C.H.A.I.N 2012-9
REPORT
Tobacco Use, Cessation and Medical Provider Intervention

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**Introduction**

For many HIV-positive individuals, the dramatic gains in life expectancy from antiretroviral medications may be offset by the health hazards of smoking. Tobacco use is far more prevalent in HIV-infected populations than in the general population: estimates of current cigarette smoking in HIV-infected populations are in excess of 40%, with rates of lifetime smoking exceeding 80% [1-9], more than twice the rates of smoking in the general population [10]. Fewer estimates of quit and smoking cessation rates are available, but studies of health care provider interventions to assist HIV-positive smokers do indicate that a large percentage of HIV-positive smokers report medical provider advice and assistance in quitting [3].

Tobacco use is a well-established risk factor for morbidity and premature death in the general population, and tobacco use is also a major contributor to lower life expectancy among people living with HIV [2, 11]. An analysis of causes of death among HIV-infected New York City residents reveals that in the period from 1999 to 2004, lung cancer was particularly dominant as a non-HIV-related cause of death [12]. The most dramatic evidence for the substantial health burden associated with smoking comes from a recently published study from Denmark. Although in many ways not comparable to the CHAIN cohort, Danish citizens living with HIV lost more life-years to smoking than to HIV-related causes [13]. One recent study found that the adjusted incidence rate ratio of cardiovascular disease in patients living with HIV who stopped smoking decreased from 2.32 within the first year of stopping to 1.49 after 3 years, when compared with people living with HIV who have never smoked [14]. The investigators further observed similar trends for myocardial infarctions and coronary heart disease.

Tobacco use may also have a direct effect on the efficacy of ART. In the Women’s Interagency HIV Study, set in 6 sites around the US, smokers on ART had poorer viral responses and poorer immunological responses, as well as greater risks of virologic rebound and of immunological failure [15]. The study further found that women living with HIV who were smokers had a greater risk of death in general and a greater risk of developing AIDS, though not a greater risk of death due to AIDS, compared with their nonsmoking peers. Conversely, an increasing number of consecutive days of smoking abstinence has been shown to be associated with lower levels of HIV-related symptom burden [16].

Tobacco use can also have an effect on conditions often found in conjunction with HIV infection. For instance, among people living with HIV, smoking may contribute to the development of pneumonia [17] and the incidence of oral thrush [18].

This study presents estimates of smoking prevalence, quit attempts and medical provider cessation assistance for members of the CHAIN cohort. It investigates long-term trends in smoking behavior and medical provider assistance and subgroup differences in smoking behavior and medical provider assistance. Parallel analyses are reported for the New York City (NYC) and Tri-County cohorts.
Key Findings

- Lifetime and current smoking prevalence are extremely high in both NYC and Tri-County. At most recent interview, 50 percent of NYC and close to 60 percent of Tri-County participants currently smoked – twice the prevalence of the general population.
- Tobacco use in the NYC and Tri-County cohorts is particularly high among substance users and among individuals with unstable housing. Over 70% of these groups are currently smoking.
- The prevalence of current smoking is substantially lower in foreign-born individuals: only 29% for NYC and 21% in Tri-County.
- Recent smoking is associated with an almost doubling of mortality risk, and elevated mortality risk is greatly reduced among those who stopped smoking prior to baseline interviews.
- Although CHAIN participants exhibit low rates of successful and sustained cessation, the prevalence of quit attempts among study participants is similar to that of adult smokers in the US.
- In the most recent interview rounds, more than three-quarters of smokers reported that their doctor advised them to quit smoking, with the percentage rising steadily.
- Around half of the smokers in the sample reported receiving some form of assistance from their doctor to quit smoking.
- Advice from medical care providers did not appear to have an effect on quit rates among CHAIN participants. This stands in contrast to the latest Cochrane review suggesting that brief doctor interventions are effective in promoting smoking cessation.

Methodology

Smoking Behavior

Self-reports of lifetime and current smoking were elicited through standard questions on smoking behavior. During baseline interviews, CHAIN participants were asked if they “smoked at least 100 cigarettes in your entire life.” If they answered yes, participants were then asked, “Do you smoke cigarettes now?” At follow-up interviews we ask, “Do you smoke cigarettes now?” Starting in Round 3 in NYC and Round 4 in Tri-County, we asked current smokers, “In the past year has a doctor or medical provider talked to you about quitting?” We refer to this outcome as provider advice. We then asked, “Has he or she prescribed anything to help you in stopping or referred you to someone who could help?” We refer to this outcome as provider assistance.

By comparing answers to the smoking questions across interviews, we distinguished current smokers from former smokers (individuals who were not smoking now but reported
smoking at baseline or at an earlier follow-up interview). We inferred a recent quitter if an individual reported not smoking now but had smoked at the previous interview. A relapsed smoker was a person who reported “smoking now” at the current interview but had said he or she was not smoking at the prior follow-up interview.\(^1\) Table 1 illustrates the construction of these categories and the computation of quit and relapse rates:

<table>
<thead>
<tr>
<th>Smoking at Interview @ R</th>
<th>Smoking @ R-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Committed Smoker Recent Quitter Current Smoker @ R-1</td>
</tr>
<tr>
<td>No</td>
<td>Relapse Smoker Long-Term Quitter Former Smoker @ R-1</td>
</tr>
</tbody>
</table>

Current Smoker @ R Former Smoker @ R

Where R is an interview from Rounds 2 through 6.

Quit Rate=\(\frac{\text{N of Recent Quitters}}{\text{N of Current smokers @ R-1 interviewed at R}}\) [Quit Rate not calculated at Baseline]

Relapse Rate=\(\frac{\text{N of Relapse Smokers}}{\text{N of Former Smokers @ R-1 interviewed at R}}\) [Relapse Rate not calculated at Baseline]

We explored potential group differences in current smoking, quit and relapse rates and medical provider advice and assistance in support of smoking cessation for variables listed in Table 2. The report appendix includes tables that show the proportions of selected subgroups for each outcome and data tables used to construct graphs in the main body of the report. Definitions of the more complex variables are provided below.

“Mental Health” was measured by the Mental Health Component Scale (MCS). The cutoff point used is an MCS score of 37, with any score above considered good mental health, and anything at or below considered poor mental health. This is the standard cutoff point in the

\(^1\) Since almost all smoking initiation occurs during adolescence and almost all sample members are 30 or older, we assume that a person who reports smoking for the first time at a follow-up interview despite reporting no lifetime use must nonetheless have initiated smoking before baseline survey. Consequently, an individual who reports smoking for the first time at a follow-up is automatically treated as a relapser and a former smoker in all previous interviews in which no smoking was reported.
research utilizing this measure and the standard way in which it has been employed in other CHAIN reports.

“Access to Comprehensive Medical Care” was coded as ‘Yes’ if a participant reported access to all of the following medical services in the past 6 months: routine checkups, well visits and vaccinations; a source of health advice; and 24-hour access in case of medical emergencies. If any of these components was not accessible, Access to Comprehensive Medical Care was coded as ‘No.’

“History of Problem Substance Use” was defined as any lifetime heroin, cocaine and/or crack use; or problem drinking as defined by the CAGE questionnaire [19]. Problem substance use was categorized as current (past six months), former, or no history.

Data Analyses

To assess the impact of group differences on various study outcomes, we fit multiple regression logistic models to pooled data from multiple rounds of interviews. For current smoking, we contrasted current smokers against either “former” or “never” smokers. Measured in this way, we capture group differences in persistence of smoking during the time we followed cohort members. For the analysis of quit rates, we pooled observations on current smokers at one interview who also reported on their smoking status (current or not) at the follow-up interviews.

Although we are interested in estimating the effect of medical care provider intervention (measured as advice and assistance) on smoking cessation, the analytical sample for these variables was greatly reduced because we started asking these questions at Round 3 in New York and Round 4 in Tri-County. Additional observations were lost because we had to lag the advice and assistance variables by one round of interviews. Thus, the sample to estimate the effect of the provider intervention variables on quit attempts was limited to current smokers at Rounds 3, 4 and 5 in NYC. There were too few observations with valid data to reliably assess the impact of medical provider intervention in Tri-County. Consequently, we first estimated quitting models without the medical provider intervention variables for both cohorts, pooling data from Rounds 2 through 6. To assess the impact of the provider intervention variables, we next estimated a model fit to a greatly reduced number of observations restricted to NYC.

For both NYC and Tri-County, we pooled successive rounds of interviews to test for stable cross-sectional group differences in medical provider advice and assistance in smoking cessation.

Mortality risk for smoking was estimated using a Cox proportional hazard model. For this analysis, we combined mortality data through December 2009 obtained for NYC 1994 Cohort, NYC 2002 Cohort, and the Tri-County 2001 cohort. Current and past smoking were based upon data from baseline interviews. Other covariates in the model include: gender, race/ethnicity, education, age, year of HIV diagnosis, income and cohort.
Findings

*Trends in Smoking Prevalence* In both the NYC and Tri County cohorts, 82% of study participants reported smoking at least 100 cigarettes at time of baseline interviews. Estimates of never smokers remained stable during successive rounds of interviews, despite the addition of new CHAIN participants in Rounds 5 and 6 in both NYC and Tri-County (Figure 1). Although

**Figure 1 – Trends in Smoking Behavior**

**NYC**

<table>
<thead>
<tr>
<th>Year</th>
<th>Former Smokers</th>
<th>Current Smokers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002-04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004-05</td>
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<tr>
<td>2009-11</td>
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</table>

**Tri-County**

<table>
<thead>
<tr>
<th>Year</th>
<th>Former Smokers</th>
<th>Current Smokers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001-03</td>
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<tr>
<td>2003-04</td>
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<td>2005-07</td>
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<td>2008-10</td>
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<td></td>
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<tr>
<td>2010-12</td>
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</table>
many people have stopped smoking since the start of the study, current prevalence remained high. In the NYC cohort, current smoking declined from about 60% during the early years of the cohort to just over 50% at the most recent round of interviews (see Figure 1). Current smoking prevalence in Tri-County closely tracks the NYC trends, but with an uptick in current smoking at the most recent interview (Round 6). The uptick could be an artifact of the switch from a cohort to a repeated cross-sectional design instituted after Round 4 interviews, which brought an influx of younger participants (Figure 1).

**Quit and Relapse Rates** Figure 2 shows that quit rates (as measured in this study) increased with successive rounds of interviews. In NYC, quit rates increased from 7% to over 10% during the most recent rounds of interviews. A similar trend is evident for Tri-County. The seemingly elevated quit rates in Tri-County for the 2008-2010 and 2010-2012 interview rounds must be interpreted cautiously, since these are based on a small number of former smokers, who by chance were interviewed at successive rounds when we switched to a repeated cross-sectional design at Round 5 interviews.

Not all quit attempts translate into permanent cessation. Our data confirm that relapse rates among the relatively small number of former smokers were, if anything, consistently higher than quit rates among the larger number of current smokers. In both cohorts, about a quarter of all former smokers interviewed at first and second follow-up interviews relapsed. In both cohorts, there was a sharp decline in relapse during the fourth (third follow-up) round of interviews (Figure 2), with a possible rebound in relapse in Rounds 5 and 6. Again, trends in Rounds 5 and 6 should be interpreted with caution. This is particularly true for Tri-County, where there were only a small number of former smokers who were re-interviewed for the Rounds 5 and 6 cross-sectional samples.

Because the quit and relapse rates have different denominators, comparison of rates is not meaningful. Instead, the absolute numbers of quitters and relapsers better describe how these behaviors affected the net change in current smoking. The bar charts in Figure 3 indicate that counts of relapsers are much higher than those of quitters in the first two follow-up rounds of NYC interviews. Quitters outnumbered relapsers in later interviews. A similar pattern is evident for Tri-County, but again, the change in sample design in Rounds 5 and 6 makes it difficult to draw strong conclusions about this trend.

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2 Cross-sectional estimates of percentage of current and former smokers were estimated for all individuals interviewed at each interview. In contrast, quit and relapse rates require smoking status at two rounds of interviews, and only a small percentage of Tri-County participants completing interviews in Rounds 5 and 6 could be linked to earlier interviews. The bases for the quit and relapse rates are reported in the Appendix tables.
Figure 2 – Trends in Quit and Relapse Rates

NYC

Tri-County
Figure 3 – Trends in Absolute Number of Quitters and Relapsers

NYC

Note: We defined quitters and relapsers based upon smoking status at previous interview round; therefore, no participants are defined as recent quitters in the first round. As the Tri-County study shifted from a cohort structure to a cross-sectional structure after Round 4, the figures for Rounds 5 (2008-2010) and 6 (2010-2012) are based on the small number of individuals who happened to have participated in the previous rounds.
Provider Cessation Intervention We also found that large numbers of current smokers reported some medical provider intervention. Over 70% of NYC current smokers received advice about smoking cessation from their medical care providers at any one round of interview and roughly half of current smokers reported that their medical provider extended some form of assistance or referral to encourage smoking cessation (Figure 4). Comparable levels of advice and assistance were reported by current Tri-County smokers (Figure 4).

Figure 4 – Trends in Reported Medical Provider Advice and Assistance with Smoking Cessation among Current Smokers

NYC

Tri-County
Subgroup Differences

Results of the logistic regression models point to considerable group variation in current smoking prevalence in both NYC and Tri-County (Table 2). Current smoking was higher among males, minority group members, past and current substance users, and participants experiencing recent spells of homelessness. Lower prevalence of current smoking was associated with age over 50 years, education beyond high school, and place of birth outside of the U.S. (The observed percentages for these groups can be found in appendix tables.) The pattern of group differences in current smoking was similar in Tri-County, with the following exceptions: gender and age were not related to current smoking in Tri-County, and the effect of education was stronger. An association between lower current smoking and better mental health that was suggested in NYC reached statistical significance in Tri-County.

Fewer subgroup differences are evident for quit and relapse rates (Table 3). Current substance use was the only consistent predictor of both reduced quit rates and higher relapse rates. In Tri-County, but not New York, individuals born outside the U.S. may have had lower lifetime rates of smoking but among current smokers they were much less likely to quit. Relapse, but not quit rates, declined with age in both cohorts. Higher educational attainment is associated with lower relapse rates in Tri-County, but not in NYC.

There were minimal group differences in receipt of medical care provider interventions (Table 4). Older participants in NYC, but not Tri-County, were more likely to report receiving medical provider advice to stop smoking. In Tri-County, but not NYC, males were less likely than females to report receiving advice from a medical care provider. Housing stability was related to assistance in both cohorts, but not in a consistent manner. Unstably housed individuals in NYC were less likely to report receiving provider advice, whereas Tri-County residents with recent spells of homelessness were more likely to report receiving provider advice.

We further ran a regression model for quitting with an expanded set of variables including the variables for receipt of provider advice and provider assistance. This model was run on a greatly reduced sample size for NYC, as these additional variables are not available for all waves. Unexpectedly, individuals who reported being advised to quit by a medical provider at one interview were less likely to have stopped smoking at the next interview (adjusted odds ratio for advice = 0.34, 95% C.I. = 0.19,0.61). No relation existed between reports of receiving assistance from medical care providers and quit rates. We are inclined to interpret these findings as evidence of a selection bias rather than a negative causal effect of receiving medical provider advice. For example, medical care providers may be more likely to provide advice to their more nicotine-dependent patients, who have greater difficulty quitting than their smoking patients with lesser nicotine dependence.
Table 2: Adjusted Odds Ratios of Current Smoking, by Participant Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>NYC</th>
<th>Tri County</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
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<td></td>
</tr>
<tr>
<td>Female</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Male</td>
<td>1.31* [1.02,1.69]</td>
<td>1.05 [0.78, 1.14]</td>
</tr>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White + Other</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Black</td>
<td>1.62* [1.09, 2.43]</td>
<td>1.40+ [0.95, 2.07]</td>
</tr>
<tr>
<td>Latino</td>
<td>1.54+ [0.97, 2.42]</td>
<td>1.65+ [0.99, 2.76]</td>
</tr>
<tr>
<td><strong>Age</strong></td>
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<td></td>
</tr>
<tr>
<td>19-39</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>40-49</td>
<td>1.02 [0.84, 1.24]</td>
<td>0.95 [0.72, 1.27]</td>
</tr>
<tr>
<td>50+</td>
<td>0.64*** [0.51, 0.81]</td>
<td>0.82 [0.60, 1.14]</td>
</tr>
<tr>
<td><strong>Education</strong></td>
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<tr>
<td>Less than High School</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>High School</td>
<td>0.89 [0.66, 1.21]</td>
<td>0.65* [0.45, 0.95]</td>
</tr>
<tr>
<td>More than High School</td>
<td>0.75+ [0.56, 1.00]</td>
<td>0.54*** [0.37, 0.78]</td>
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<tr>
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<tr>
<td>Brooklyn</td>
<td>0.99 [0.77, 1.28]</td>
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</tr>
<tr>
<td>Manhattan</td>
<td>0.96 [0.77, 1.21]</td>
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<tr>
<td>Queens</td>
<td>0.93 [0.68, 1.27]</td>
<td></td>
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<tr>
<td>Staten Island</td>
<td>1.52+ [0.97, 2.37]</td>
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<td><strong>County of Residence</strong></td>
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<tr>
<td>Rockland</td>
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<td>1.05 [0.49, 2.27]</td>
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<td>Westchester</td>
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<td>0.85 [0.43, 1.71]</td>
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<tr>
<td><strong>Problem Substance Use</strong></td>
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</tr>
<tr>
<td>Never</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Past</td>
<td>1.99*** [1.64, 2.43]</td>
<td>3.29*** [2.48, 4.36]</td>
</tr>
<tr>
<td>Current</td>
<td>2.98*** [2.39, 3.74]</td>
<td>4.17*** [2.98, 5.84]</td>
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<tr>
<td><strong>Place of Birth</strong></td>
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<td>U.S.</td>
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<td>1</td>
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<tr>
<td>Puerto Rico</td>
<td>0.94 [0.58, 1.52]</td>
<td>0.84 [0.41, 1.70]</td>
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<td>Foreign Born</td>
<td>0.39*** [0.27, 0.57]</td>
<td>0.22*** [0.14, 0.35]</td>
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<td><strong>Mental Health</strong></td>
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<td>MCS&lt;=37</td>
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<td>1</td>
</tr>
<tr>
<td>MCS&gt;37</td>
<td>0.92 [0.82, 1.04]</td>
<td>0.77** [0.65, 0.91]</td>
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<tr>
<td>Housing Situation</td>
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<tr>
<td>-------------------</td>
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</tr>
<tr>
<td>Stable</td>
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<td>1.06 [0.82,1.37]</td>
</tr>
<tr>
<td>Unstable</td>
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<td>1.29 [0.81,2.06]</td>
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<tr>
<td>Homeless</td>
<td>1.23* [1.01,1.49]</td>
<td>1.29 [0.81,2.06]</td>
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<table>
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<th>Access to Comprehensive Medical Care</th>
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<th>1</th>
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<tbody>
<tr>
<td>No</td>
<td>1.04 [0.94,1.16]</td>
<td>1.02 [0.93,1.12]</td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

| N of Individuals | 1009 | 777 |
| N of Observations | 3344 | 1817 |

+p<.1 p<.05, **p<.01, ***p<.001
Table 3: Adjusted Odds Ratios for Quit Attempts and Relapse, by Participant Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Quitting NYC-Multivariate</th>
<th>Quitting TC-Multivariate</th>
<th>Relapse NYC-Multivariate</th>
<th>Relapse TC-Multivariate</th>
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<tbody>
<tr>
<td>Gender</td>
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<tr>
<td>Female</td>
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<tr>
<td>Male</td>
<td>1.15 [0.75, 1.77]</td>
<td>0.76 [0.41, 1.42]</td>
<td>0.83 [0.49, 1.42]</td>
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<td>Race/Ethnicity</td>
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<tr>
<td>Black</td>
<td>0.91 [0.45, 1.84]</td>
<td>1.57 [0.61, 4.00]</td>
<td>0.91 [0.40, 2.07]</td>
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<tr>
<td>Latino</td>
<td>0.94 [0.42, 2.11]</td>
<td>1.26 [0.42, 3.82]</td>
<td>0.62 [0.24, 1.64]</td>
<td>1.28 [0.38, 4.26]</td>
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<tr>
<td>Age</td>
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<td>19-39</td>
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<td>40-49</td>
<td>0.64 [0.33, 1.22]</td>
<td>0.68 [0.30, 1.55]</td>
<td>0.38* [0.17, 0.84]</td>
<td>0.36* [0.13, 0.99]</td>
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<td>50+</td>
<td>1.25 [0.66, 2.37]</td>
<td>0.79 [0.34, 1.81]</td>
<td>0.37* [0.17, 0.79]</td>
<td>0.22** [0.08, 0.61]</td>
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<td>Less than High School</td>
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<td>1</td>
</tr>
<tr>
<td>High School</td>
<td>1.11 [0.66, 1.86]</td>
<td>1.07 [0.52, 2.20]</td>
<td>1.00 [0.49, 2.02]</td>
<td>0.85 [0.35, 2.07]</td>
</tr>
<tr>
<td>More than High School</td>
<td>1.12 [0.68, 1.85]</td>
<td>1.10 [0.52, 2.29]</td>
<td>0.89 [0.49, 1.64]</td>
<td>0.36* [0.14, 0.97]</td>
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<td></td>
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<td>Bronx</td>
<td>0.70 [0.41, 1.18]</td>
<td></td>
<td>0.90 [0.44, 1.84]</td>
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<tr>
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<td></td>
<td>0.83 [0.42, 1.62]</td>
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</tr>
<tr>
<td>Manhattan</td>
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<tr>
<td>Queens</td>
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<td>2.55 [0.73, 8.89]</td>
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</tr>
<tr>
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<td>1.82 [0.19, 17.44]</td>
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<td>1</td>
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<tr>
<td>Past</td>
<td>0.67 [0.39, 1.14]</td>
<td>0.58 [0.27, 1.22]</td>
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<td>1.58 [0.64, 3.93]</td>
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<tr>
<td>Current</td>
<td>0.30*** [0.16, 0.58]</td>
<td>0.38+ [0.14, 1.05]</td>
<td>3.74*** [1.77, 7.90]</td>
<td>5.29** [1.49, 18.71]</td>
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<td>1</td>
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<tr>
<td>Puerto Rico</td>
<td>1.04 [0.48, 2.24]</td>
<td>3.58* [1.21, 10.58]</td>
<td>1.19 [0.43, 3.32]</td>
<td>1.29 [0.27, 6.25]</td>
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<tr>
<td>Foreign Born</td>
<td>1.45 [0.71, 2.97]</td>
<td>3.15* [1.13, 8.77]</td>
<td>1.16 [0.49, 2.74]</td>
<td>1.26 [0.42, 3.79]</td>
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<td>1.77+ [0.95, 3.27]</td>
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<td>0.53+ [0.26, 1.09]</td>
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<td></td>
<td>NYC-Multivariate</td>
<td>TC-Multivariate</td>
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<td>Housing Situation</td>
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<tr>
<td>Homeless</td>
<td>0.72 [0.39,1.31]</td>
<td>0.94 [0.31,2.88]</td>
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<td>Access to Comprehensive</td>
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<tr>
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<tr>
<td>Yes</td>
<td>0.95 [0.78,1.15]</td>
<td>0.85 [0.61,1.17]</td>
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<tr>
<td>N of Individuals</td>
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<td>278</td>
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</tr>
<tr>
<td>N of Observations</td>
<td>1349</td>
<td>620</td>
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*p<.1 * p<.05, ** p<.01, ***p<.001
Table 4: Adjusted Odds Ratios for Medical Care Intervention in Smoking, by Participant Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Advice NYC</th>
<th>Tri-County</th>
<th>Assistance NYC</th>
<th>Tri County</th>
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<tbody>
<tr>
<td><strong>Gender</strong></td>
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<tr>
<td>Female</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Male</td>
<td>1.00 [0.69,1.45]</td>
<td><em><em>0.51</em> [0.27,0.96]</em>*</td>
<td>1.12 [0.80,1.57]</td>
<td>1.26 [0.79,2.02]</td>
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<tr>
<td><strong>Race/ Ethnicity</strong></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>White+Other</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Black</td>
<td>0.82 [0.42,1.58]</td>
<td>1.07 [0.41,2.82]</td>
<td>1.32 [0.76,2.31]</td>
<td>0.94 [0.49,1.79]</td>
</tr>
<tr>
<td>Latino</td>
<td>0.78 [0.37,1.61]</td>
<td>0.45 [0.15,1.37]</td>
<td>1.17+ [0.62,2.20]</td>
<td><strong>2.18+ [0.93,5.07]</strong></td>
</tr>
<tr>
<td><strong>Age</strong></td>
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<td></td>
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<td>19-39</td>
<td>1</td>
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<td>1</td>
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<tr>
<td>40-49</td>
<td>1.40 [0.85,2.33]</td>
<td>0.90 [0.35,2.33]</td>
<td>1.39 [0.83,2.30]</td>
<td>1.19 [0.59,2.40]</td>
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<tr>
<td>50+</td>
<td><em><em>1.99</em> [1.17,3.40]</em>*</td>
<td>1.35 [0.51,3.55]</td>
<td><strong>1.58+ [0.94,2.66]</strong></td>
<td>1.56 [0.77,3.15]</td>
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<tr>
<td><strong>Education</strong></td>
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<tr>
<td>Less than High School</td>
<td>1</td>
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<tr>
<td>High School</td>
<td>1.30 [0.82,2.05]</td>
<td>0.93 [0.42,2.06]</td>
<td>0.86 [0.57,1.28]</td>
<td>1.62+ [0.92,2.84]</td>
</tr>
<tr>
<td>More than High School</td>
<td>1.07 [0.68,1.67]</td>
<td>0.76 [0.36,1.57]</td>
<td>0.98 [0.65,1.48]</td>
<td>1.41 [0.82,2.42]</td>
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<tr>
<td><strong>Borough of Residence</strong></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Bronx</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Brooklyn</td>
<td>1.22 [0.77,1.93]</td>
<td>1.25 [0.76,2.06]</td>
<td>1.16 [0.75,1.79]</td>
<td>1.51 [0.80,2.88]</td>
</tr>
<tr>
<td>Manhattan</td>
<td>0.71 [0.40,1.25]</td>
<td>0.75 [0.42,1.31]</td>
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</tr>
<tr>
<td>Queens</td>
<td>1.25 [0.61,2.56]</td>
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<tr>
<td>Staten Island</td>
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<td><strong>County of Residence</strong></td>
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<tr>
<td>Putnam</td>
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<td>1</td>
</tr>
<tr>
<td>Rockland</td>
<td></td>
<td></td>
<td></td>
<td>1.33 [0.27,6.63]</td>
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<tr>
<td>Westchester</td>
<td></td>
<td></td>
<td></td>
<td>0.74 [0.16,3.33]</td>
</tr>
<tr>
<td><strong>Problem Substance Use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Past</td>
<td>0.97 [0.58,1.62]</td>
<td>1.32 [0.57,3.05]</td>
<td>1.35 [0.86,2.10]</td>
<td>1.38 [0.73,2.59]</td>
</tr>
<tr>
<td>Current</td>
<td>0.93 [0.53,1.61]</td>
<td>1.21 [0.47,3.15]</td>
<td>1.02 [0.63,1.64]</td>
<td>1.17 [0.57,2.38]</td>
</tr>
<tr>
<td><strong>Place of Birth</strong></td>
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<td></td>
<td></td>
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<td>U.S.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Puerto Rico</td>
<td>1.23 [0.60,2.52]</td>
<td>1.58 [0.42,5.91]</td>
<td>1.32 [0.70,2.50]</td>
<td>1.32 [0.41,4.23]</td>
</tr>
<tr>
<td>Foreign Born</td>
<td>0.68 [0.36,1.27]</td>
<td>3.05 [0.63,14.67]</td>
<td>0.71 [0.37,1.35]</td>
<td>0.74 [0.28,1.92]</td>
</tr>
<tr>
<td><strong>Mental Health</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCS&lt;=37</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>MCS&gt;37</td>
<td>0.87 [0.60,1.26]</td>
<td>0.70 [0.37,1.34]</td>
<td>0.93 [0.69,1.26]</td>
<td>1.06 [0.67,1.68]</td>
</tr>
</tbody>
</table>
### Smoking and Health

In the prior CHAIN analysis on this topic released in report 2007-4, current smoking was found to be unrelated to inpatient days, outpatient visits, and visits to the emergency room. However, based upon unpublished findings, smoking at the time of baseline interview almost doubled the mortality risk compared to never smokers (Hazard Ratio= 1.86, 95% CI=1.40,2.49). Just as important, former smokers, as of baseline interviews, had substantially reduced mortality risk (Hazard Ratio=1.37, 95% CI=0.97,1.93). This is consistent with well-established findings that people ultimately gain health benefits from smoking cessation.

### Discussion

Lifetime and current smoking prevalence are extremely high in both the NYC and Tri-County CHAIN cohorts. As of the most recent rounds of interviews, 52% of NYC cohort members and 58% of Tri-County cohort members reported current smoking. These levels are comparable to estimates obtained from other HIV cohorts [1-5] and are over twice the level of current smoking for the general adult population [10]. Smoking is undoubtedly related to the extensive history of substance use in this and other HIV-positive populations. Cigarette smoking is ubiquitous among users of other substances, and smoking continues well after cessation of substance use [20]. At the most recent interview, 80% of current problem substance users in NYC and 86% in Tri County reported smoking. Although measures of addiction are not included in this study, we may surmise that nicotine dependency may be more intractable for individuals who abuse alcohol and other substances than for individuals who have achieved sobriety [21, 22]. Study findings also indicate that current problem substance use is associated with lower quit rates and higher relapse rates. Unstable housing is also associated with elevated rates of current smoking. Among participants experiencing recent homelessness, 72% in NYC and 82% in Tri-County reported current smoking. At the other extreme, foreign-born individuals have

<table>
<thead>
<tr>
<th>Housing Situation</th>
<th>Advice NYC</th>
<th>Advice Tri-County</th>
<th>Assistance NYC</th>
<th>Assistance Tri County</th>
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<tr>
<td>Stable</td>
<td>1</td>
<td>0.80 [0.35,1.86]</td>
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<td>0.85 [0.46,1.57]</td>
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<tr>
<td>Unstable</td>
<td>1.01 [0.56,1.61]</td>
<td>0.57 [0.17,1.92]</td>
<td>0.71+ [0.48,1.04]</td>
<td>3.67* [1.13,11.94]</td>
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<tr>
<td>Homeless</td>
<td>1.09 [0.93,1.29]</td>
<td>1.25 [0.83,1.90]</td>
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<td>1.25 [0.90,1.75]</td>
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</table>

<table>
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<tr>
<th>Access to Comprehensive Medical Care</th>
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<th>Assistance NYC</th>
<th>Assistance Tri County</th>
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<td>No</td>
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<td>1.09 [0.93,1.29]</td>
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<td>1.09 [0.94,1.25]</td>
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<tr>
<td>Yes</td>
<td>1.09 [0.93,1.29]</td>
<td>1.25 [0.83,1.90]</td>
<td>1</td>
<td>1.25 [0.90,1.75]</td>
</tr>
</tbody>
</table>

| N of Individuals | 493 | 314 | 439 | 278 |
| N of Observations | 1111 | 426 | 931 | 372 |

*p<.1 * p<.05, ** p<.01, ***p<.001
substantially lower rates of smoking than native-born cohort members. Among foreign-born individuals, 29% living in NYC and 21% living in Tri-County reported current smoking.

Quit attempt rates among study smokers (7%-14% in NYC; 6%-16% in Tri-County) are comparable to rates in the general population (6.2% in 2010) [23].

While relapse was high in the early rounds of interviews, quit attempts have tended to outpace relapse in later rounds of interviews. This suggests that the cohort is aging out of smoking, as is the pattern in the general population. Evidence remains of high rates of relapse among former smokers in the study cohorts, particularly when there is a history of substance use.

Advice regarding smoking cessation appears to be a routine part of medical care for smokers in our samples. 84% of smokers in the most recent NYC wave reported talking to their doctors about cessation. For the most recent Tri-County wave, the figure is almost 90% (see tables A-4a and A-4b). These results are somewhat higher than those in the general population, in which the percentage of smokers who report ever being advised to quit by a health professional varies from 48.3% [23] to 69% [24]. However, more concrete assistance with tobacco cessation extended to only around half of all smokers in our cohorts.

We were not able to detect a positive effect of either medical care provider advice or medical care provider assistance on quit rates in the CHAIN cohorts. This may be a reflection of limited observation or imperfect statistical controls, or there may be a distinct difference in the effectiveness or targeting of medical care provider advice within HIV-positive populations, as compared with the general population. A comprehensive review [25] suggests that, in general, medical care provider advice does have an effect on smoking cessation. Clearly, more detailed investigations are needed to gain a better understanding of how and to whom medical providers choose to give advice and assistance to stop smoking, among their HIV-positive patients.

Tobacco use among people living with HIV is associated with other behaviors in ways that may complicate cessation strategies for PLWHA. Smoking among people living with HIV is associated with illicit substance use [3, 26, 27], as well as with alcohol consumption [6, 26, 27]. Social networks are also of importance in designing cessation programs, as people living with HIV may have social support networks in which close to half of the individuals are also smokers [28, 29]. Furthermore, smoking cessation programs focused on people living with HIV may have to take into account the relationship between smoking, HAART, and body image [30].

There is increasing literature investigating the possibility and effectiveness of smoking cessation programs specifically for people living with HIV [11, 31, 32]. Timing may be of importance in such interventions, as people may be more motivated to change their behaviors in the period directly following a diagnosis of HIV [9]. The use of cell phone-based interventions may be appropriate for such groups, as cellphone usage is widely prevalent [33]. A cell phone-based intervention in Houston, in which participants were given a prepaid cell phone, a series of eight proactive counseling calls over 2 months, and access to a hotline, suggested that the group
receiving this constellation of support had a higher point prevalence abstinence rate than a control group receiving standard support [34].

Not all interventions that attempt to tailor smoking cessation programs specifically to people living with HIV show the same level of success, which may be due to the wide range of ways in which programs are tailored. For example, a randomized controlled trial conducted among 145 people recruited in the Bronx compared an intensive group-therapy intervention focused on people living with HIV (Positively Smoke Free) with standard care [35]. Both groups were offered three months of nicotine replacement therapy, and outcomes were biochemically confirmed. Assignment to the enhanced intervention was associated with increased odds of quitting. The enhanced intervention was also associated with significant decreases in daily cigarette consumption and with significant increases in self-efficacy and motivation to quit. A randomized controlled study of 444 individuals living with HIV in the northeast US demonstrated less effectiveness. It compared two smoking cessation programs: standard care plus nicotine replacement therapy; and intensive, motivationally-enhanced treatment plus nicotine replacement therapy specifically tailored to the needs of people living with HIV [36]. After six months of follow up, the enhanced treatment did not improve cessation rates beyond standard care.

Furthermore, many people living with HIV may not be seeking complete smoking cessation as an end goal of treatment. In one descriptive study of HIV-positive smokers enrolled in a smoking cessation clinical trial, less than half of the smokers in the program reported absolute abstinence as their end goal [28]. There may also be particular elements and aspects of interventions which are more appealing to people living with HIV. A San Francisco-based survey of 228 people living with HIV revealed that, of those who reported they were thinking about quitting, 82% expressed interest in a prescription for nicotine replacement medication, 69% expressed interest in group smoking cessation programs, and 56% reported that they would be interested in both [7]. Focus groups conducted in a Louisiana HIV outpatient clinic revealed themes that arise in discussions of smoking cessation with people living with HIV: a desire for increased and more specific information on the health effects of smoking as related to HIV status, difficulty in quitting, and the worry of an increased burden of medication represented by nicotine replacement therapy [37]. There is also room to tailor programs specifically to the needs of subgroups among people living with HIV, such as gay men [29].

Training for care providers is another element of encouraging smoking cessation among individuals living with HIV. In a study of New York State HIV/AIDS service providers in 2005-2007, less than half of the providers reported always assessing the tobacco use status and history of their clients [1]. Although medical providers were more likely to report tobacco cessation services, nearly 40% did not always assess smoking status. However, the study also suggested that 94% of providers questioned indicated that they would be very or somewhat willing to establish new smoking cessation programs.
As part of the Swiss HIV Cohort Study, a multicenter prospective observational study, one participating center implemented half a day of standardized training for physicians in the counseling and pharmacotherapy of smokers and a checklist for semi-annual documentation of counseling [38]. Participants at this center were more likely to stop smoking and had fewer relapses compared with the remaining locations that did not implement the intervention. Similarly, a pilot study of a smoking cessation program in NYC has suggested that educating service providers as to the specific cessation needs of people living with HIV may be as important as the type of services such providers offer [39].

In short, smoking is a major health hazard in study cohorts and remains at very high levels. Further effort needs to be devoted to developing and testing optimal interventions that target both the biological and social conditions that lie at the root of persistent smoking in the CHAIN cohort, as well as in people living with HIV/AIDS more generally.
APPENDIX TABLES

NOTE: Highlighted rows in the appendix tables signify that the N for the highlighted group was lower than 25. The results presented in such rows should therefore be interpreted with additional care.

Table A-1a – Smoking Categories by Round – NYC

<table>
<thead>
<tr>
<th></th>
<th>Round 1</th>
<th>Round 2</th>
<th>Round 3</th>
<th>Round 4</th>
<th>Round 5</th>
<th>Round 6</th>
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<tr>
<td>TOTAL N</td>
<td>693</td>
<td>548</td>
<td>481</td>
<td>400</td>
<td>584</td>
<td>645</td>
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<tr>
<td>Never Smokers</td>
<td>122</td>
<td>90</td>
<td>82</td>
<td>71</td>
<td>108</td>
<td>124</td>
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<tr>
<td></td>
<td>17.60%</td>
<td>16.42%</td>
<td>17.05%</td>
<td>17.75%</td>
<td>18.49%</td>
<td>19.28%</td>
</tr>
<tr>
<td>Former Smokers</td>
<td>154</td>
<td>124</td>
<td>104</td>
<td>106</td>
<td>164</td>
<td>186</td>
</tr>
<tr>
<td></td>
<td>22.22%</td>
<td>22.63%</td>
<td>21.62%</td>
<td>26.50%</td>
<td>28.08%</td>
<td>28.93%</td>
</tr>
<tr>
<td>Current Smokers</td>
<td>417</td>
<td>334</td>
<td>295</td>
<td>223</td>
<td>312</td>
<td>333</td>
</tr>
<tr>
<td></td>
<td>60.17%</td>
<td>60.95%</td>
<td>61.33%</td>
<td>55.75%</td>
<td>53.42%</td>
<td>51.79%</td>
</tr>
</tbody>
</table>

Table A-2a – Quit Rate by Round – NYC

<table>
<thead>
<tr>
<th>Round</th>
<th>Number of Smokers in Previous Round*</th>
<th>Number of Recent Quitters</th>
<th>Quit Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>324</td>
<td>23</td>
<td>0.07</td>
</tr>
<tr>
<td>3</td>
<td>279</td>
<td>20</td>
<td>0.07</td>
</tr>
<tr>
<td>4</td>
<td>227</td>
<td>23</td>
<td>0.10</td>
</tr>
<tr>
<td>5</td>
<td>194</td>
<td>27</td>
<td>0.14</td>
</tr>
<tr>
<td>6</td>
<td>268</td>
<td>34</td>
<td>0.13</td>
</tr>
</tbody>
</table>

*Only smokers in previous round that were interviewed in current round.

Table A-3a – Relapse Rate by Round – NYC

<table>
<thead>
<tr>
<th>Round</th>
<th>Number of Former Smokers in Previous Round*</th>
<th>Number of Relapsers</th>
<th>Relapse Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>134</td>
<td>33</td>
<td>0.25</td>
</tr>
<tr>
<td>3</td>
<td>102</td>
<td>22</td>
<td>0.22</td>
</tr>
<tr>
<td>4</td>
<td>90</td>
<td>11</td>
<td>0.12</td>
</tr>
<tr>
<td>5</td>
<td>97</td>
<td>15</td>
<td>0.15</td>
</tr>
<tr>
<td>6</td>
<td>145</td>
<td>27</td>
<td>0.19</td>
</tr>
</tbody>
</table>

*Only former smokers in previous round that were interviewed in current round.
Table A-4a – Reported Medical Advice and Assistance with Smoking Cessation among Current Smokers, Rounds 3-6 – New York

<table>
<thead>
<tr>
<th></th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL N</td>
<td>295</td>
<td>223</td>
<td>312</td>
<td>333</td>
</tr>
<tr>
<td>% Reported Talking to Doctor about Quitting Smoking</td>
<td>73.22%</td>
<td>75.34%</td>
<td>81.41%</td>
<td>84.08%</td>
</tr>
<tr>
<td>% Reported Doctor Provided Assistance to Quit / Referral Made</td>
<td>45.76%</td>
<td>48.43%</td>
<td>50.32%</td>
<td>49.85%</td>
</tr>
</tbody>
</table>
Table A-5a – Group Differences in Smoking Status at Round 6 Interviews (2008-2011) – NYC

<table>
<thead>
<tr>
<th></th>
<th>Never Smokers</th>
<th>Former Smokers</th>
<th>Current Smokers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOTAL N</strong></td>
<td>124</td>
<td>186</td>
<td>333</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19-39</td>
<td>35.38%</td>
<td>10.77%</td>
<td>53.85%</td>
</tr>
<tr>
<td>40-49</td>
<td>20.58%</td>
<td>20.16%</td>
<td>59.26%</td>
</tr>
<tr>
<td>50+</td>
<td>15.13%</td>
<td>38.58%</td>
<td>45.70%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>15.85%</td>
<td>31.42%</td>
<td>52.46%</td>
</tr>
<tr>
<td>Female</td>
<td>23.66%</td>
<td>25.45%</td>
<td>50.54%</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>20.69%</td>
<td>31.03%</td>
<td>48.28%</td>
</tr>
<tr>
<td>Black</td>
<td>16.57%</td>
<td>28.18%</td>
<td>54.70%</td>
</tr>
<tr>
<td>Latino</td>
<td>22.86%</td>
<td>29.52%</td>
<td>47.62%</td>
</tr>
<tr>
<td>Other</td>
<td>26.67%</td>
<td>26.67%</td>
<td>46.67%</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than High School</td>
<td>14.92%</td>
<td>30.16%</td>
<td>54.29%</td>
</tr>
<tr>
<td>High School</td>
<td>23.38%</td>
<td>23.38%</td>
<td>52.25%</td>
</tr>
<tr>
<td>More than High School</td>
<td>22.99%</td>
<td>31.03%</td>
<td>45.98%</td>
</tr>
<tr>
<td><strong>Borough</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bronx</td>
<td>14.88%</td>
<td>30.36%</td>
<td>53.57%</td>
</tr>
<tr>
<td>Brooklyn</td>
<td>23.33%</td>
<td>27.14%</td>
<td>49.52%</td>
</tr>
<tr>
<td>Manhattan</td>
<td>18.42%</td>
<td>33.55%</td>
<td>48.03%</td>
</tr>
<tr>
<td>Queens</td>
<td>23.29%</td>
<td>30.14%</td>
<td>46.58%</td>
</tr>
<tr>
<td>Staten Island</td>
<td>12.20%</td>
<td>9.76%</td>
<td>78.05%</td>
</tr>
<tr>
<td><strong>Problem Substance Use</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>46.01%</td>
<td>22.54%</td>
<td>31.46%</td>
</tr>
<tr>
<td>Past</td>
<td>6.44%</td>
<td>37.73%</td>
<td>55.52%</td>
</tr>
<tr>
<td>Current</td>
<td>4.72%</td>
<td>14.15%</td>
<td>80.19%</td>
</tr>
<tr>
<td><strong>Housing Stability</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stable</td>
<td>20.15%</td>
<td>31.32%</td>
<td>48.35%</td>
</tr>
<tr>
<td>Unstable</td>
<td>19.23%</td>
<td>13.46%</td>
<td>67.31%</td>
</tr>
<tr>
<td>Homeless</td>
<td>8.51%</td>
<td>17.02%</td>
<td>72.34%</td>
</tr>
<tr>
<td><strong>Access to Comprehensive Medical Care</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>19.82%</td>
<td>30.07%</td>
<td>49.89%</td>
</tr>
<tr>
<td>No</td>
<td>17.86%</td>
<td>26.02%</td>
<td>55.61%</td>
</tr>
<tr>
<td><strong>Mental Health</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCS&lt;=37.0</td>
<td>20.95%</td>
<td>20.95%</td>
<td>58.11%</td>
</tr>
<tr>
<td>MCS&gt;37</td>
<td>18.71%</td>
<td>31.19%</td>
<td>49.70%</td>
</tr>
<tr>
<td><strong>Place of Birth</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>US</td>
<td>14.40%</td>
<td>29.01%</td>
<td>56.19%</td>
</tr>
<tr>
<td>Puerto Rico</td>
<td>16.98%</td>
<td>32.08%</td>
<td>50.94%</td>
</tr>
<tr>
<td>Other</td>
<td>44.44%</td>
<td>26.26%</td>
<td>29.29%</td>
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</table>
Table A-6a – Group Differences in Reported Medical Advice and Assistance with Smoking Cessation, among Current Smokers, Round 6 – NYC

<table>
<thead>
<tr>
<th></th>
<th>% Reported Talking to Doctor about Quitting Smoking</th>
<th>% Reported Doctor Provided Assistance to Quit / Referral Made</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL N</td>
<td>333</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19-39</td>
<td>74.29%</td>
<td>42.86%</td>
</tr>
<tr>
<td>40-49</td>
<td>80.56%</td>
<td>47.22%</td>
</tr>
<tr>
<td>50+</td>
<td>89.61%</td>
<td>53.90%</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>83.85%</td>
<td>50.00%</td>
</tr>
<tr>
<td>Female</td>
<td>84.40%</td>
<td>49.65%</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>89.29%</td>
<td>50.00%</td>
</tr>
<tr>
<td>Black</td>
<td>83.84%</td>
<td>50.00%</td>
</tr>
<tr>
<td>Latino</td>
<td>84.00%</td>
<td>50.00%</td>
</tr>
<tr>
<td>Other</td>
<td>71.43%</td>
<td>42.86%</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than High School</td>
<td>85.51%</td>
<td>54.53%</td>
</tr>
<tr>
<td>High School</td>
<td>82.67%</td>
<td>45.33%</td>
</tr>
<tr>
<td>More than High School</td>
<td>84.44%</td>
<td>51.11%</td>
</tr>
<tr>
<td>Borough</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bronx</td>
<td>84.44%</td>
<td>52.55%</td>
</tr>
<tr>
<td>Brooklyn</td>
<td>88.46%</td>
<td>50.96%</td>
</tr>
<tr>
<td>Manhattan</td>
<td>82.19%</td>
<td>52.05%</td>
</tr>
<tr>
<td>Queens</td>
<td>73.53%</td>
<td>32.35%</td>
</tr>
<tr>
<td>Staten Island</td>
<td>84.38%</td>
<td>53.13%</td>
</tr>
<tr>
<td>Problem Substance Use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>82.09%</td>
<td>46.27%</td>
</tr>
<tr>
<td>Past</td>
<td>83.48%</td>
<td>53.04%</td>
</tr>
<tr>
<td>Current</td>
<td>87.06%</td>
<td>45.88%</td>
</tr>
<tr>
<td>Housing Stability</td>
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<tr>
<td>Stable</td>
<td>84.47%</td>
<td>52.65%</td>
</tr>
<tr>
<td>Unstable</td>
<td>80.00%</td>
<td>31.43%</td>
</tr>
<tr>
<td>Homeless</td>
<td>85.29%</td>
<td>47.06%</td>
</tr>
<tr>
<td>Access to Comprehensive Medical Care</td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>85.27%</td>
<td>49.55%</td>
</tr>
<tr>
<td>No</td>
<td>83.33%</td>
<td>51.96%</td>
</tr>
<tr>
<td>Mental Health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCS&lt;=37</td>
<td>84.88%</td>
<td>53.49%</td>
</tr>
<tr>
<td>MCS&gt;37</td>
<td>83.81%</td>
<td>48.58%</td>
</tr>
<tr>
<td>Place of Birth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>US</td>
<td>84.15%</td>
<td>50.19%</td>
</tr>
</tbody>
</table>
### Puerto Rico and Other

<table>
<thead>
<tr>
<th></th>
<th>Puerto Rico</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>92.59%</td>
<td>72.41%</td>
</tr>
<tr>
<td></td>
<td>70.37%</td>
<td>27.59%</td>
</tr>
</tbody>
</table>
### Table A-1b – Smoking Categories by Round – Tri-County

<table>
<thead>
<tr>
<th>Total N</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never Smokers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>398</td>
<td>315</td>
<td>338</td>
<td>234</td>
<td>302</td>
<td>251</td>
</tr>
<tr>
<td>%</td>
<td>18.39%</td>
<td>18.41%</td>
<td>20.54%</td>
<td>18.38%</td>
<td>22.46%</td>
<td>18.33%</td>
</tr>
<tr>
<td>Former Smokers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>239</td>
<td>194</td>
<td>198</td>
<td>129</td>
<td>157</td>
<td>145</td>
</tr>
<tr>
<td>%</td>
<td>60.2%</td>
<td>61.59%</td>
<td>58.93%</td>
<td>55.13%</td>
<td>55.09%</td>
<td>57.77%</td>
</tr>
</tbody>
</table>

### Table A-2b – Quit Rate by Round – Tri-County

<table>
<thead>
<tr>
<th>Round</th>
<th>Number of Current Smokers in Previous Round*</th>
<th>Number of Quitters</th>
<th>Quit Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>187</td>
<td>11</td>
<td>0.06</td>
</tr>
<tr>
<td>3</td>
<td>151</td>
<td>15</td>
<td>0.10</td>
</tr>
<tr>
<td>4</td>
<td>135</td>
<td>17</td>
<td>0.13</td>
</tr>
<tr>
<td>5</td>
<td>51</td>
<td>8</td>
<td>0.16</td>
</tr>
<tr>
<td>6</td>
<td>60</td>
<td>7</td>
<td>0.12</td>
</tr>
</tbody>
</table>

*Only smokers in previous round that were interviewed in current round.

### Table A-3b – Relapse Rate by Round – Tri-County

<table>
<thead>
<tr>
<th>Round</th>
<th>Number of Former Smokers in Previous Round*</th>
<th>Number of Relapsers</th>
<th>Relapse Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>70</td>
<td>18</td>
<td>0.26</td>
</tr>
<tr>
<td>3</td>
<td>51</td>
<td>12</td>
<td>0.23</td>
</tr>
<tr>
<td>4</td>
<td>49</td>
<td>5</td>
<td>0.10</td>
</tr>
<tr>
<td>5</td>
<td>20</td>
<td>6</td>
<td>0.30</td>
</tr>
<tr>
<td>6</td>
<td>27</td>
<td>7</td>
<td>0.26</td>
</tr>
</tbody>
</table>

*Only former smokers in previous round that were interviewed in current round.
Table A-4b – Medical Advice and Assistance with Smoking Cessation among Current Smokers, Rounds 4-6 – Tri-County

<table>
<thead>
<tr>
<th></th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL N</td>
<td>129</td>
<td>157</td>
<td>145</td>
</tr>
<tr>
<td>% Reported Talking to Doctor about Quitting Smoking</td>
<td>81.40%</td>
<td>87.90%</td>
<td>89.66%</td>
</tr>
<tr>
<td>% Reported Doctor Provided Assistance to Quit / Referral Made</td>
<td>41.86%</td>
<td>45.22%</td>
<td>53.79%</td>
</tr>
</tbody>
</table>
### Table A-5b – Group Differences in Smoking Categories in Round 6 – Tri-County

<table>
<thead>
<tr>
<th></th>
<th>Never Smokers</th>
<th>Former Smokers</th>
<th>Current Smokers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOTAL N</strong></td>
<td>46</td>
<td>60</td>
<td>145</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19-39</td>
<td>39.02%</td>
<td>14.63%</td>
<td>46.34%</td>
</tr>
<tr>
<td>40-49</td>
<td>16.25%</td>
<td>21.25%</td>
<td>62.50%</td>
</tr>
<tr>
<td>50+</td>
<td>13.08%</td>
<td>28.46%</td>
<td>58.46%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>20.56%</td>
<td>21.50%</td>
<td>57.94%</td>
</tr>
<tr>
<td>Female</td>
<td>16.67%</td>
<td>25.69%</td>
<td>57.64%</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>2.94%</td>
<td>41.18%</td>
<td>55.88%</td>
</tr>
<tr>
<td>Black</td>
<td>19.42%</td>
<td>20.14%</td>
<td>60.43%</td>
</tr>
<tr>
<td>Latino</td>
<td>24.29%</td>
<td>21.43%</td>
<td>54.29%</td>
</tr>
<tr>
<td>Other</td>
<td>12.50%</td>
<td>37.50%</td>
<td>50.00%</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than High School</td>
<td>13.68%</td>
<td>20.51%</td>
<td>65.81%</td>
</tr>
<tr>
<td>High School</td>
<td>18.64%</td>
<td>32.20%</td>
<td>49.15%</td>
</tr>
<tr>
<td>More than High School</td>
<td>25.68%</td>
<td>22.97%</td>
<td>51.35%</td>
</tr>
<tr>
<td><strong>County</strong></td>
<td></td>
<td></td>
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<td>23.04%</td>
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<tr>
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<td>26.32%</td>
<td>21.05%</td>
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### Table A-6b – Group Differences in Reported Medical Advice and Assistance with Smoking Cessation, among Current Smokers, Round 6 – Tri-County

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<tr>
<th></th>
<th>% Reported Talking to Doctor about Quitting Smoking</th>
<th>% Reported Doctor Provided Assistance to Quit / Referral Made</th>
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<tr>
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<td>60.71%</td>
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<td>55.15%</td>
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<tr>
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Figure A-1 – Tobacco Use Categories at Most Recent Interview:

NYC:

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<tbody>
<tr>
<td>Never</td>
<td>19%</td>
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<tr>
<td>Former Smokers (without recent quitters)</td>
<td>24%</td>
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<tr>
<td>Recent Relapsers</td>
<td>4%</td>
</tr>
<tr>
<td>Recent quitters</td>
<td>5%</td>
</tr>
<tr>
<td>Current Smokers (without recent relapsers)</td>
<td>48%</td>
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</table>

TRI-COUNTY:

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Never</td>
<td>18%</td>
</tr>
<tr>
<td>Former Smokers (without recent quitters)</td>
<td>21%</td>
</tr>
<tr>
<td>Recent Relapsers</td>
<td>3%</td>
</tr>
<tr>
<td>Recent quitters</td>
<td>3%</td>
</tr>
<tr>
<td>Current Smokers (without recent relapsers)</td>
<td>55%</td>
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Bibliography:


