

## Supplemental Appendix

**Table S1: Baseline characteristics**

Characteristic	Value
Demographics	
Male, %	69.9
Age [95% CI]	35.4 [34.6-36.2]
High school education, %	24.5
Married, %	44.6
Asset index [95% CI]	-0.05 [-0.23-0.13]
Employed	69.4%
Health	
Not on ART at baseline, %	54.1
Tobacco use, %	5.9
Problem or heavy drinking, %	9.0
Depressed, %	19.8
Incomplete viral suppression, %	42.0
Median pre ART CD4, cells/mm <sup>3</sup> [IQR]	137 [80.0-201.5]
Food insecurity status	
Any food insecurity, %	78.5
Severe food insecurity, %	39.3
Median HFIAS score [95% CI]	8.7 [8.0-9.4]

**Table S2: Sensitivity analyses**

Sensitivity analysis	Result
Categorical variable for food insecurity	<p>We ran additional models using a categorical variable for food insecurity to explore a possible dose response relationship between levels of food insecurity and our outcomes. The categorical variable for food insecurity compared food secure (reference category) to mildly, moderately, and severely food insecure participants.</p> <p><u>Non-adherence:</u> Severe food insecurity was associated with over 2-fold higher odds of ART non-adherence (AOR = 2.38; 95% CI 1.63-3.49; p&lt;0.001). Mild and moderate food insecurity were not significantly associated with higher odds of ART non-adherence.</p> <p><u>Incomplete viral suppression:</u> Moderate and severe food insecurity (but not mild food insecurity) were significantly associated with 49% (95% CI 1.12-1.98; p&lt;0.01) and 64% (95% CI 1.23-2.18; p&lt;0.001) higher odds of incomplete viral suppression, respectively, compared to no food insecurity, suggesting a dose response relationship.</p> <p><u>Low CD4 count:</u> All levels of food insecurity were significantly associated with higher odds of low CD4 cell count (adjusted odds ratios ranged from 41% to 55%; p&lt;0.05 for all levels); however, these were not ordered in magnitude, suggesting no dose-response relationship.</p>

Lagged explanatory variables for CD4 model	<p>To address the directionality of the association between food insecurity and low CD4 count, we estimated a model with a time lag in which the explanatory variables including both adherence and viral load suppression were lagged by three months relative to the outcome. In the lagged model of low CD4 count, the association of food insecurity with low CD4 cell count was attenuated but still statistically significant (AOR=1.25, 95% CI=1.02-1.52; p&lt;0.05). The association of food insecurity with low CD4 cell count was similar in lagged models that excluded adherence and VL suppression.</p> <p>For models with adherence and viral load suppression as the outcome, we did not estimate lagged models, as we hypothesized that impacts of food insecurity would occur concurrently based on previous qualitative studies with this and other populations.<sup>1</sup></p>
Controlling for duration of ART	<p>Given the non-linear relationship between duration of ART and CD4 cell count during the first year of ART, for models with low CD4 cell count as the outcome, we conducted an additional sensitivity analysis controlling for duration of ART as a potential confounder where we restricted the analysis to individuals receiving ART for ≥1 year. In adjusted analyses restricted to individuals receiving ART for at least one year (n=404) and controlling for duration of ART as a continuous variable, the association between low CD4 count and food insecurity was retained, though attenuated (AOR=1.22, 95% CI=1.00-1.48; p&lt;0.05). When adherence and viral suppression were added to the adjusted models, results were similar (AOR=1.23; 95% CI=0.99-1.51; p=0.06) (See Table S3).</p>

<sup>1</sup> a) Weiser SD, Tuller DM, Frongillo EA, Senkungu J, Mukiibi N, Bangsberg DR. Food insecurity as a barrier to sustained antiretroviral therapy adherence in Uganda. PLoS One 2010;5:e10340. b) Hardon AP, Akurut D, Comoro C, Ekezie C, Irunde HF, et al. (2007) Hunger, waiting time and transport costs: time to confront challenges to ART adherence in Africa. AIDS Care 19: 658-665. c) Kalofonos IA (2010) "All I Eat Is ARVs". Medical Anthropology Quarterly 24: 363-380

**Table S3: Factors associated with CD4 < 350 among ART clients in Uganda restricted to ART duration ≥ 1 year**

Characteristic	(1) Adjusted OR (95% CI)	(2) Adjusted OR (95% CI) with adherence and VL suppression
Any food insecurity	1.22 (1.00-1.48) *	1.23 (0.99-1.51) <sup>†</sup>
Age (per 10 years)	1.31 (1.16-1.48) ***	1.34 (1.18-1.52) ***
Male (vs female)	1.04 (1.02-1.07)***	1.05 (1.02-1.07)***
Less than high school education	1.50 (1.22-1.85)***	1.41 (1.13-1.77)**
Employed		

Asset index (continuous)		
Married	1.32 (1.09-1.60)**	1.44 (1.17-1.77)***
Problem drinking		
Tobacco use, past 30 days	0.51 (0.30-0.86)*	0.51 (0.29-0.89)*
ART duration, years	0.47 (0.42-0.52) ***	0.45 (0.40-0.51) ***
Pre ART CD4 per 100	0.31 (0.28-0.35) ***	0.30 (0.27-0.35)***
VL<400		1.51 (0.97-2.36)
Adherence < 90%		1.54 (0.98-2.40)

\*\*\* p<0.001 \*\* p<0.01 \* p<0.05

<sup>†</sup> p = 0.06

Column (1) shows results from a regression model of food insecurity on CD4<350 adjusting for ART duration. Column (2) adds viral suppression and adherence to the model from column (1) to explore their role as potential mediators of the relationship between food insecurity and CD4<350.