Alcohol, substance use and smoking associations with lipoatrophy and lipohypertrophy
For the Centers for AIDS Research Network of Integrated Clinical Systems (CNICS) Cohort

Background
- Lipoatrophy (LA) and lipohypertrophy (LH) have been associated with antiretroviral therapy, HIV itself, and demographic and lifestyle factors
- Few studies have examined the role of behavioral factors such as substance use and physical activity
- Behavioral factors such as substance abuse, physical activity, and smoking are likely correlated with each other. Discerning unique contributions will require considering them simultaneously
- Prior studies have been small, yielded conflicting findings, and did not distinguish LA and LH
- We conducted this study to examine the independent association between alcohol and substance use with LA and LH among a large and diverse nationally distributed cohort

Methods
- STUDY SUBJECTS: Adults who completed a clinical assessment of patient reported outcomes (PROs) as part of a clinical care visit before 11/2013. The assessment was integrated into care between 2006 & 2012 at 6 CNICS sites across the US
- DATA: The CNICS data repository captures comprehensive longitudinal clinical data including demographic, clinical, laboratory, medication, and socioeconomic data
- Patients used tablet PCs with touch screens to complete the clinical assessment every 4-6 months including measures of LA and LH (based on the Fat Redistribution and Metabolic Change [FRAM] instrument), smoking status, alcohol use, illicit drug use, and physical activity
- BODY MORPHOLOGY: FRAM items for individual body regions were coded on a 7-point scale. A LH score was calculated using all positive responses and a LA score was calculated using all negative responses. LA and LH were also categorized as none (0 points), mild (1-12 points), and moderate-to-severe (>12 points)
- ALCOHOL: We used an AUDIT-C score of ≥4 for men and ≥3 for women to define at-risk alcohol consumption
- SUBSTANCE USE: We used the ASSIST to assess current, prior or never use overall & for each of 4 drug classes: cocaine/crack, methamphetamine, opiates/heroin, marijuana
- STATISTICAL ANALYSES: We used generalized estimating equations with robust standard errors to assess differences in body morphology associated with alcohol, tobacco, and other substance use, while accounting for within-subject correlations between repeated measures
- We used ordinal logistic regression adjusting for repeated measures for categorical LA and LH

Results
- 7931 patients completed the clinical assessment 21,279 times
- Table 1 describes demographic and clinical characteristics at initial assessment by LA/LH
- Among all 21,279 assessments, no LA or LH was reported in 8,471 (40%), mild LA in 4301 (20%), mild LH in 7,123 (33%), moderate-to-severe LA was reported in 582 (3%), and moderate-to-severe LH was reported in 803 (4%) of assessments
- Older age, detectable viral load and high current CD4 cell counts were associated with more severe LA in adjusted analyses
- Older age, male sex, and higher current CD4 cell counts were associated with more severe LH in adjusted analyses
- Prior methamphetamine use, prior and current cocaine use and prior marijuana use were all associated with more severe LH
- These results support the conclusion that LA and LH are distinct. While lack of physical activity and higher CD4 counts are associated with both, associations with substance use and other clinical characteristics differed

Discussion/Conclusions
- We found a high prevalence of body morphology abnormalities: 60% of 7931 patients had at least some LA or LH
- Most abnormalities were mild, with only a small percentage reporting moderate-to-severe LA (3%) or LH (4%)
- Behavioral factors differed in their associations with LA and LH. Current cigarette smoking, marijuana use, and opiate use were all associated with more severe LA in adjusted analyses
- Prior methamphetamine, cocaine, and marijuana use and current cocaine use were associated with more severe LH
- These results may prove useful in counseling patients who wish to avoid body morphology changes and further our understanding of associations with these conditions and their possible mechanisms