dx 92-95* Current drug*** Low t-cell* Low mcs*	Male** High pov area*** Current drug***	High pov area** Current drug***	Male***, Black* Bx/Man*** High pov area*** Current drug*** HIV dx 96-98* Less HS**	Male*** Bx/Man*** High pov area*** Current drug**
<i>Dual diagnosis</i>	High pov area* Unstable hous***	Latino** Less than HS*** High pov area* Unstable hous**	White/Latino* Unstable*	Recent OI* Unstable housing*	Unstable hous*	Recent OI***
<i>Unstably housed drug users</i>	Less HS* High pov area* Recent OI**	Less HS*	Male* Less HS* Recent OI*	Manhattan** High pov area*	Manhattan* High pov area**	Male** Manhattan** High pov area*
<i>Multiply diagnosed</i>	Less than HS* High pov area*	Less than HS**				

⁴ STD definition expanded in Wave 5 and Wave 6 to include syphilis and gonorrhea, previously had only included Herpes

Table A-5. Comorbidities associated with NOT ENTERING appropriate medical care, or NOT RETAINING appropriate medical care, NYC CHAIN data 1994-1999

	WAVE 2	WAVE 3	WAVE 4	WAVE 5	WAVE 6
Period covered (n)	7/95 - 7/96 (568)	2/96 - 12/96 (480)	10/96 - 10/97 (420)	10/97 - 11/98 (652)	11/98 - 1/00 (495)
<i>Factors associated with not entering appropriate medical care</i>	Drug use* Unstable housing*** Unhoused drug***	Unhoused drug**	MDI*		Drug use*
<i>Factors associated with not maintaining continuously appropriate medical care</i>	Unstable housing** Dual diagnosis**	Unstable housing*	Unstable housing* Unhoused drug*	Drug use* Unstable housing**	

* p <.05

** p<.01

*** p<.001

Table A-6. Criteria for Determining Appropriate HIV Medical Care

Step	Criterion	Coded as Appropriate/Preferred Practice
1	Number of visits to primary care provider in past 6 months, Rounds 1 & 2 (pre-1996)	<i>If asymptomatic = 1 visit/6 months</i>
		<i>If symptomatic or AIDS diagnosis = 2 visits/6 months</i>
2	Number of visits to primary care provider in past 6 months, Rounds 3, 4, 5 (post-1996)	<i>If asymptomatic, not on antiretroviral therapy (ARV) = 1 visit/6 months</i>
		<i>If on ARV or symptomatic or AIDS diagnosis = 2 visits/6 months</i>
		<i>If CD4 count < 500 and viral load > 10,000 = 2 visits/6 months</i>
3	Specific services received from primary care provider in past 6 months	<i>Minimum of one CD4 check</i>
		<i>Respondent reported both a physical exam and a blood test/work up</i>

Note: Depending on time period, either steps 1 + 3 (pre-1996) or steps 2 + 3 (post-1996) have to be present to qualify for meeting preferred practice guidelines. Sources include New York State AIDS Institute "Protocols for the Primary Care of HIV/AIDS in Adults and Adolescents (Nov 1995), on the latest edition of "Criteria for the Medical Care of Adults with HIV Infection" by the AIDS Institute (Mar 1998), and on personal interviews with key program staff at the AIDS Institute.

Table A-7. Bias Table of Comorbidities, by Wave of Interview

	Interviewed at subsequent wave (percentage)									
	WAVE 2		WAVE 3		WAVE 4		WAVE 5		WAVE 6	
	7/95 - 7/96		2/96 - 12/96		10/96 - 10/97		10/97 - 11/98		11/98 - 1/00	
Interviewed at subsequent wave	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
n¹	63	566	33	471	27	415	17	371	131	494
Comorbidity at prior wave										
TB	5	5	3	4	7	3	0	2	4	2
STD	14	18	12	15	7	13	6	11	7*	13
Current drug user	46	36	45	36	33	38	18	32	30**	19
Very low mental health	43	36	39	30	26	29	12	29	38*	29
Unstably housed	55**	36	36	23	19	23	18	23	40***	20

* p <.05

** p<.01

*** p<.001

¹ This “n” is of eligible individuals only, which *excludes* CHAIN participants who died or moved out of NYC