

Food and Nutrition Services, HIV Medical Care, and Health Outcomes

Food security and good nutrition – access to sufficient and nutritious food - are essential for people living with HIV/AIDS (PLWH) to maintain an active and healthy life. The physiological consequences of inadequate nutrition for PLWH have long been recognized.² Evidence also supports the role of food insecurity as an important barrier to adherence to HIV care and antiretroviral treatment regimens, thus limiting the health benefits of treatment advances.³ There are public health consequences as well. The promise of universal treatment for HIV for improving the health of PLWH and curtailing continued transmission depends on timely and sustained engagement in care and treatment, and maintaining very low or undetectable viral load which limits the potential for forward transmission. However, multiple studies have shown that this is not accomplished for most persons living with HIV. There is substantial fall off at each stage of the “treatment cascade” from diagnosis, linkage to care, retention in care, adherence to treatment regimen, to viral suppression. In the U.S., barely half of all HIV infected persons are sustained in regular medical care, and only about a quarter achieve viral suppression.⁴ Integrating effective food and nutrition services into HIV treatment programs is essential for the health and quality of life of infected persons, but also to achieve treatment as prevention goals and the promise of ending the AIDS epidemic in the U.S. and globally.

This Fact Sheet is the third in a series of studies of food and nutrition service needs, use of food and nutrition services, and outcomes associated with food insecurity among representative samples of adults living with HIV in New York City and the northern suburban region of Westchester, Putnam, and Rockland counties.

Key Research Findings

- **Food insecurity is widespread among PLWH**
- **PLWH who are food insecure have multiple clinical and social service needs**
- **Poor diet among PLWH is much more common than healthy eating**
- **Food insecurity is associated with poor engagement with HIV care – missed appointments, lack of adherence to treatment**
- **Food insecure PLWH have more ER visits and inpatient stays**
- **Food insecurity is associated with poor health outcomes among PLWH**
- **More than half of all PLWH rely upon food programs to help meet their basic needs**
- **Effective food and nutrition services improves retention in HIV care, adherent ART use, and health outcomes**
- **Incorporating effective food and nutrition services as critical components of HIV care would improve health, advance HIV prevention goals, and achieve medical cost savings**

METHODOLOGY

- Data for analysis were provided by an ongoing study of persons living with HIV/AIDS in the New York City area, the Community Health & Information Network (CHAIN) Project.¹
- The sample was designed to be broadly representative of the HIV-positive population who are receiving medical and/or social services in either New York City or in the northern Tri-County suburban area.
- This report is based on data from over 1000 HIV-positive adults who were interviewed in 2003-2012. Overtime analyses are based on the NYC cohort only, interviewed every 12-18 months. Rates of follow-up are over 80% for each interview period.
- Study participants answered a series of questions about their food and diet experiences, need for services and use of services
- Food insecurity was measured based upon standardized indicators of food insecurity (e.g. not having enough money for food, going an entire day without eating anything at all etc.) as well as self-reported need for assistance with obtaining food or meals.

Table 1. Indicators of Food Insecurity and Poor Diet among PLWH¹

	NYC	Tri-Co	Total
(n=)	(702)	(396)	(1098)
Indicators of food insecurity <ul style="list-style-type: none"> • Not enough money for food • At least sometimes not enough to eat • Didn't have anything to eat for a whole day OR • Report problems or need for services regarding food, groceries or meals 	42%	43%	42%
Poor dietary pattern <ul style="list-style-type: none"> • Less than one serving fruits or vegetables per day • Sweet or salty snacks more than two times per day OR • Meals at fast food restaurant three or more times /week 	71%	63%	69%

1. New York City and Tri-County study participants interviewed in 2008-2011

Food insecurity is widespread among persons living with HIV/AIDS

Using standard measures of food insecurity, more than two of every five (42%) study participants in both NYC and Tri-County currently experience food insecurity, rates 2-3 times as high as among the general adult population in New York.⁵ At most recent interview, they reported not having enough money for food that they or their family need, describe their food situation as sometimes or more often not having enough to eat, answer that they have gone a whole day without anything at all to eat in the past 30 days, or report a continuing need for assistance regarding food or meals (Table 1).

Over 80% of the NYC continuing cohort has been food insecure at one or more times during a 6-year study period. More than half have been food insecure at more than one assessment, conducted approximately every 12- 18 months. The most common pattern appears to be multiple episodes of food insecurity prior to resolution of need for food or meal assistance. However, substantial numbers cycle between episodes of security and insecurity.⁶

Poor dietary practices are much more common than healthy eating

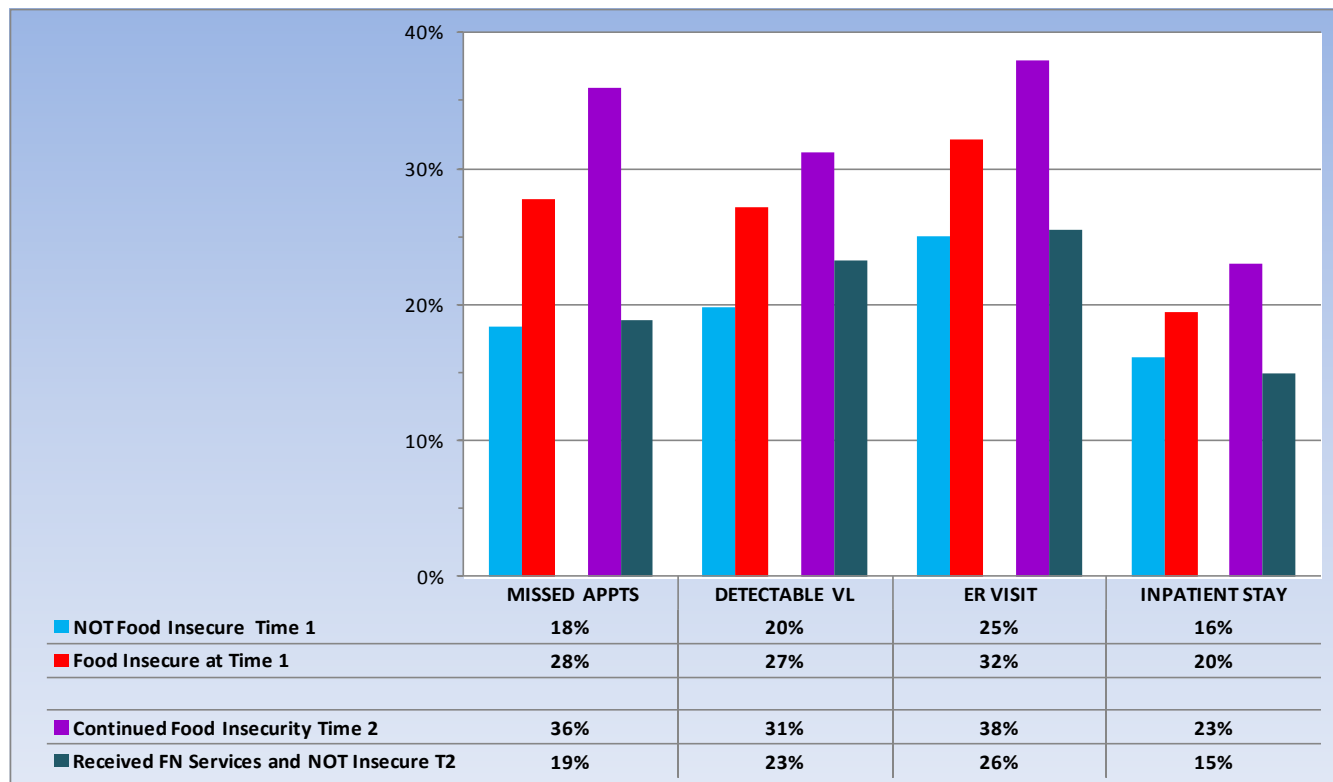
Dietary patterns are poor among the entire study sample of PLWH. Almost half of all study participants (46%) report eating less than one serving of fruit or vegetables or juice per day. Sugary (candy, cookies) or salty (chips, crackers) snacks are consumed more often, an average of two serving a day. Approximately 40% eat at fast food restaurants more than three times per week and 15% regularly have at least one meal per day at MacDonal'd's, Burger King, Taco Bell or other low cost, fast food venues. Fewer than 5% of the sample met established criteria for good diet and nutritional intake. We created a composite indicator of more adequate and less adequate or 'poor' diet indicated by less than one serving of fruit or vegetables per day, or sugary or salty snacks more than two times each day, or three or more meals per week at fast food restaurants. The great majority of all CHAIN study participants, 69%, fall in the poor diet category (Table 1). Consistent with other research, there is a strong association between food insecurity and diet; 80% of PLWH who are food insecure have a very poor diet.

PLWH who are food insecure have multiple needs

Food insecurity and poor diet are no less common among PLWH who have diet sensitive health comorbidities; over 80% report unhealthy BMI (>25.0 or <18.5) or hypertension, CVD, heart problems, high cholesterol, kidney disease, wasting syndrome, diarrhea for a month or more. Rates of food insecurity are high among persons with unmet need for treatment for behavioral health problems (mental illness, substance abuse). PLWH who are food insecure experience multiple forms of economic hardship. Food insecurity is strongly associated with housing insecurity among HIV positive persons as well as among others with chronic illness.⁷ One-third (33%) of study participants who were food insecure were homeless or unstably housed or at risk of housing loss; 40% reported not enough money to pay utility bills. Transportation needs were high among food insecure PLWH in both NYC and in the suburban counties. Hardship indicators are twice to three times as high comparing food insecure vs. food secure PLWH.

Most HIV positive persons who are food insecure have multiple complex vulnerabilities and an inability to meet basic subsistence needs, which contributes to both poor engagement with HIV care as well as compromised quality of life and poor health outcomes.

Figure 1. Food Insecurity, Food & Nutrition Services, and Change in Outcomes Over Time



Food insecurity is associated with poor engagement with HIV care

Both cross-sectional and over time analyses of the CHAIN data show that PLWH who are food insecure report more missed appointments for HIV primary care, an indicator of poor engagement with care and independently associated with poor health outcomes. The food insecure are less likely to be receiving medical care that meets minimum clinical practice standards with regard to number of recommended visits, tests to monitor HIV disease, and antiretroviral medication therapies as indicated. They are less likely to be on ART and those who are on ART are less likely to be adherent to treatment regimen. Not uncommon among persons with HIV disease who are less than fully engaged in HIV care and treatment, rates of emergency room visits and hospital inpatient admissions are higher among those who are food insecure compared to similar PLWH who do not report difficulties obtaining enough and appropriate food.⁸

Food insecurity is associated with poor health outcomes among PLWH

There is increasing evidence that food insecurity is associated with poor clinical and functional health outcomes among persons living with HIV in the U.S. and other high resource countries.⁹ Among the CHAIN study cohort, the food insecure are significantly less likely score high on standardized measures of good mental health and physical health functioning and quality of life, and more likely to have a detectable viral load, and a viral load count above 10,000 copies/ml. Food insecurity is independently associated with medical care and health outcomes in analyses controlling for a range of socio-demographic variables, housing status and area of residence, mental health and substance abuse co-morbidities, receipt of case management, medical care, and ART medications. Food insecurity has implications for program cost effectiveness. Due to worse clinical and functional health and higher morbidity, client health-care needs increase, and ER and inpatient care is more likely.¹⁰

Effective food and nutrition services improves engagement with HIV care and health outcomes

More than half of PLWH interviewed receive services from a food or nutrition program in the form of meals provided in a group setting, meals delivered to the home, a food voucher or a grocery bag from a food pantry, or some other help with food or meals. However, few programs address all needs and substantial proportions of PLWH who have accessed food and nutrition services continue to be food insecure.¹¹ Nonetheless, over time analysis shows that 20-25% of formerly food insecure individuals who access services are no longer food insecure by the next interview period. Very few (<5%) resolve food insecurity without food assistance. We conducted a series of longitudinal analyses, examining outcomes among PLWH who are food insecure at one interview and receive food and nutrition services and are not insecure by the next interview (referred to here as receiving ‘effective’ food/nutrition services), compared to those who continue to be food insecure. Figure 1 (above) shows some of these relationships.

The general pattern is very clear: food insecurity is associated with worse medical care and health outcomes; and continuing food insecurity is even more strongly associated with poor outcomes – missed medical appointments for HIV, having a detectable viral load, and using high cost emergency room and hospital inpatient services. However, formerly food insecure PLWH who receive food /nutrition services and are no longer food insecure, are at much lower risk for these negative outcomes. For example, 28% of PLWH who were food insecure at one interview period reported missing two or more scheduled appointments for HIV care in the six months prior to interview. If these same persons received food/nutrition services and by the next interview were no longer food insecure, only 19% missed two or more appointments. In contrast, among those who continued experiencing food insecurity, almost twice as many, 36%, reported missing multiple appointments.

Table 2. presents results of a series of statistical analyses, looking across interview periods. Each interview with each CHAIN study participant constituted an opportunity to examine the relationship between food insecurity and receipt of food and nutrition services for each of the medical care and health outcomes. Each model examines predictors of the outcome at Time 2 among respondents who were food insecure at the prior interview (Time 1), controlling for a range of individual characteristics, other needs and services received. Numbers shown in Table 2 are the odds for each outcome – e.g. missing multiple appointments - among PLWH who had been food insecure at one interview, received services and then were no longer food insecure by the next interview, compared to PLWH who continued to experience food insecurity. The analyses control for other factors known to be associated with HIV outcomes.

We found that the odds of missing multiple appointments are one fourth as high (AOR 0.26) for food insecure PLWH who received effective food and nutrition services, as for those who continued to be food insecure, and the odds of an ER visit or inpatient stay are about half as high. When we consider positive outcomes – adherent ART use, viral suppression, and good physical functioning, the odds of good outcomes are much higher for formerly food insecure PLWH who receive effective food and nutrition services. Taking ART medications is the strongest predictor of suppressed viral load. However, in other analyses we found that food insecurity appears to be a barrier to achieving or sustaining viral suppression by reducing the likelihood that food insecure PLWHs will be taking ART medications, as well as reducing adherence among those on a prescribed regimen.

Conclusion

Food insecurity and nutritional needs are widespread among adults living with HIV, and highest among PLWH with multiple complex needs. While use of food and meal services is high, available resources do not appear to be sufficient to address needs. Given the increasing costs to PLWHA of purchasing healthy food and the challenges faced by providers to secure funding for food and other supportive services, unmet need for food and nutrition services is expected to grow.¹² Not only CHAIN but other research has provided strong evidence that food insecurity and poor nutrition pose barriers to HIV treatment and care and are associated with worse clinical outcomes for PLWH. On the other hand, effective food and nutrition services, services associated directly or indirectly with resolving food insecurity and improving nutrition, can make a substantial difference in both engagement with care and health outcomes. Food and nutrition programs may improve outcomes for PLWH directly by addressing nutritional needs and improving absorption and efficacy of ART well as indirectly by reducing stress and barriers to care associated with competing subsistence priorities, and/or by providing health education and service linkages facilitating access and engagement with medical care. Effective food and nutrition services contribute to improved treatment outcomes for individuals and, since treatment effectiveness reduces forward transmission, achieves HIV prevention goals as well. Healthy and active PLWH save health care costs. Evidence supports integrating medically informed food and nutrition support as a critical component of HIV care, consistent with “food is medicine” initiatives.

HIV Food &
Nutrition Study

ADVISORY GROUP MEMBERS

Karen Pearl, Chair
*God's Love We
Deliver*

Maria Caban
BOOM!Health

Carlos Guevarra
CAMBA

Robert Maher
Touch, Inc

Miriam Rabban
Bronx Works

Robert Steptoe
ACQC

Michelle Gassama
Project Hospitality

Dorella Walters
*God's Love We
Deliver*

Alissa Wassung
*God's Love We
Deliver*

Jan Zimmerman
*Village Care &
Momentum*

—————
Tam Ho
Erin Eriksson
*M*A*C
AIDS Fund*
—————

COLUMBIA UNIVERSITY

Angela Aidala
Casey Castro
Haydee Cespedes
Yoav Vardy
Maiko Yomogida

Table 2. Receipt of ‘Effective’ Food and Nutrition Services¹ and HIV Medical Care and Health Outcomes among formerly Food Insecure Persons Living with HIV/AIDS

	Missed Appoint'mts ²	Adherent ART Use ³	ER Visit past 6mos	Inpatient Stay	Good Health QOL ⁴	Undetectable Viral Load ⁵
	AOR	AOR	AOR	AOR	AOR	AOR
FOOD & NUTRITION SERVICES						
Effective food & nutrition services¹	0.32*	1.82*	0.55*	0.53*	2.73*	1.29
Resolved food insecurity w/o services	0.46	1.59	0.48	0.20	1.73	0.623
Socio-demographics						
Age ⁶	0.99	1.04*	0.99	0.98	0.94*	1.05*
Gender: Female	2.56*	0.64#	2.04*	2.13*	0.28*	0.74
Race/Ethnicity: Black ⁷	0.67	0.96	0.56*	0.56	3.40*	1.03
Race/Ethnicity: Latino ⁷	0.86	0.94	0.65	0.78	1.67	1.36
Income below poverty line	1.67#	0.95	1.43#	1.08	1.25	0.88
Stably housed ⁸	1.18	1.26	0.87	0.52#	1.03	0.79
Behavioral Health Challenges						
Low mental health ⁹	0.65#	1.09	1.01	2.25*	0.36*	1.22
History of problem drug use ¹⁰	1.70#	0.74	1.28	1.31	0.89	0.48*
Current problem drug use ¹⁰	4.19*	0.26*	1.56#	1.97#	0.44#	0.14*
Services Received						
Antiretroviral Treatment	0.91	Na	0.87	0.96	0.63	3.67*
Medical Case Management ¹¹	0.48*	1.23	0.97	1.19	0.45*	0.99
Social Services Case Management ¹²	1.02	1.53#	1.63*	1.20	0.63	0.84

Note: AOR = adjusted odds ratio; * p < .05 Logistic regression equations using random effects procedure to adjust for the dependency among multiple observations contributed by the same individual. N=833 individuals interviewed 2+ times, 2003-2013 in NYC. Analysis based on 444 NYC respondents who were food insecure at one or more interview periods, 806 observation points.

1. All models examine receipt of effective FNS services (associated with resolution of food insecurity) and other predictors of each outcome among respondents who food insecure at the previous interview.
2. Missed two or more scheduled appointment for HIV medical care in the six months prior to interview.
3. Prescribed ART and adherent to treatment regimen v. no ART or nonadherent.
4. Score ≥ 50 on the MOS-SF12v2 Physical Component Summary Score, the mean population score indicating average or ‘good’ physical health functioning and well-being (Ware et al. 2007. User's Manual for the SF-12v2 Health Survey. Lincoln, RI: QualityMetric Inc.).
5. Self-report viral load as ‘undetectable’ or below 400 (Messeri et al. 2013. Validating Self-Reported HIV Test Results Using Surveillance Registry Data. CHAIN Report 2012-8).
6. Continuous variable, age 20-80 years.
7. Reference category = White/other
8. Stably housed – no experience past six month homeless (in a homeless shelter, single room occupancy or welfare hotel (SRO), street or public place not meant for sleeping) or unstable housing (in a temporary or transitional housing program, or temporarily doubled up in someone else's home).
9. Score > 42 on the on the MOS-SF12v2 Mental Component Summary Score, indicating clinically significant mental health symptoms of depression, anxiety, and/or impaired social functioning (Ware et al. 2007).
10. Current problem drug use indicated by use of heroin, cocaine, crack, or problem drinking within the six months prior to interview, or lifetime use but not within the prior six months.
11. Case manager has helped respondent get medical services, coordinate medical services, or referred to medical services
12. Case manager developed a care plan, helped get or referred to specific social services, coordinated social services, filled out forms for entitlements

This report was prepared by Angela Aidala with the assistance of Maiko Yomogida, Yoav Vardy and colleagues at Columbia University, in collaboration with the Advisory Group of HIV food and nutrition service providers listed, [and reviewed by the CHAIN Study Technical Review Team (TRT)] The ongoing CHAIN project has been supported by HRSA grant # HA00015. Funding for this report was provided by MAC AIDS Fund. The findings and recommendations in this presentation are solely the responsibility of the authors and do not necessarily represent the official views of HRSA, the MAC AIDS Fund, NYC DOHMH, or the CHAIN TRT.

Literature cited and other resources:

- ¹ For description of the CHAIN program of research see Health and Human Services Planning Council of New York website: http://www.nyhiv.com/data_chain.html
- ² World Health Organization (2005). *Nutrition and HIV/AIDS*. Geneva: World Health Organization; Fields-Gardner, C. and A. Campa (2010). Position of the American Dietetic Association: Nutrition Intervention and Human Immunodeficiency Virus Infection. *J Amer Dietetic Assoc* 110(7): 1105-1119.
- ³ Special Issue Supplement, *AIDS & Behavior* 18 (Suppl 5), October 2014. Adherence to HIV and TB care and treatment, the role of food security and nutrition. Issue editors Claros JM, dePee S, Bloem MW.
- ⁴ AIDS.gov (2013). *The HIV/AIDS Care Continuum*. Available at <http://aids.gov/federal-resources/policies/care-continuum/>.
- ⁵ Aidala AA, Yomogida M, and the HIV Food & Nutrition Study Team (2011). Fact Sheet #1: HIV/AIDS, Food & Nutrition Service Needs and Health Outcomes. Community Health Advisory Brief Report. Available at: New York Health & Human Services Planning Council, http://www.nyhiv.com/pdfs/chain/Food%20Need%20Medical%20Care_factsheet%20v8.pdf ; Coleman-Jensen A, Gregory C, Singh, A. (2014). Household Food Security in the United States in 2013, ERR-173, U.S. Department of Agriculture, Economic Research Service. Available at www.ers.usda.gov/publications/err-economic-research-report/err173.aspx
- ⁶ Aidala A, Yomogida M, Miller R, and the HIV Food & Nutrition Study Team (2013). Fact Sheet #2: Who Needs Food & Nutrition Services and Where Do They Go for Help? Community Health Advisory Brief Report. Available at: New York Health & Human Services Planning Council, http://www.nyhiv.com/pdfs/chain/Food%20Need%20Medical%20Care_factsheet%20v8.pdf
- ⁷ Seligman HK, Laraia BA, Kushel MB. (2010). Food insecurity is associated with chronic disease among low-income NHANES participants. *J Nutrition*, 140(2):304-10; Aidala et al. (2013) Fact Sheet #2.
- ⁸ Aidala et al. (2011). Fact Sheet #1. Aidala A A, et al. (2012). Food Insecurity, Medical Care, and Health Outcomes among PLWH in a High Resource Setting: The Importance of Food and Nutrition Services. Poster presented at the XIX International AIDS Conference Washington DC. Available at <http://pag.aids2012.org/EPosterHandler.axd?aid=20339>
- ⁹ Aidala A A, et al. (2011). Fact Sheet #1; McMahon J. et al. (2011). Poverty, Hunger, Education, and Residential Status Impact Survival in HIV. *AIDS & Behavior* 15(7): 1503–1511; Paton NI, Sangeetha S, Earnest A, Bellamy R. (2006). The impact of malnutrition on survival and the CD4 count response in HIV-infected patients starting antiretroviral therapy. *HIV Medicine*, 7(5):323-30; Aberman NL, Rawat R, Drimie S, et al. (2014). Food security and nutrition interventions in response to the AIDS epidemic: Assessing global action and evidence. *AIDS & Behavior*, 18 (Suppl 5) :554-65
- ¹⁰ See also: Weiser SD, Hatcher A, Frongillo EA, et al. (2013). Food insecurity is associated with greater acute care utilization among HIV-infected homeless and marginally housed individuals in San Francisco. *J Gen Intern Medicine*, 28(1):91-8.
- ¹² Pearl, Karen (2012). The Food As Medicine Advocacy Initiative: Using New Research to Secure Public Funding for Food and Nutrition Services for PLWH. Poster presented at the meetings of the American Public Health Association San Francisco, CA. <https://apha.conf-ex.com/apha/140am/webprogram/Paper270968.html> ; For summary of federal statistics on food insecurity in New York and results of a survey of food and nutrition providers see: NYC Coalition Against Hunger (2014). *Superstorm of Hunger: Lingering Shortfalls Expose a Tale of Two Food Cities*. Available at <https://nyccah.org/files/FINAL%20Hunger%20Survey%20Report%20Web%20Site.pdf>