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FOOD AND NUTRITION
TECHNICAL ASSISTANCE



USAID
FROM THE AMERICAN PEOPLE

Review of Kenya's Food by Prescription Program

July 2009

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This review is made possible by the generous support of the American people through the support of USAID/Kenya, the Office of HIV/AIDS and the Office of Health, Infectious Disease, and Nutrition, Bureau for Global Health, United States Agency for International Development (USAID), under terms of Cooperative Agreement No. GHN-A-00-08-00001-00, through the Food and Nutrition Technical Assistance II Project (FANTA-2), managed by FHI 360.

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Published July 2009

Recommended Citation:

Food and Nutrition Technical Assistance II Project (FANTA-2). *Review of Kenya's Food by Prescription Program*. Washington, DC: FANTA-2, FHI 360, 2009.

Contact information:

Food and Nutrition Technical Assistance II Project (FANTA-2)
FHI 360
1825 Connecticut Avenue, NW
Washington, D.C. 20009-5721
Tel: 202-884-8000
Fax: 202-884-8432
Email: fantamail@fhi360.org
Website: www.fantaproject.org

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Acknowledgements

The Food and Nutrition Technical Assistance II (FANTA-2) Project wishes to acknowledge all those who contributed to this review of the Food by Prescription Program. Coordination support for the review was provided by the head of NASCOP, Dr. I. Mohammed; the nutrition manager, Ms. R. Akelola; and subsequently by Ms. M. Wachira. FANTA-2 consultant D. Mwaniki managed the review and synthesized findings into the consolidated report. Quantitative and qualitative reviews were carried out by FANTA-2 consultants S. Oiyee and W. Onyango Ouma, respectively. A. Waruru provided assistance in preparing the consolidated report. Provincial nutrition officers and district nutrition officers coordinated facility visits and facility-level enquiries. R. Low, B. Njoroge and C. Michobo of Insta Products Ltd. provided insights into the food delivery system and food prescription. Input to the review findings were made by M. Maina of USAID/Kenya and by T. Castleman, E. Muyunda, R. Mwadime, A. Swindale and Esther Wamai of FANTA-2.

Acronyms

ACC	Administrative Committee on Coordination (United Nations)
AIDS	Acquired immune deficiency syndrome
ART	Antiretroviral therapy
BMI	Body mass index
CCC	Comprehensive Care Centre
CHW	Community health workers
CORPs	Community owned resource persons
CRS	Catholic Relief Services
EC	Exited client
FANTA-2	Food and Nutrition Technical Assistance II
FAO	Food and Agricultural Organization
FBF	Fortified blended flour
FBP	Food by Prescription
FGD	Focus group discussion
HFA	Height-for-age
HIV	Human immunodeficiency virus
HSB	Health-seeking behavior
KEBS	Kenya Bureau of Standards
KEMRI	Kenya Medical Research Institute
KEPH	Kenya Essential Package for Health
LOS	Length of stay
LOT	Length of treatment
LTF	Loss/lost to follow-up
MOH	Ministry of Health
MUAC	Mid-upper arm circumference
NASCOP	National AIDS and STI Control Programme
NHSSP	National Health Sector Strategic Plan
OI	Opportunistic infections
OVC	Orphans and vulnerable children
P/PP	Pregnant and postpartum
PEPFAR	President's Emergency Fund for AIDS Relief
PLHIV	People living with HIV/AIDS
PMTCT	Prevention of mother-to-child transmission
RDA	Recommended daily allowance
RUTF	Ready-to-use therapeutic food
SCN	Sub-Committee on Nutrition
USAID	United States Agency for International Development
VCT	Voluntary counseling and testing
WFA	Weight-for-age
WFH	Weight-for-height
WHO	World Health Organization

Definition of Terms

Ready-to-use therapeutic food	Food high in energy and protein with added vitamins and minerals, specifically designed to treat uncomplicated severe acute malnutrition (SAM) in outpatient and community therapeutic centers.
Ready-to-use supplementary food	Food high in energy and protein with added vitamins and minerals, specifically designed to treat moderate acute malnutrition in communities with limited access to appropriate diet.
Lost to follow-up	A client is lost to follow-up if he/she misses two or more consecutive monthly reviews and collection of prescribed food before graduation.
Graduation	Client discharge (exit) upon attaining exit anthropometric criteria, defined as BMI \geq 20 kg/m ² for adults, MUAC >24 cm for pregnant and postpartum mothers, and weight-for-age and/or weight-for-height \geq -1.0 z-score in children
Length of treatment	Total time that a client remained on prescribed food (active treatment) before he/she exited the FBP program (also called supplementation time)
Length of stay	Total time that a client remained in the FBP program before he/she exited, i.e. from enrolment to exit. It comprises length of treatment and the period on non-active treatment. It also includes periods of missed food supplementation and non-compliance.
Quality of life	Individual's perception of his/her position in life in the context of the culture and value systems in which he/she lives and in relation to his/her goals, expectations, standards and concerns.
Admission	Enrolment of eligible clients into the FBP program.
Re-admission	Enrolment of eligible clients who were previously discharged on attaining nutritional normalcy as per FBP program criteria.
Relapse	Weight loss in clients to the point of clinical malnutrition after recovery from a previous episode of clinical malnutrition.
Kenya Essential Package for Health	Range of health services and goods delivered at the six levels of care delivery, namely, community, dispensaries, health centers and maternity/nursing homes, primary hospitals, secondary hospitals, and tertiary hospitals.
Fortified blended foods	A mixture of cereals, legumes, vegetable oil and sugar that has been milled, blended and pre-cooked by extrusion or roasting and then fortified with a pre-mix of vitamins and minerals. It may contain dried skim milk.
Recommended daily allowance	The levels of intake of essential nutrients considered to be adequate to meet the known nutritional needs of healthy persons in each life-stage and gender group.
Orphans and vulnerable children	Children affected by HIV, including children orphaned or made vulnerable by HIV
Push system	A system in which product flow is based on a projected production plan. In a push environment, forecasts are used to predict what the production rates should be. Product demand is not considered.
Pull system	A system in which the flow of resources targets replacing only what has been consumed. The product flow is determined by its demand by the final consumer.

Executive Summary

BACKGROUND

The Kenya National HIV/AIDS Strategic Plan and the National Health Sector Strategic Plan (2005-2010) underlined the need to effectively address malnutrition among people living with HIV infection and those affected by the pandemic. In line with this position and with support from the President's Emergency Fund for AIDS Relief (PEPFAR), USAID/Kenya initiated a Food by Prescription (FBP) program in collaboration with the National AIDS and STI Control Programme (NAS COP) in the Ministry of Health (MOH), Insta Products Ltd. (Kenya). At the time of this review in November 2007, the program provided fortified blended flour (FBF) by prescription to malnourished adults living with HIV (PLHIV), HIV-positive pregnant and postpartum women (P/PP) and orphans and vulnerable children (OVC) who are either clinically malnourished or at risk of malnutrition. The program package also includes capacity strengthening of service providers, nutrition assessment and counseling, and provision of point-of-use water treatment to clients. The aim of this review was to better understand the operation and effectiveness of the program after 20-22 months of operations (quantitative data as of September 2007 and qualitative data collected in November 2007) and to obtain information about a number of key issues related to the program.

APPROACHES

The review was based on quantitative analysis of client data and qualitative assessments in 12 health facilities (sites) that were sampled from a pool of 55 FBP implementing sites. The sites were purposively sampled to include sites with more than six months of FBP service delivery experience, high client workload and geographic variation. Eligible clients received FBF prescriptions aimed at providing about 45 percent of clients' daily energy requirements, 50 percent to 78 percent of protein requirements, and approximately one recommended daily allowance of micronutrients. At the time of this review, the sampled facilities had enrolled 12,829 clients, or 52 percent of the total clients in the 55 FBP sites. These clients were composed of 6,917 (46 percent) PLHIV, 5,982 (42 percent) OVC and 1,765 (12 percent) P/PP. Detailed analysis was restricted to PLHIV FBP clients because PEPFAR guidance about uses of food is more rigorous for this group than for P/PP and OVC, and because key questions about this group had emerged. Data from eligible adult PLHIV who had exited the program after graduation at body mass index (BMI) ≥ 20 kg/m², experienced attrition, or were currently on supplementation (n=5364) were analyzed to understand the response to the program among these groups, in particular, BMI changes, length of treatment and attrition. Thirteen focus group discussions (FGDs) with clients and with health workers were conducted, as well as key informant interviews.

FINDINGS

The enrolled adult PLHIV consisted of 65 percent females and 35 percent males. Females were younger than males [32, (IQR 27, 40) years vs. 37, (IQR 31-45 years)], (p<0.001). The median BMI of eligible clients was 17.05 (IQR 15.81, 17.86) kg/m². There was no significant difference in BMI between females and males. Approximately one-half of these clients were mildly malnourished, and the remainder were almost equally divided between moderate and severe grades. The median CD4 count for pre-ART clients (n=1062) was higher than that of ART clients (n=1526), [210 (IQR 67,407) cells/ μ L vs. 134 (IQR 48, 244) cells/ μ L], (p<0.001). Nearly 9 percent more males than females had CD4 counts below 250 cells/ μ L (p<0.0001). This pattern was consistent with established delayed treatment-seeking behavior among males. Upon supplementation, 60.8 percent of the clients gained weight during the first month. In the second and third months, 55.1 percent and 53.8 percent gained weight, respectively. The corresponding median BMI increase was 0.4 (IQR -0.7, 1.2) kg/m², 0.3 (IQR -1.7, 1.06) kg/m² and 0.3 (-0.75, 0.78) kg/m² during the first, second and third month, respectively. Among severely and moderately malnourished clients, the ratio of those who gained weight to those who lost was approximately 2:1. Among the mildly malnourished, this ratio was close to unity.

On enrolment, the median BMI of clients who had exited the FBP program (exited clients [EC], n=3324) was 17.1 (IQR 15.8, 17.9) kg/m². The proportions of exited clients who enrolled with severe or moderate malnutrition were 24.3 percent and 28.7 percent in the ART and pre-ART groups, respectively. On average a decrease by one BMI unit was associated with a decrease in CD4 count of 28 (95 percent CI 21, 35) cells/ μ L, (p<0.001). The median number of monthly food prescriptions

issued to clients who graduated was three (IQR 3, 5). The corresponding average length of treatment (LOT) for these clients was 105 days and 99 days in the ART and pre-ART groups respectively. BMI at enrolment was significantly associated with LOT ($p=0.015$, $p<0.001$, respectively). For every unit increase in BMI, the LOT decreased by 20 (95 percent CI 9, 32) days. This indicates the likelihood of faster nutritional recovery among less severely malnourished clients. The median rates of BMI increase among clients who gained weight were 1.04 (IQR 0.57, 1.68) $\text{kg/m}^2/\text{month}$ of supplementation and 0.94 (IQR 0.59, 1.7) $\text{kg/m}^2/\text{month}$ of supplementation in the pre-ART and ART groups, respectively ($p=0.549$). Overall, corresponding median BMI increases were 3.3 (IQR 2.4, 4.3) kg/m^2 and 3.4 (IQR 2.6, 4.7) kg/m^2 among pre-ART and ART clients, respectively. In addition, males graduated more quickly than females ($p=0.002$). Qualitative assessment underlined possible differences in gender behaviors in adherence, with more women sharing the prescribed food than men. The findings from FGDs indicate that factors contributing to LOT are poor health status at enrolment, opportunistic infections, poor health-seeking behavior (HSB), poverty constraints to paying for travel and food, sharing of food, stigma, poor appetite, unusual taste of FBF porridge and lack of support at home.

Overall attrition due to loss to follow-up (LTF), deaths and transfers to other facilities among PLHIV accounted for 50.1 percent of the exited clients. LTF accounted for 98 percent of observed attrition. The proportion of all clients who are LTF ranged from 36 percent to 64 percent in different facilities. It occurred more commonly in pre-ART than ART clients (56 percent vs. 38.5 percent, $p<0.001$). The median LOT for pre-ART LTF clients was shorter than that of the ART LTF clients (0, IQR 0, 35 days vs. 14, IQR 0, 64 days), ($p<0.001$). The predictors of LTF were male gender, pre-ART status, severe malnutrition and enrolment in the first nine months of the program. The FGDs and key informant interviews identified migration, job transfers, poverty, employer restrictions, stigma and taste of porridge as key contributing factors to LTF. A significant proportion of the LTF may also be unreported deaths.

The majority of OVC (55.73 percent) were under 23 months old. In addition, 25.1 percent ($n=716$) of all malnourished OVC were on ART. The median weight-for-age (WFA) and weight-for-height (WFH) z-score for children at enrolment were -2.9 (IQR -3.9, -2.2) and -2.7 (IQR -3.6, -2.0), respectively. Applying <-3 z-scores as the cutoff, the proportions of severely underweight and wasted children were 47 percent and 39.4 percent, respectively. The median LOT for OVC on ART was longer than that of pre-ART OVC (5.2, IQR 3.3, 7.7 months vs. 3.8, IQR 2.1, 5.3 months) ($p=0.002$). LTF among OVC was estimated at 45.5 percent. The mean age of P/PP women was 27.2 (range 15-50) years, and 31.8 percent of them were on ART. In addition, 60.3 percent of the P/PP clients were pregnant. The median number of dispensed food prescriptions was one (IQR, 1-2), and LTF among reviewed sites was estimated at 59 percent.

From key informant interviews and site visits, several system-related challenges were identified. Nearly all facilities cited inadequate space for counselors and food storage as well as shortage of staff as challenges. Nutritionists were not available in some facilities, and most of the staff trained originally had left. The use of mobile telephones helped minimize the number of problems associated with push systems such as stock-outs and expiration of commodities, and where problems did occur was mainly in remote areas.

CONCLUSIONS AND RECOMMENDATIONS

For severely malnourished clients, the lower rate of recovery and greater risk of LTF underlined the need for more specialized services and products, including more nutrient dense food products (such as RUTF), greater follow-up of defaulters and steps to minimize stigma. Measures to address LTF and delayed graduation are also needed. Fuller integration of FBP services into care and treatment programs is required to facilitate routine and standardized delivery of services in comprehensive care centres (CCC). For example, the schedule of client FBP services should be aligned with ART provision schedules. Strengthening nutrition screening, assessment and counseling to ensure early detection of clinical malnutrition at health facilities and in communities is required for improved program effectiveness, including reduction of LTF. Finally, commodity management should be strengthened to fully establish a pull system.

1. Introduction

1.1 BACKGROUND

Malnutrition among people living with HIV (PLHIV) remains a major challenge to achieving the full impact of interventions aimed at improving their quality of life, productivity and survival. At its advent, HIV was commonly referred to as “slim disease,” underlining the presence of severe wasting. This terminology has persisted in local dialects in Kenya, suggesting the common occurrence of nutritional wasting. Reviews of service utilization data indicate that 15 percent to 65 percent of adults attending comprehensive care centres (CCCs) in public facilities in Kenya have body mass index (BMI) below 18.5 kg/m² (UNICEF; FBP program data). Among orphans and vulnerable children (OVC), it is estimated that 30 percent are underweight with weight-for-age (WFA) below -2 z-score. In addition, the rates of malnutrition among PLHIV appear to be relatively higher among clients residing in regions with poorer food security. Given that nutritional disorders start early in the disease progression, comprehensive nutrition interventions are increasingly being advocated as an adjunct to ART. The overarching goal of nutritional interventions is to prevent malnutrition and restore good nutritional status of malnourished PLHIV with a view to maintain their productivity and immune function capacities. These interventions also aim to improve adherence to treatment and potentially prolong the pre-ART stage.

The President's Emergency Plan for AIDS Relief (PEPFAR) is funding the Food by Prescription (FBP) program in Kenya that provides nutritional support to malnourished HIV-positive adults, pregnant and postpartum (P/PP) women and OVC. At the time of the review, the program was implemented by the National AIDS and STI Control Programme (NASCO) in the Ministry of Health (MOH) in collaboration with Insta Products Ltd., a Kenyan food manufacturing company. Given the lack of prior experience in implementing large-scale therapeutic interventions for PLHIV, the program was initially implemented on a pilot basis to support learning. The program began in January 2006 and the first phase ended in 2008, when an expanded program began. With increasing demand for scale-up of the FBP program within Kenya and replication elsewhere, it was deemed necessary to improve implementers' understanding of the program operations to inform efforts to strengthen and expand the program in Kenya and other countries. The purpose of this review was to examine service delivery under the FBP program with a view toward learning more about specific issues such as duration of food supplementation, loss to follow-up (LTF), changes in client nutritional status, and the food delivery system. The review focused on lessons learned with respect to operations, relative effectiveness of the FBP intervention, success factors and obstacles faced by the program.

1.2 SIGNIFICANCE OF HIV-ASSOCIATED MALNUTRITION

HIV infection is characterized by a long progressive decline in health, with periodic acute episodes of opportunistic infections (OIs) during advanced stages. It is known that an individual's response to the chronic disease process results in increased nutrient requirements and changes in nutrient use. The resulting involuntary weight loss is aggravated by inadequate consumption of both quantity and quality of food due to disease symptoms (e.g., loss of appetite, pain, nausea and vomiting) and food insecurity. Psychosocial stress and inadequacies of adaptive responses exacerbate the wasting process. Malnutrition resulting from weight loss has been associated with progressive functional impairment and reduced immune competence (Consay and Kennedy, 1999). These complications characterize the infection and malnutrition cycle, leading to decreased rate of healing, increased frequency of OIs, longer convalescence periods and increased mortality (ACC/SCN, 1991; Konstantinides, 1988). Recent documentation of the association between moderate to severe adult malnutrition (BMI <17 kg/m²) and low quality of life associated with morbidity and disability, and the role of moderate to severe adult malnutrition as an independent predictor of death (Paton et al, 2006) strongly underlines the significance of nutrition in the health of adults, in particular HIV-infected adults. During acute illness, lean body mass is the single most important predictor of survival (WHO 1998). Demling and Desante (2000) suggest that progressive loss of 10 percent to 40 percent of lean body mass is associated with an exponential increase in the risk of mortality. This relationship points to the importance of intensive nutrition interventions, including therapeutic food products, to ensure recovery of malnourished PLHIV, as well as the need for strong preventive interventions to prevent malnutrition.

The negative effect of HIV on household food security, productive labor, income and assets is well recognized (SCN, 2004). In resource-poor settings, malnutrition is common and has been associated with more rapid disease progression among both pre-ART and ART clients. Thus, implementation of basic package of nutrition services consisting of nutrition assessment, counseling and education, and provision of food for eligible PLHIV clients is needed in health facilities. The aim of such a package should be to ensure consumption of an adequate quantity and quality of food, identify and treat OIs, encourage physical exercise and provide regimens of specialized food products to manage malnutrition.

1.3 PROGRESSION OF HIV-ASSOCIATED MALNUTRITION

HIV infection is accompanied by progressive nutrition alterations and other pathological changes. The critical points in the decline of nutrition status correspond to cutoff points for malnutrition, which for the program are set at BMI < 18.5 kg/m² for adult PLHIV, MUAC < 21 cm for P/PP women and WFH or WFA < -1.5 z-score for OVC, including pediatric HIV patients. As discussed above, the risk of mortality and complications associated with malnutrition among PLHIV may be reduced if malnutrition is corrected and adequate nutrient intake is guaranteed.

In resource-limited settings where poverty and food security are rife, provision of therapeutic and supplementary food products is a critical component of comprehensive care and support interventions, enhancing adherence to ART drugs and correcting malnutrition during treatment. The protocol for therapeutic and supplementary food provision is guided by existing knowledge about energy and nutrient requirements of PLHIV during asymptomatic and symptomatic periods. It is estimated that energy needs increase by 10 percent in asymptomatic HIV-infected adults and children. In symptomatic disease stages, energy needs increase by 20-30 percent in adults and by 50- 100 percent in children experiencing weight loss (WHO, 2003).

Upon recovery from malnutrition or in the absence of malnutrition, nutrition education and counseling, along with livelihood support as needed, can help ensure adequate food intake and prevention of malnutrition.

1.4 FBP PROGRAM CONTEXT

This program was implemented as a public-private partnership between the National AIDS and STI Control Programme (NAS COP) in the Ministry of Health (MOH) and USAID/Kenya as public entities and Insta Products Ltd., a private Kenyan company. The FBP program was established based on the understanding that a comprehensive set of nutrition interventions improves the outcomes of care, treatment and support of PLHIV. Health providers had observed that the absence of therapeutic and supplemental food product interventions remained a critical gap in comprehensive integrated care for PLHIV in Kenya. Thus, the FBP program's objective was to provide energy and nutrient-dense food products along with nutrition assessment, counseling and clean, safe water to PLHIV who were malnourished or at risk of malnutrition. Besides nutritional outcomes, other impacts such as increased uptake of antiretroviral (ARV) drugs, greater adherence to ARV drugs, lower rates of LTF and reduction of stigma were expected. The program was designed to reduce malnutrition among the most vulnerable groups, namely OVC, pregnant or postpartum mothers and malnourished adult PLHIV.

Based on empirical estimates of nutritional needs among malnourished clients, the supplementary food products prescribed in this program provide about 50 percent of energy and 50 percent to 78 percent of protein requirements for targeted PLHIV, pregnant and postpartum women and OVC. The food is intended to help compensate for reduced intake and increased nutritional demands associated with the disease. The food products used in the program at the time of review were blended pre-cooked corn-soy flour fortified with micronutrients, i.e., fortified blended flour (FBF). The formulations for the three population groups differed mainly in the amount of micronutrients included. In addition, the quantities provided to young children were smaller, with daily servings of 100g of FBF for 0.5- to 2-year-olds, 200 g of FBF for 2- to 10-year-olds, and 300 g of FBF for 11- to 17-year-olds and adults. The recommended use of FBF is preparation of porridge (*uji*). At the time of the review, only FBF was used, and more nutrient-dense foods such as ready-to-use therapeutic food (RUTF) were not yet used.

Daily use of the recommended FBF serving along with other home foods was intended to realize WHO recommended micronutrient intake at the level of one RDA (FAO/WHO, 1998). The program design estimated that it would take an average of four months to restore healthy nutritional status and attain discharge criteria. This strategy entailed a two-stage process consisting of recovery to normal nutritional status (e.g., BMI \geq 18.5 kg/m² for adults) and accrual of buffer weight (e.g., BMI \geq 20 kg/m²) to reduce relapse rates among graduated clients. For children under age 10, a graduation cutoff point of WFA > -1.0 z- score was used.

Insta Products manufactured and delivered food products and point-of-use water treatment kits to the participating facilities. The supply of these commodities was predominantly based on a push arrangement in which the volume of commodities supplied was largely determined by the supplier since there was no clear system of forecasting demand levels.

A number of questions emerged from the program, requiring greater examination to inform the scale-up of the program in Kenya and possible replication of similar programs in other countries. These questions include:

1. What is the average duration of food receipt for FBP clients? What are the main reasons for stopping food provision? What is the average time it takes FBP clients to reach the program's exit criteria? What, if any, obstacles are there to more rapid graduation?
2. How do clients' clinical and nutritional statuses change following graduation? What proportion of graduated adult clients become eligible again for food supplementation due to poor nutritional status?
3. What is the LTF rate among FBP clients? What are the main reasons for LTF? To what extent does LTF in the FBP differ from LTF in other ART sites in Kenya?
4. What proportion of non-pregnant adult FBP clients enter the program with moderate or mild malnutrition (BMI = 16-18.5 kg/m²)? How does the nutritional status of these clients change during their participation in the program, and how long does it take for these changes to occur?
5. What are the benefits, challenges and implications of the current delivery system for distribution of food?
6. How is the food used by FBP clients? To what extent is it consumed by individuals other than FBP clients (e.g., shared with other household members)?
7. How do clients and service providers perceive the program? What are the perceived benefits, costs and additional burdens it imposes?

1.5 TERMS OF REFERENCE

Commissioning of this review was informed by the need for quantitative and qualitative information on the utilization, efficiency and impact of FBP services, including sustainability and system performance. The following objectives guided the review:

1. Establish the average duration of food supplementation for FBP clients in ART and pre-ART population groups and identify reasons for longer-than-expected duration.
2. Assess recovery from malnutrition and identify factors associated with recovery for the different population groups.
3. Assess responsiveness of men and non-pregnant women with mild and moderate malnutrition to the FBP based on BMI gains and the rate of BMI gain.
4. Identify factors that influence compliance to FBP recommendations.
5. Identify factors associated with attrition before recovery from malnutrition.
6. Estimate the rate of re-admission of discharged (graduated) PLHIV into food supplementation due to poor nutritional status and the time required for recovery.
7. Establish the suitability of the current food product delivery system: benefits, challenges and implications.

8. Identify how the food is used and the benefits and costs of the program perceived by clients and service providers.

2. Program Status and Review Methodology

2.1 THE KENYA FOOD BY PRESCRIPTION PROGRAM DESIGN

The Kenya FBP program utilizes fortified, nutrient-dense, pre-cooked, corn-soy flour that is rehydrated with boiling water as porridge and provides approximately one-half of clients' average daily energy requirement and the majority of daily micronutrient requirements. There are three food formulations, designed to meet the nutritional needs of the three key target populations: PLHIV and OVC above age 10, OVC between 6 months and 10 years old, and HIV-positive pregnant and postpartum women. At the time of the review, food for adults, including P/PP women, was being targeted only toward clinically malnourished individuals. For OVC, food eligibility is determined by OVC status and not HIV status. Food is dispensed and monitored through health care facilities and is not intended to be used for household food security.

Programmatic criteria have been developed to ensure maximum impact of the food on the target population. Food and water quality products are distributed by prescription to outpatients via the pharmacy in comprehensive care centres (CCCs) or by a nutritionist to clients who meet the eligibility criteria. This distribution mechanism, the individual daily-serving-size food packages and the accompanying counseling are all intended to minimize sharing of food within the family. Patients are monitored at their health facilities for adherence, nutritional status and medical outcomes. These outcomes are tracked in a database by the implementing partner. Eligibility criteria are based on national guidelines for nutrition and HIV/AIDS established by NASCOP and stakeholders.

At the time of the review, admission criteria for adults is BMI < 18.5 kg/m² or MUAC less than 22 cm (if BMI cannot be taken) among patients who present for the first time or those who have been discharged from nutrition rehabilitation for severe malnutrition. Admission criteria for P/PP women includes those with MUAC < 22 cm, slower-than-average weight gain during pregnancy, symptoms of AIDS or other signs of micro- and macro-nutrient deficiency. For older OVC (5-11 years), all HIV-positive children and those with malnutrition defined by a WFH < -2 z-score and/or the presence of bilateral edema, are admitted to the program. OVC aged 6 months to 5 years are eligible for the program based on malnutrition (WFH or WFA < -1.5 z-score) or vulnerability to malnutrition. Those with a WFH < -3 z-score are treated according to the national (WHO) guidelines for the management of severe malnutrition and are enrolled in the FBP program only after discharge from rehabilitation.

Adults are discharged from the program once their BMI improves to equal or above 20 kg/m². Malnourished P/PP women are provided with food until six months postpartum or until their MUAC improves to over 24 cm. After the sixth month postpartum, if they remain malnourished, they are treated according to the FBP protocol for malnourished adult PLHIV. Younger children (6 months-5 years) admitted with malnutrition are discharged if the WFH (or WFA) is greater than -1.0 z-score and their weight does not falter for two consecutive weighings. Older children (5-11 years) and adolescents (12-18 years) are discharged when their WFH is greater than -1.5 z-score or greater than 85 percent of the reference median.

Program sites have been selected based on HIV prevalence, client load, malnutrition rates, facility-perceived need, capacity and willingness to participate in the program. While most sites are USG-supported care sites, some sites are faith-based or private sector facilities.

The MOH/NASCOP with PEPFAR support has supported development of National Guidelines on Nutrition and HIV, national training materials for CCCs and job aids to support front-line health workers (nutritionists, nurses, clinical officers and doctors) and guide implementation of nutrition services in facilities. Pre-service training of nutritionists on nutrition and HIV is also occurring, and under the leadership of MOH/NASCOP, USAID and other donors and implementing partners have developed a curriculum to accompany the guidelines, which includes FBP in anticipation of scale-up of food programs throughout the country.

2.2 PROGRAM OPERATIONS

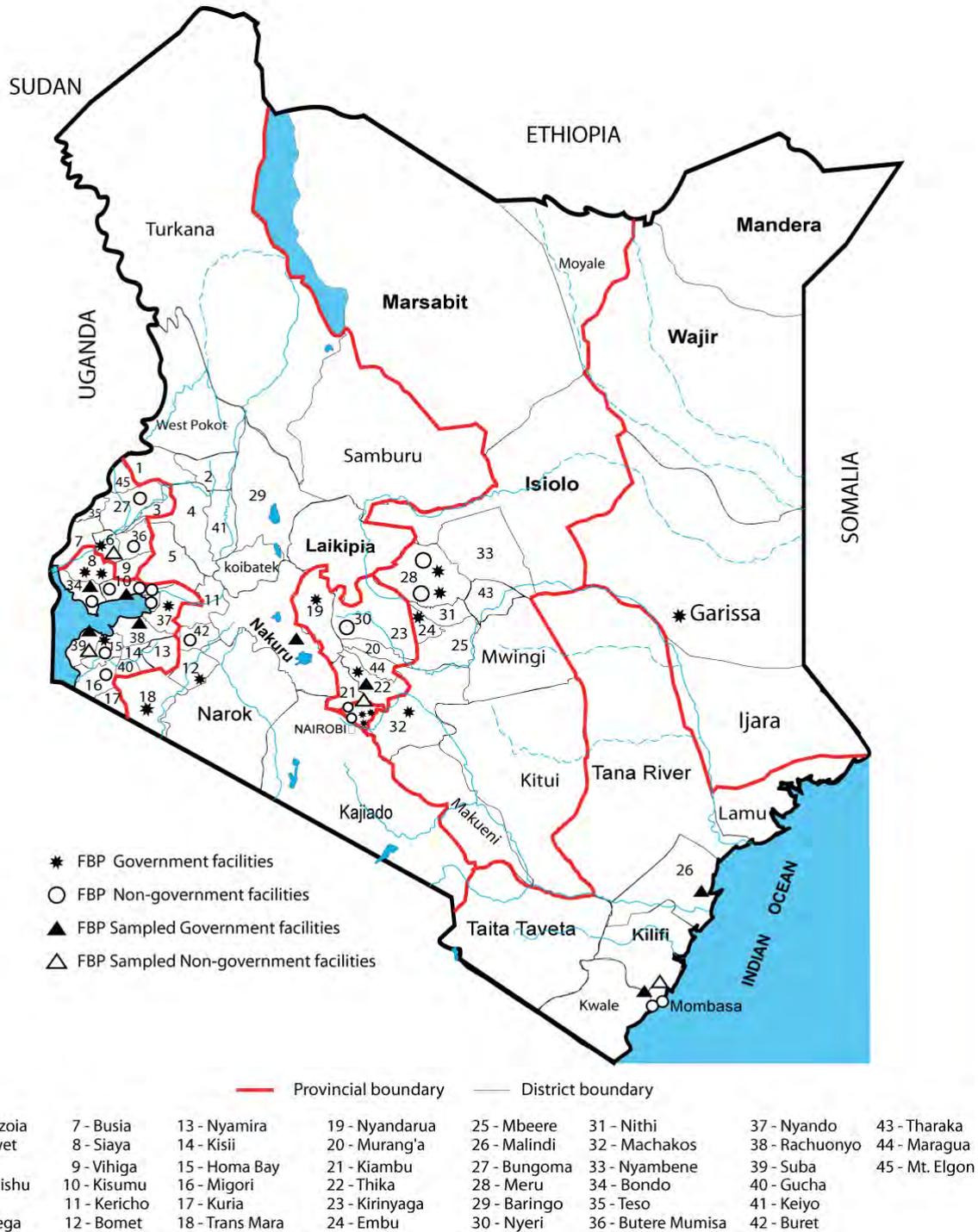
The FBP program is operational in all regions in Kenya. By September 2007, 55 primary facilities had joined the FBP program and 27,913 clients had been served since January 2006. All facilities received similar orientation and used the same intervention protocol. The FBP program included screening for malnutrition and provision of a nutrition intervention package consisting of assessment, education, counseling, supplementary food products and other elements of comprehensive care. On-site training sessions include support supervision for FBP services. Staff, storage infrastructure and equipment were provided by facilities. The chronology of events in the development of the initial protocol of the FBP program is shown in **Table 1**. The administrative and geographic locations of the participating facilities and those sampled are shown in **Figure 1**.

Table 1. Chronology of events in the pilot implementation of the program

Quarter	Period	Cumulative number of facilities	Cumulative number of clients	Interventions/remarks
1	October - Dec. 2005	-	-	Contract award by USAID, capacity strengthening and infrastructure building, FBP program design, site identification and selection; protocol design and approval.
2	January-March 2006	7	1,850	Pre-pilot phase begins; training module designed; orientation briefings held for initial group of implementing facilities; health workers trained; first batch of food products delivered to 6 facilities ^a ; enrolment of clients begins; reporting by sites begins.
3	April-June 2006	7	3,137	FBP protocol reviewed and exit criteria specified; electronic reporting tool developed; new reporting tools introduced; push system weaknesses come to play; Insta is awarded "Diamond Mark of Quality" by the Kenya Bureau of Standards (KEBS); product micronutrient content adjusted to meet FAO/WHO recommendations; FBP training module harmonized with national curricula; component of home water treatment using WaterGuard™ integrated into FBP program.
4	July-September 2006	7	4,250	Health workers receive refresher training; improved data collection tools introduced; inventory control checks at sites put in place; new job aids reflecting protocol introduced. Review of guidelines.
5	October-December 2006	15	5,579	Pilot phase begins: FBP activities harmonized with NASCOP and scale-up of sites initiated; training of health workers and implementation of FBP begins in 15 new sites; data collection and reporting streamlined.
6	January-March 2007	27	11,228	NASCOP begins oversight and coordination role; second phase pilot scale-up begins; training of health workers and FBP implementation begins in 13 new sites.
7	April-June 2007	53	19,118	CRS and Insta collaborate on training of CRS health workers and started implementation of FBP in 21 CRS-supported facilities.
8	July-September 2007	55	27,913	FBP's second year ends; 3 additional sites start implementing FBP; 58 sites countrywide now running FBP; FBP program review by FANTA begins.

^aFacilities in Nairobi, Nyanza, Western and Coast provinces

Figure 1. Distribution of FBP program facilities in Kenya



2.3 APPROACHES TO REVIEW

The review was based on a retrospective analysis of service utilization data and a cross-sectional qualitative study of client and provider perspectives in a sample of FBP program facilities. The retrospective analysis was based on clients who had been admitted in the FBP program.

2.3.1 Sampling of facilities

At the time of the review, in September-November 2007, 55 facilities were providing FBP service. That number increased to 58 at the end of 2007. Of the original 55 facilities, the sampling frame consisted of 21 that had been providing FBP services for at least six months at the time of analysis. This period was considered sufficient for the selected sites to have adequate numbers of clients for meaningful analysis and to have gained experience on challenges in FBP service delivery. From the 21 facilities, 12 facilities that had relatively large volumes of clients and were in different geographic contexts were purposively sampled (**Figure 1**). These facilities were in either urban or peri-urban areas, situated in the peripheries of large towns or in small urban settlements. According to the April 2007 Kenya Food Security Update, Coastal facilities were in the moderately food-secure zones, while other sites were food-secure zones (there often are food-insecure households--including ones affected by HIV--in food-secure zones). Eight public health facilities, two missionary facilities (private, not-for-profit) and two private facilities (not-for profit) were sampled. Details of the selected facilities and range of services using the Kenya Essential Package for Health (KEPH) criteria (National Health Sector Strategic Plan II (2005-2010) appear in **Table 2**.

Table 2. General characteristics of the selected FBP program facilities

	Province/District	Facility	Facility KEPH level ^a	Location/ ownership
1	Nairobi/Nairobi	Coptic Hospital	5	Urban/missionary
2	Nyanza /Kisumu	Nyanza Prov. Gen. Hospital	6	Urban/public
3	/Kisumu	Faces Kisumu	3	Urban/private
4	/Bondo	Bondo District Hospital	4	Urban/public
5	/Rachuonyo	Rachuonyo District Hospital	4	Peri-urban/public
6	/Suba	Faces Suba District	3	Peri-urban/public
7	Coast/Mombasa	Coast Provincial Hospital	6	Urban/public
8	/Mombasa	Bomu Mkomani Clinic	3	Urban/private
9	/Malindi	Malindi District Hospital	5	Urban/public
10	Central/Thika	Gatundu Sub-District Hospital	4	Peri-urban/public
11	Western/Mumias	St Mary's Hospital Mumias	5	Peri-urban/ missionary
12	Rift Valley/Nakuru	Nakuru Provincial Hospital	6	Urban/public

^aThe KEPH in this context denotes where preventive and curative health services are provided. The lowest level is the community, where health promotion and prevention activities are dominant, and the highest are levels 5 and 6, which are referral hospitals (National Health Sector Strategic Plan II).

2.3.2 Study population

Client information was drawn primarily from ART and pre-ART adult clients who had ever enrolled in the FBP program. The focus was on adult clients because a number of the review questions focused on this group, straightforward anthropometric enrolment and exit criteria existed for this group, and it was the largest population group with the most complete data. Detailed quantitative analysis used records of clients who had exited the FBP program at the time of the review. Adult exit from the FBP program primarily occurred after attaining the exit criterion of a BMI greater than 20 kg/m² or as a result of attrition or death. Profiling exited clients provides information on effectiveness of interventions. In addition, to gain insight into factors affecting duration of supplementation, data on clients who had attained the therapeutic end point of BMI > 18.5 kg/m² at the time of review but had not exited the program were analyzed. Since clients on ART are on average more frequently reviewed (every one to three months) than pre-ART clients (biannual), comparison of client attrition between FBP and non-FBP facilities was limited to clients in the ART program. Data on OVC and P/PP women

who had ever enrolled in the program were reviewed to provide information on characteristics of the beneficiaries during the same period as exited adult clients.

2.3.3 Sources of quantitative data

Data from the 12 sampled facilities were retrieved from a database managed by Insta. The data capture forms appear in **Annexes 1 and 2**. Registers in the CCC facilities were also examined for details that were not routinely captured in the Insta database. These included information about re-admissions into the FBP program after graduation, and dates of eligibility and initiation of ART for FBP clients.

Client attrition has been recognized as a major challenge in provision of care and support to HIV-positive clients (Rosen et al., 2007). To gain insight into attrition in the context of FBP services, data on LTF were collected from five facilities that were providing ART but not offering FBP program services (non-FBP sites) and situated in the same geographic catchments as the 12 sampled FBP program facilities. These facilities were Rhodes Hospital in Nairobi Province, Tudor Health Centre in the Coast Province, Kombewa Sub-District Hospital in Kisumu and Madiany Health Centre in Bondo district in Nyanza Province, and Kiambu District Hospital in the Central Province. The numbers of all clients and of clients lost to follow-up during the period of CCC services were collected.

2.3.4 Sources of qualitative data and information

Data on providers' perspectives were collected using key informant interviews and focus group discussions (FGDs) in nine of the 12 facilities (logistical constraints prevented data collection at the other three sites). Client perspectives were collected through FGDs in the same facilities. Spot observations were collected during facility visits and were used to reinforce and verify information from the interviews and FGDs.

2.3.4.1 Key informant interviews

Interviews were conducted with in-charges of facilities as well as two medical officers, one program manager, one clinical officer and two nurses who were available during the facility review visit. These interviews focused on daily operations of the FBP program and integration of the program into CCC activities.

2.3.4.2 Focus group discussions

Ten FGDs were conducted with FBP program clients and three were conducted with service providers. The FGDs with providers and clients were conducted in English and Kiswahili respectively. Data were recorded using a digital sound recorder as a backup to manual note-taking. The number of FGDs was limited by saturation of responses to the issues being discussed, that is, no additional FGDs were conducted once no new information or data emerged from the discussions (**Annex 3**).

On average, one client focus group comprising male and female clients was conducted in each facility visited. There was equal gender representation in the focus groups. In Nyanza Provincial General Hospital, separate FGDs were conducted for men and women. Client groups were adults who had been on FBP one to six months. Each focus group was composed of six to 10 participants. Discussions were conducted at the CCC.

Participants in the service provider FGDs were nutritionists, nurses, clinical officers, social workers and counselors working in the CCC. Discussions centered on overall coordination of the FBP program activities, including nutrition assessments and screening of clients, counseling, clinical observations, social assessments, dispensing of food products, record keeping and follow-up in the community.

The Insta team was also interviewed about their experiences with management of supplies, facility reporting and technical inputs to implementing facilities.

2.4 THE FBP PROGRAM BENEFICIARIES

The sampled facilities had served nearly half of the 27,913 clients that had ever enrolled in the FBP program at the time of review (**Table 3**). Facilities in Nyanza and Coast Provinces reported larger numbers of clients than other regions (**Table 4**). The average rate of enrolment ranged from 30 clients per month in Gatundu Sub-District Hospital to 215 clients per month in Nyanza Provincial General Hospital. The provincial hospitals had on average higher rates of enrolment than other facilities. FACES Kisumu and FACES Suba also had higher client recruitment rates than similar facilities in Western Kenya (174 clients/month). The OVC enrolment rate was higher in the three provincial hospitals than in other facilities.

Table 3. Summary of clients admitted into the FBP program during period under review

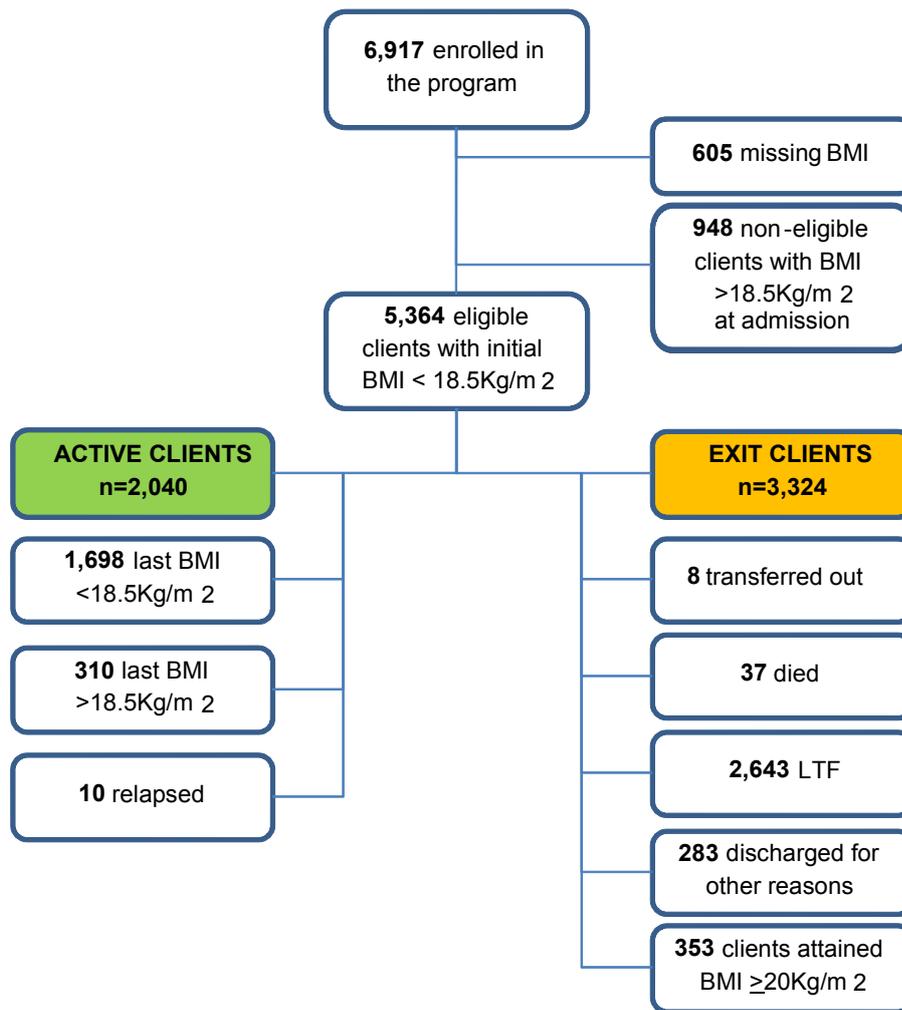
Client subgroup	Period				Total N
	Jan. 06- Sep. 06		Oct. 06-Sep. 07		
	n	%	n	%	
OVC 6 to < 24 months	723	17%	4712	20%	5435
OVC 2 to 4 yrs	330	8%	2097	9%	2427
OVC 5 to 10 yrs	422	10%	2046	9%	2468
OVC 11 to 17 yrs	210	5%	864	4%	1074
P/PP	346	8%	3332	14%	3678
Adult PLHIV	2219	52%	10612	44%	12831
Total	4,250		23,663		27,913

Table 4. Service utilization in sampled FBP program facilities

	Facility	Period of operation (months)	Number of clients ever enrolled	Number in client groups		
				Adults	P/PP mothers	OVC
1	Coptic Hospital	20	691	496	63	132
2	Nyanza Prov. Gen. Hospital	20	4,300	1,806	408	2,086
3	FACES Kisumu	10	1,505	705	338	462
4	Bondo District Hospital	9	555	379	28	148
5	Rachuonyo District Hospital	9	819	599	9	211
6	FACES Suba District	9	1,564	677	244	462
7	Coast Provincial Hospital	9	1,112	136	240	736
8	Bomu Mkomani Clinic	10	732	64	64	194
9	Malindi District Hospital	20	1,397	695	67	635
10	Gatundu Sub-District Hospital	9	273	133	40	100
11	St Mary's Hospital Mumias	20	886	477	130	279
12	Rift Valley Provincial Hospital	6	832	340	134	358
	Total		14,666	6,917	1,765	5,984

2.5 REVIEW OF ADULT CLIENTS

The quantitative data analysis was based on adult clients who had exited the FBP program (exited clients, or ECs) and those that had recovered from clinical malnutrition ($BMI \geq 18.5 \text{ kg/m}^2$) but were still in the program. The variables of interest included age, sex, date of enrolment, treatment group, date of exit, BMI on admission, BMI at exit and reason for exit (**Annex 4**). Among the ever-enrolled adults, it was observed that, contrary to the guidelines, 22.5 percent of the clients had BMIs that were either greater than 18.5 kg/m^2 or unknown (**Figure 2**). For the purpose of this review, the sample under consideration was 5,364 adult PLHIV. In the EC group, clients lost to follow-up (LTF) constituted 49 percent of the eligible clients. Among 283 discharged for other reasons, the reason for discharge was indicated for only 64 clients.

Figure 2. Adult clients at reviewed sites

2.6 REVIEW OF ORPHANS AND VULNERABLE CHILDREN

OVC were the second-largest group of clients (5,984, or 41 percent) in the sampled FBP program facilities. Over 30 percent of these children were enrolled in Nyanza Provincial General Hospital. Among OVC clients, the age groups comprised 6- to 24-month-olds, 2- to 4-year-olds, 5- to 10-year-olds and 11- to 17-year-olds. Their admission was based on malnutrition status, vulnerability to malnutrition due to OVC status, and need for follow-up after discharge from treatment for severe malnutrition. FBP program service providers are expected to record anthropometric measurements of all clients. Of the 5,984 OVC records, 4,611 (77 percent) had valid WFA z-score baseline data, 3,823 (64 percent) had valid WFH z-score baseline data and 4,375 (73 percent) had valid height-for-age (HFA) z-score baseline data.

2.7 REVIEW OF PREGNANT AND POSTPARTUM WOMEN

The proportion of P/PP women clients in the FBP sites reviewed was 12 percent (**Table 4**). Enrolment of P/PP women into the FBP program was intended to prevent or correct malnutrition. Providers were expected to record MUAC data for all clients, but cursory observations of participating facilities indicate that adult MUAC tapes are uncommon. Apparently, MUAC is not routinely used in nutrition assessments, and weight data collected at the maternal and child health (MCH) clinics were not transferred to the FBP data capture form. At the time of review, only 57 clients (4 percent) had MUAC data. Furthermore, upon examining the data for admission eligibility, discharge and completeness of client data, only 15 cases had complete data. Therefore, analysis of data from ECs was limited to cursory experiences on characteristics of the P/PP group.

2.8 CLIENT ATTRITION

Data were compiled on client attrition, mainly from LTF but also transfers and deaths, among adult clients in FBP program facilities. LTF was defined as two or more consecutive missed months of client review and collection of prescribed food and excluded deaths, transfers and exclusion due to poor compliance. Significant inter-facility variations in client attrition were noted.

2.9 DATA ANALYSIS

Although analysis by facility was not conducted due to relatively small numbers in most of the facilities, it was observed that, on enrolment, characteristics of age, sex and nutritional status based on BMI of reviewed ECs were comparable to those of the entire population of adult PLHIV clients. The role of program enhancements introduced in September 2006 (**Table 1**) was also considered in the analysis.

Facility data were pooled for ART and pre-ART clients, notwithstanding possible heterogeneity across facilities in enrolment and organization management. Analysis was restricted to within and between group comparisons of outcome variables observed among ART and pre-ART clients. Descriptive statistics were reported using means and medians as measures of central tendency and distribution as percentages. Analyses from the two cohorts (ART and pre-ART) of adult clients are reported separately.

Analysis of adult data was carried out to establish the following:

- Characteristics of gender, age and initial nutritional status
- Average LOT in the FBP program among graduated and LTF clients
- Factors that affected the length of treatment for graduated clients
- Factors contributing to LTF
- Frequency and characteristics of readmitted clients

Analysis of qualitative data focused on three thematic areas: factors contributing to the duration of supplementation and compliance, LTF and the service delivery system. Analysis of data on service utilization by OVC and P/PP women was limited to characteristics of the two populations and their overall experiences in the FBP program.

The FBP enrolment database was categorized into pre-ART and ART groups. The proportion of clients ever enrolled was significantly larger in the pre-ART group than in the ART group. In contrast, the clients who had exited the program were predominantly from the ART group. The proportions in the two groups with relatively complete data were comparable.

2.10 LIMITATIONS

The quantitative dataset on EC had numerous shortcomings, particularly in the follow-up period. Overall, missing anthropometric data among P/PP women and to some extent OVC limited the scope of analysis. Among adult PLHIV, exclusion of client records with missing data on age or BMI as well as those who were not eligible due to protocol deviations resulted in dropping of 22.5 percent of the client records. In addition, the exited adult PLHIV retrospective selection bias, the exclusion bias resulting from high attrition (49 percent) and records with missing data limited interpretation of the findings from these data. Furthermore, since the number of clients who had graduated was relatively small, data from different facilities were pooled to give overall distribution patterns. This may have masked unique facility or subgroup response characteristics, which may have limited the possibility of identifying good program practices. Such variation was supported by discussions with providers, which revealed that although facilities had received the same training program before introduction of FBP services, each facility applied different approaches for running the FBP program. Other limitations included failure to provide details on OIs and CD4 counts after enrolment. This limited the extent to which the impact of FBP could be assessed.

While FGD participants offered a good mix of short-term and long-term (> 2 months) experiences, the participants were drawn from relatively new cohorts of the FBP program clients. Thus, the FGDs may have missed out on experiences gained in the earlier periods of the program. Moreover, inability to

carry out FGDs in the community or home of graduated and LTF clients limited the extent to which crucial issues such as use of food at home could be covered.

FGDs and key informant interviews revealed that apart from the nutritionists, most providers did not have in-depth knowledge of the FBP program. Consequently, this may have limited the level of participation and the range of experiences shared by providers.

3. Findings and Discussion

3.1 CHARACTERISTICS OF EVER-ENROLLED ADULT CLIENTS

The findings on gender distribution of adult clients ever enrolled in the sampled sites were consistent with reported epidemiological patterns in Kenya's last Demographic and Health Survey and more recent Kenya AIDS Indicator Survey (KDHS, 2003, KAIS, 2007). The 6,917 adult clients enrolled at the time of the review consisted of 65 percent females and 35 percent males. These proportions are comparable to those observed in the ART program in Kenya (66 percent females and 34 percent males), (LSTIK, 2007). The median age of all adult clients was 34, (IQR 27-40) years. Females were younger than males (32, [IQR 27, 40] years vs. 37, [IQR 31-45] years), ($p < 0.001$).

3.1.1 Nutritional status of the eligible clients

On enrolment, the median BMI of eligible clients was 17.05 (IQR 15.81, 17.86) kg/m^2 ($n=5364$). The median BMI of the pre-ART clients (17.0 kg/m^2) was comparable to that of ART clients (17.09 kg/m^2). There were no significant gender differences in the median BMI on enrolment ($p=0.16$). In addition, both genders exhibited relatively similar patterns of distribution of different grades of malnutrition. Among males, 27.12 percent had severe malnutrition, 22.8 percent had moderate malnutrition and 50.08 percent had mild malnutrition. Among females, 27.59 percent had severe malnutrition, 20.49 percent had moderate malnutrition and 51.91 percent had mild malnutrition.

3.1.2 Disease stage based on CD4 immune status

Nearly one-half ($n=2,588$) of ever-enrolled clients had baseline CD4 count reports. The overall median CD4 count was 152 (IQR 53, 297) cells/ μL of blood. Consistent with treatment protocol, pre-ART clients had on average higher CD4 counts than ART clients. Overall, the median CD4 count for pre-ART clients was 210 (IQR 67,407) cells/ μL while that of ART clients was 134 (IQR 48, 244) cells/ μL ($p < 0.001$). ART clients had mean CD4 cell counts that were lower than the pre-ART patients by as much as 100, (95 percent CI 83, 117) cells/ μL ($p < 0.001$).

The median CD4 counts in pre-ART female clients ($n=688$) and ART female clients ($n=950$) were 247 (IQR 86,441) cells/ μL and 144 (IQR 56, 251) cells/ μL , respectively. The corresponding median CD4 counts in pre-ART male clients ($n=374$) and ART male clients ($n=576$) were 143 (IQR 42, 357) cells/ μL and 117 (IQR 41, 227) cells/ μL , respectively ($p < 0.04$). The proportion of males having CD4 counts below 250 cells/ μL was nearly 9 percent higher than the proportion of females ($p < 0.0001$). OIs were associated with a lower CD4 cell count by 48.8 (95 percent CI 32, 65 cells/ μL), $p < 0.001$. This pattern was consistent with established delayed treatment-seeking behavior among males.

3.1.3 Overall nutrition responses

The majority of FBP clients (60.8 percent) gained weight during the first month of food supplementation. The proportion of clients who gained weight during the second and third month of follow-up was 55.1 percent and 53.8 percent, respectively (**Table 5**). Among those with severe and moderate grades of malnutrition, the ratio of those who gained weight to those who lost was approximately 2:1. Among clients with mild grades of malnutrition and those whose BMI had reached the 18.5 kg/m^2 cutoff point, slightly more clients seemed to lose than gain weight. The overall median BMI increase was 0.4 (IQR -0.7, 1.2) kg/m^2 during the first month, 0.3 (IQR -1.7, 1.06) kg/m^2 during the second month and 0.3 (-0.75, 0.78) kg/m^2 during the third month. These findings show that the largest weight gains were realized during the first month of food treatment.

Table 5. Nutritional responses among FBP clients

LOT months /sample size	Direction of weight change	Grades of malnutrition			Healthy weight (BMI >18.5 kg/m ²)	Overall %
		Severe	Moderate	Mild		
First month n=1,582	Loss	125 (7.9%)	140 (8.9%)	356 (22.5%)	0	39.3%
	Gain	257 (16.3%)	207 (13.1%)	193 (12.2%)	304 (19.2%)	60.8%
Second month n= 1,543	Loss	111 (7.7%)	87 (5.6%)	304 (19.7%)	191 (12.4%)	45.4%
	Gain	198(12.8%)	149 (9.7%)	347 (22.5%)	156 (10.1%)	55.1%
Third month n=885	Loss	45 (5.1%)	43 (4.9%)	179 (20.2%)	142 (16.1%)	46.3%
	Gain	93 (10.5%)	89 (10.1%)	177 (20.0%)	117 (13.2%)	53.8%

3.2 CHARACTERISTICS OF THE EXITED CLIENT (EC) GROUP

The adult EC group had exited the FBP program for any of the following reasons: graduation, attrition, death or transfer to other facilities. Transfers accounted for 0.24 percent of reviewed ECs and were thus excluded in subsequent analysis.

3.2.1 Age and gender characteristics of EC group

The female-to-male ratio in the adult EC group was nearly 2:1 (62.7 percent vs. 37.3 percent). Female clients were significantly younger than male clients (median age 32, [IQR 27, 40] years, vs. 38, [IQR 32, 45] years) ($p < 0.001$). This observation suggests that gender and age distributions in the EC group were similar to the entire sample of adult PLHIV.

The proportion of female ART and pre-ART ECs was 61.9 percent and 63.4 percent, respectively. On average ART clients were older than pre-ART clients (36 [IQR 30, 43] years versus 33 [IQR 28, 41] years) ($p < 0.001$). In line with the established impact of ART on the health and survival of clients, the proportion of ART ECs who graduated was three times that of pre-ART ECs (19.62 percent [233/1,182] vs. 6.62 percent [120/1814] ($p < 0.001$)). In addition, attrition through LTF was significantly higher among pre-ART clients than ART clients (56.0 percent vs. 38.5 percent; $p < 0.001$). The proportions of reported deaths among pre-ART and ART clients were comparable (0.71 percent vs. 0.67 percent), ($p = 0.867$). These findings were consistent with greater responsiveness of FBP clients who were also on ART.

3.2.2 Nutrition status of the EC group

On enrolment, the median BMI of the EC group was 17.1, (IQR 15.8, 17.9) kg/m². The proportion of ECs with severe malnutrition was 24.3 percent and 28.7 percent among ART and pre-ART clients, respectively. As shown in **Table 6**, the median BMI of clients who graduated was higher than that of clients LTF in both pre-ART and ART group ($p < 0.001$). Similarly, the median BMI of clients who died during follow-up period was on average lower than that of those who graduated, but the difference was not significant ($p = 0.16$). Thus overall, on enrolment the median BMI of clients who graduated was higher than that of clients who died or were LTF ($p < 0.001$). This observation suggests that attrition was more likely among clients who had poorer nutrition status at the time of enrolment. Similarly, responses among ART clients were better than among pre-ART clients. ART clients accounted for 66 percent and 77 percent of those who graduated and those discharged for other reasons, respectively. ART clients accounted for 35.9 percent of all clients LTF.

Table 6. Nutrition status of ECs

Intervention	Client exit status	BMI, kg/m ² on enrolment		
		N	Median	IQR
Pre-ART	Graduated	120	17.74	16.93,18.22
	LTF	1694	16.92	15.59,17.9
	Died	21	17.41	15.98,17.90
ART	Graduated	233	17.67	16.89,18.14
	LTF	949	17.04	15.81,17.86
	Died	16	16.81	15.42,17.67

3.2.3 Enrolment CD4 and BMI relationship

For the entire EC group, regression analysis showed that controlling for other variables, on average a decrease by one BMI unit was associated with a decrease in CD4 count of 28 (95 percent CI 21, 35) cells/ μ L, ($p < 0.001$). The LTF group had a similar result; a decrease of one BMI unit was associated with a decrease in CD4 count of 33 (95 percent CI 25, 41) cells/ μ L ($p < 0.001$).

3.2.4 Response to food supplementation and ART status

Client nutrition recovery rate (change in BMI per month) was estimated at 0.4 (IQR -0.7, 1.2) kg/m² and 0.3 (-0.75, 0.78) kg/m² in the pre-ART and ART groups respectively. Among clients who gained weight, the estimated median rate of BMI increase with time were 1.04 (IQR 0.57, 1.68) kg/m²/month of supplementation and 0.94 (IQR 0.59, 1.7) kg/m²/month in the pre-ART and ART groups, respectively ($p = 0.549$). Median total BMI increase was 3.3 (IQR 2.4, 4.3) kg/m² among pre-ART clients and 3.4 (IQR 2.6, 4.7) kg/m² among ART clients ($p = 0.6$).

3.2.5 Period of food supplementation

3.2.5.1 Length of treatment

In the FBP program, the period of supplementation was examined primarily in terms of estimated LOT, which is defined as the estimated number of days clients were on active food supplementation. Calculation of LOT uses the number of food prescriptions availed. Length of stay (LOS), which is discussed in subsequent sections, is defined as the estimated period between enrolment and exit, and includes days on food supplementation plus any possible days not on food due to missed appointments, non-compliance or other reasons.

Among ECs who graduated, the overall median LOT was 105 days and 99 days for the ART and pre-ART groups, respectively (**Table 7**). The median LOT for male clients who graduated was shorter than that of females.

Table 7. Distribution of median LOT among graduated clients

Client exit criteria	Gender	Pre-ART		ART	
		n	Median (IQR), days	n	Median (IQR), days
Graduated	Females	83	107(23, 458)	157	112(8, 532)
	Males	37	88(10, 333)	76	92(30, 332)
	Overall	120	99(10, 458)	233	105(8, 532)

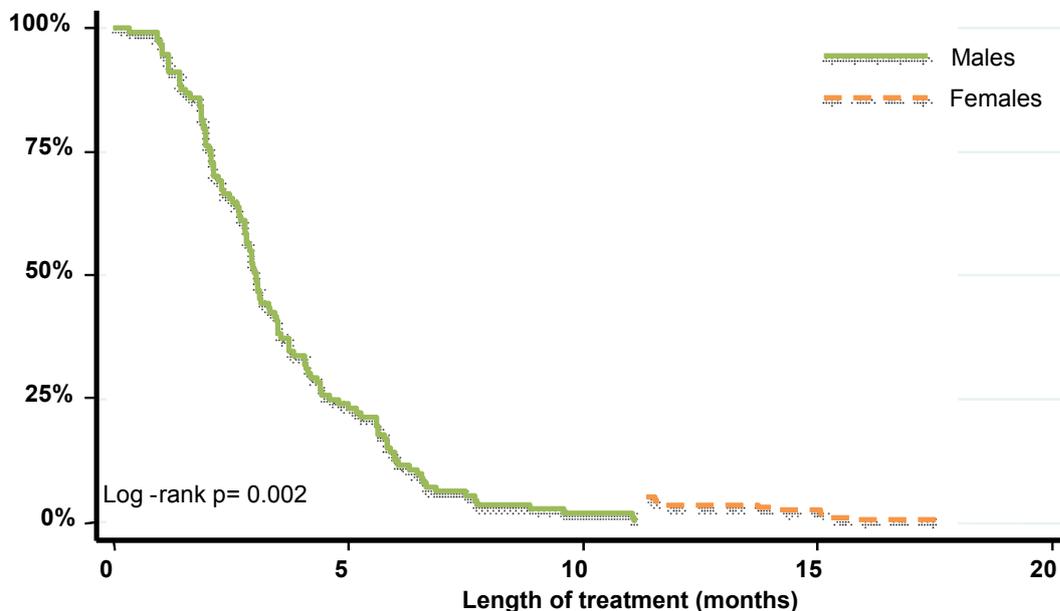
The median number of food prescriptions issued to clients was three (IQR 3, 5) for clients who graduated. Graduating pre-ART clients had significantly fewer prescriptions (3 [IQR 2, 4]) than graduating ART clients (4 [IQR 3, 5]), ($p = 0.007$). Women who graduated had more prescriptions than men (4, [IQR 3,5]) vs. 3, [IQR 3,4], respectively, $p = 0.012$). Thus using food prescriptions as an indicator of the average LOT for clients who graduated, LOT was three to four months. The median number of food prescriptions dispensed to LTF clients was one (IQR 1, 2) while that of those who died was three (IQR 2, 4). The low number of food prescriptions to LTF clients indicates that the majority of these clients exited shortly after enrolment.

3.2.5.2 Predictors of LOT

To establish predictors of LOT, linear regression analysis was carried out with age, gender, BMI and CD4 on enrolment and ART status as independent variables. CD4 and BMI at enrolment were both significantly negatively associated with LOT ($p=0.015$ for CD4, $p<0.001$ for BMI). For every unit increase in BMI, LOT decreased by 20, (95 percent CI [9-32]) days. This underlined the likelihood of faster recovery among less malnourished clients. It is noteworthy that the majority of clients who graduated (71 percent) were mildly malnourished at the time of enrolment. These findings underscore the importance of regular weight screening and education to ensure early detection of the onset of clinical malnutrition. There was no difference in LOT between ART and pre-ART clients.

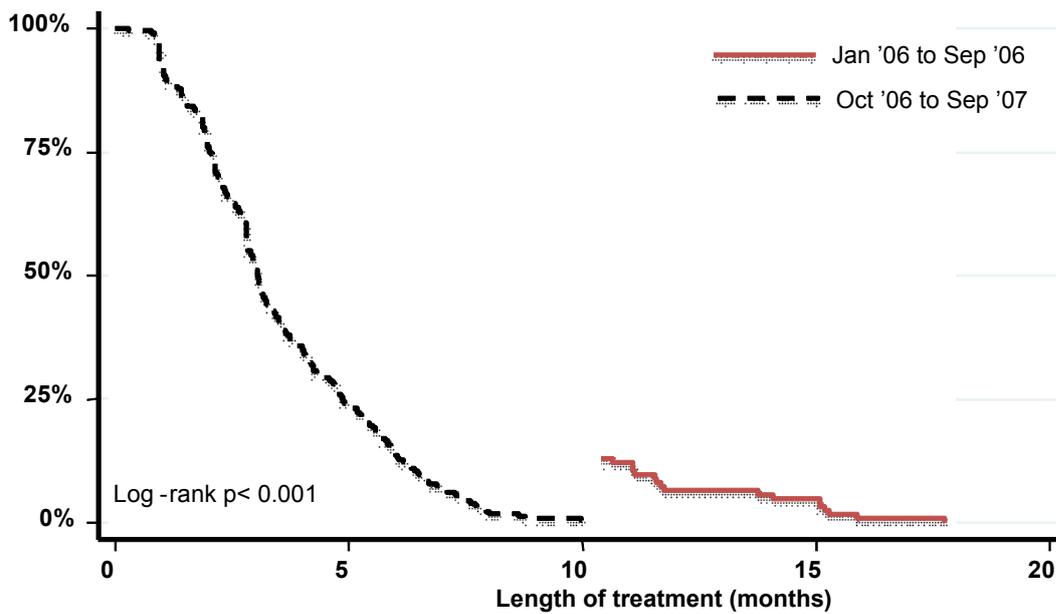
As observed previously, data analyzed in this review showed that males graduated earlier than females (**Figure 3**). Given that BMI profiles across gender were comparable on enrolment, one possible reason for this difference could be gender differences in adherence. The FGDs and key informant interviews indicate more women may share the prescribed food than men. The findings from the qualitative review suggested that sharing of supplemental food, stigma, non-availability of home support and access to other foods are important factors in treatment of malnutrition among FBP program clients.

Figure 3. Differences in LOT, by gender



Program improvements introduced in September 2006 (e.g., training, review of guidelines) were aimed at fine-tuning operations (**Table 1**). LOT decreased significantly among clients enrolled after September 2006 compared with the preceding period ($p<0.001$) (**Figure 4**). The shift in the graph means a shorter LOT and suggests improvements in FBP program performance.

Figure 4. LOT of clients before and after program improvement



3.2.6 Delayed graduation

Based on qualitative client data, causes of delayed graduation included failure to discharge the clients upon attaining BMI ≥ 20 kg/m² and adherence-related problems. Based on the median length of stay (LOS)—the duration between enrolment and exit—clients who graduated were discharged from FBP approximately one month after the last prescription (**Table 8**). The median LOS was longer than LOT by approximately one month (137 days vs. 103 days).

Table 8. Median LOS among ECs

Client exit criteria	Gender	LOS for Pre-ART clients		LOS for ART clients	
		n	Median (IQR), days	n	Median (IQR), days
Graduated	Females	83	140(23, 532)	157	161(28, 546)
	Males	37	105(28, 469)	76	115(35, 602)
	Overall	120	133(23, 532)	233	140(28, 602)
LTF	Females	1,063	0(0, 597)	576	20(0, 556)
	Males	631	0(0, 456)	373	26(0, 384)
	Overall	1,694	0(0, 597)	949	23(0, 565)
Reported deaths	Females	15	154(0, 385)	7	146(0, 257)
	Males	6	27(0, 202)	9	160(0, 346)
	Overall	21	84(0, 385)	16	148(0, 346)

It is worth noting that LTF was higher among pre-ART clients than ART clients (84.5 percent vs. 64.7 percent), ($p < 0.001$). Among LTF clients, pre-ART clients were supplemented for longer periods than ART clients ($p < 0.001$).

Among graduated clients, mildly malnourished clients had shorter LOS than those with moderate and severe malnutrition. Similarly, ART clients appeared to have longer LOS than pre-ART clients (**Table 9**). In both comparisons, the differences were not significant.

Table 9. Median LOS and severity of malnutrition on enrolment

Client exit criterion	Nutrition status on enrolment	LOS for Pre-ART clients		LOS for ART clients	
		n	Median (range), days	N	Median (range), days
Graduated	Severe	12	215(26, 458)	35	158(56, 602)
	Moderate	21	218(67, 526)	33	172(64, 504)
	Mild	87	112(23, 532)	165	133(28, 546)
	Overall	120	133(23, 532)	233	140(28, 602)
LTF	Severe	515	0(0, 442)	264	18(0, 565)
	Moderate	351	0(0, 597)	198	27(0, 556)
	Mild	828	0(0, 456)	487	23(0, 442)
	Overall	1,694	0(0, 597)	949	23(0, 565)
Reported deaths	Severe	6	27(0, 525)	4	271(146, 346)
	Moderate	4	274(26, 382)	4	116(0, 149)
	Mild	11	84(60, 186)	8	140(60, 252)
	Overall	21	84(0, 385)	16	148(0, 346)

Among clients who graduated, 156 (44.2 percent) continued in the program after attaining a BMI of 20 kg/m². Median final BMI of these over-retained clients was 21 (IQR 20.3, 22.1) kg/m². The median period of over-retention was two (IQR 1, 5) months. On average, female clients were retained for longer periods than male clients (2.3 months vs. 1.2 months, respectively). The corresponding proportion of females among the over-retained clients was 70.5 percent. In addition, clients enrolled in the first phase of the program (prior to September 2006) were retained much longer after reaching the BMI endpoint than clients enrolled in the second phase (median 4.6 [IQR 1.2, 9.3] months vs. 1.2 [(IQR 1.0, 2.3)] months). Public facilities were 1.6 times more likely to over-retain clients than missionary- and NGO-supported facilities.

Among graduated clients, biological factors on admission—including severity of malnutrition and disease progression (inferred from CD4 count)—were important determinants of LOT. In addition, qualitative review indicated that factors impeding early graduation from the FBP program consisted of issues related to both the client (demand side) and provider (supply side). Syntheses from FGDs and key informant reports indicated that poor quality of service and poor adherence to recommended intake of prescribed supplemental food were possible contributors to delayed graduation. The quality-of-service concerns included shortage of staff, shortage of counseling rooms, stock-outs, the perception that porridge is not user-friendly outside the home environment, and lack of alignment between client schedules for FBP and ART services.

In some cases, there appeared to be inadequate client counseling on the importance of eating a balanced diet alongside the supplementary food. Fear of being stigmatized for taking special porridge at the workplace or at home may have contributed to non-compliance and poor adherence. Consumption of porridge does not permit privacy. cursory information suggests that communities around FBP sites easily recognize FBF prescribed by the program. The stigma associated with the supplementary food interfered with clients in transporting food from the health facility to their homes. Clients reported taking precautionary measures to avoid being seen transporting the flour. However, stigma was not universal. For example, while stigma was reported to be an impediment to porridge intake in sites such as Nairobi, it was perceived to be a lesser problem in Nyanza province.¹

Some of the far-flung facilities in the Coast and Western regions experienced stock-outs due to delays in delivery of supplies. Some delays were attributed to late submission of orders that arose from inadequate organization of the commodity management system and shortage of staff in facilities.

In accounting for prolonged treatment time, it is necessary to consider that clients enrolled prior to September 2006 may have stayed longer in the program due to unclear exit criteria. Some workers and clients even believed that FBP was to be available throughout clients' lifetimes.

¹ The province has the highest prevalence rates of HIV infection in Kenya, and the combined effort of government agencies, development partners and civil society may have reduced stigma.

Client perspectives about LOT revolved around inadequate consumption of supplementary food due to a range of factors. Although these factors were not weighted, non-adherence due to sharing of food at home was considered by clients to be the single most important contributor to inadequate intake. Sharing of food was reported in all facilities visited and was common among clients with younger dependents or HIV-positive spouses because of perceived social obligation and food consumption norms. It is clear that sharing of food can be addressed only through multiple interventions, among them intensifying client education, addressing household food insecurity and introducing different types of food products.

It was reported that weak clients could not carry large amounts of supplemental food and required money to meet transport costs. In addition, poverty among clients may have prevented them from accessing other foodstuffs. In this regard, some clients were said to rely on FBP as their only source of food, which was not the intention of the FBP food package. Poor compliance among clients was also attributed to lack of or inadequate social and family support.

Upon enrolment, some clients' poor health condition affected their ability to pay attention to the counselor, resulting in inadequate uptake of counseling services. FGDs suggested that the most intense counseling and education on the FBP program took place on enrolment. With prevailing staff shortages, clients with poor health may have missed crucial information that was not adequately covered during subsequent visits.

OIs make it difficult to swallow solid food, and recurrent illnesses such as diarrhea lead to loss of appetite and hence inability to take porridge as required. These infections were reported to be partly related to poor hygiene in clients' homes and sub-optimal health-seeking behaviors. In addition, persistent psychosocial stress was reported to be a significant obstacle to weight gain. Focus group discussants suggested that even intensive counseling given to ART clients did not eliminate psychosocial stress. Poor appetite in part may have been consequences of psychosocial stress. Affected clients would take porridge only when their appetite allowed them. Furthermore, providers associated the taste-altering effects of ART with poor appetite.

3.2.7 Issues relevant to LOT

Syntheses of the issues emerging from the quantitative and qualitative review pointed to opportunities for options to address challenges related to LOT. A summary of issues, suggested actions and expected impacts are summarized in **Table 10**.

Table 10. Synthesis of issues and opportunities related to LOT and LOS

Challenges	Weakness	Suggested action	Expected impact
Shortage of staff	Inadequate quality of service	Increase staffing; integrate FBP services fully	Increased demand for nutrition education, higher demand levels.
Shortage of counseling rooms	Inadequate quality of service	Standardize nutrition counseling and integrate in the post-test counseling and education	Increased demand for nutrition education, improved quality of nutrition education service to create and strengthen the pull effect
Stock-outs due to delay in delivery of supplies	Interruptions in supply and inconsistent intake	Develop/strengthen the pull aspects the system; automate the FBP service by integrating it with ART/pharmaceutical supply chain through information and communication technology, training and/or bring on board supply officers where the pharmaceutical supplies chain is not operational.	Improved efficiency and effectiveness of the program
Porridge as an energy and nutrient "delivery food" was	Inadequate intake and interruption while away from home and due to	Introduce alternative supplemental and RUTF; easier to consume as individual package; more effective for clients with severe/moderate	Increased energy and nutrient intake, shorter duration of recovery

considered not user-friendly in certain circumstances	stigma	malnutrition and when away from home. . Sequence treatment of severe and moderate malnutrition into RUTF + supplementary food followed by supplementary food alone.	
Alignment and integration of FBP and ART programs for ART clients not fully implemented by service providers	Client participation efficiency and facility efficiency and effectiveness decreased due to unnecessary visits and absorption capacity	Review operations of the CCC, PMTCT, VCT and inpatient services. Align schedules for client FBP and ART services. Explicitly involve clinicians in the program.	Strengthened integration of nutrition care in comprehensive services
Poor health among clients on enrolment	Inadequate responsiveness – long supplementation period, dropping out – LTF, inefficiency	Increase diagnostic/screening services for earlier detection; identify additional predictor criteria for rapid progressors	Earlier detection (during mild stage) and reduced rates of severe malnutrition; prevent progression and ensure explicit decisive protocols
Frequent and inadequate attention to OIs	Factors affecting client health-seeking behaviors (HSB); inadequate hygiene; ART services free but cost issues on diagnosis and treatment for OIs	Strengthen client counseling and education; review strategies to improve uptake and delivery of treatment for OIs	Reduced rate of severe OIs and improved efficiency of the FBP program
Sub-optimal health-seeking behaviors by clients	Delayed treatment seeking; poor personal and home hygiene	Intensify counseling and education; improve quality of care, decentralize service for OIs strengthen capacity of community liaisons (e.g., CHWs and CORPs)	Early diagnosis and treatment of OIs, improved quality of life
Cash poverty - the cost of transport	Interrupted intake or inadequate intake – smaller rations	Decentralize services – integration into ART program – comprehensive care and treatment plan	Increased access and compliance to FBP intake
Poverty – food insecurity	Rations providing 50% of energy may not be adequate for some beneficiaries.	Interface with community and joint programs with agencies providing dry rations (e.g., WFP), food production, micro-enterprise for own IGA and improvement of food security	Stabilized food security for the vulnerable; improved post-diagnosis intake for pre-ART and general community
Sharing of food at home	Inadequate counseling to overcome self stigma and facilitate disclosure; external stigma and sharing of food to minimize the stigma of a special food for PLHIV; sharing of food to benefit those not on FBP, e.g., among couples and exposed children as a special diet.	Address household food insecurity; provide alternative food packages that do not facilitate sharing such as RUTF sachets; improve education efforts	Increased compliance with FBP
Stigma associated with infection	Inadequate counseling on disclosure and self stigma; persistent external stigma against PLHIV; delayed integration	Intensify anti-stigma campaign; strengthen counseling service; demystify good nutrition for all; modify packaging of food	Reduced stigma and increased acceptance; revitalized political/policy moves to de-stigmatize HIV/AIDS

	of anti-stigma campaign		
Psychosocial stress	Inadequate counseling for the FBP program; unclear use of other measures to improve appetite	Strengthen counseling service and use of appetite stimulators and exercise	Improved quality of life and stability
ART-associated side effects and impact on taste	Inadequate counseling for the FBP program on side effects of ART	Strengthen counseling and education service to improve awareness and tolerance of side effects	Improved compliance (reduced LTF)
Lack of home support and assistance in food preparation	Porridge cooking protocol not convincing to all clients; concept of pre-cooked FBF and the significance not adequately explained to clients	Review acceptability of FBP formulations with respect to taste, smell and appearance; review the product design for the FBF.	Increased acceptability of the supplemental and therapeutic foods, increase uptake of FBP services.

3.3 ATTRITION AMONG ADULT EXIT CLIENTS

Client attrition was reviewed in the context of LTF, deaths and transfers among clients in the FBP program. Overall attrition due to LTF, deaths and transfers was 50.1 percent. LTF was the largest contributor to attrition, accounting for 98.3 percent of all cases. A relatively small proportion of client attrition (0.24 percent) was attributed to transfers. Overall, attrition was higher among males than females (52.7 percent vs. 48.7 percent, $p=0.005$).

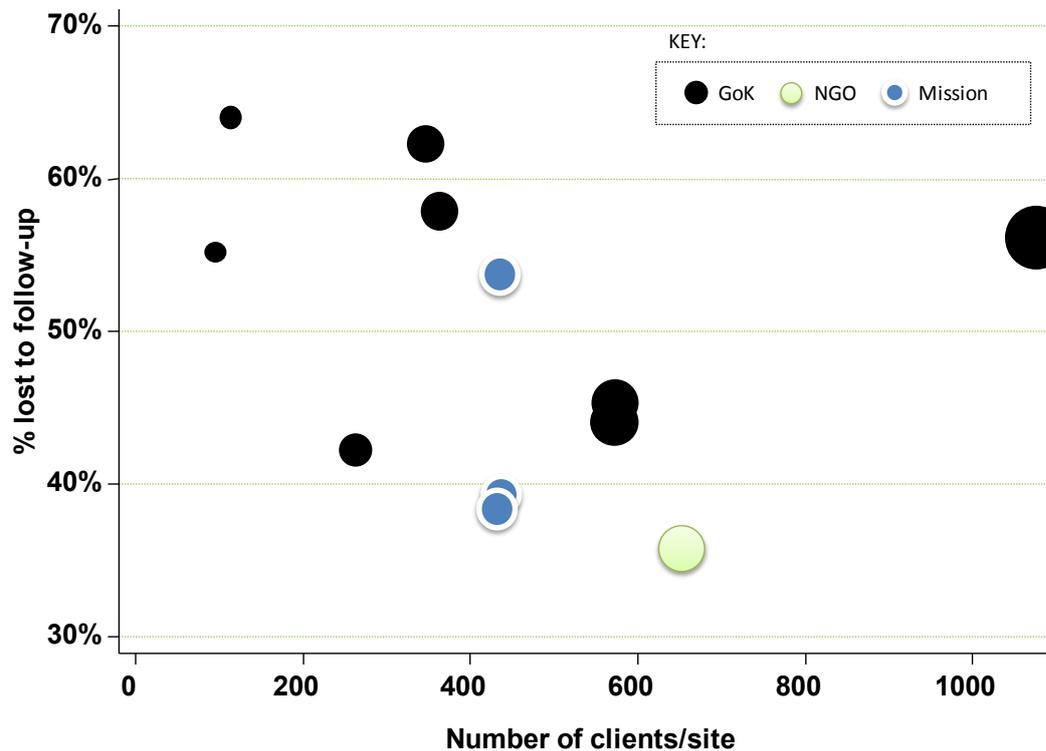
3.3.1 Loss to follow-up

In the sampled facilities, 48 percent of enrolled clients were LTF. The proportion of LTF clients in different facilities ranged from 36 percent in FACES Lumumba (Kisumu) to 64 percent in Coast Provincial General Hospital (PGH) (**Table 11**). Malindi District hospital in the Coast reported a similarly high LTF rate (62 percent). Overall, LTF was higher before September 2006 than after (58 percent vs. 48 percent).

Table 11. LTF rate in FBP review sites

Province/facility	%LTF
Central/Gatundu Sub-District Hospital	55%
Coast/Bomu Mkomani Clinic	39%
Coast/Coast PGH	64%
Coast/Malindi District Hospital	62%
Nairobi/Coptic Hospital (Ngong Road)	54%
Nyanza/Bondo District Hospital	58%
Nyanza/FACES Lumumba Health Centre	36%
Nyanza/Nyanza PGH	56%
Nyanza/Rachuonyo District Hospital	44%
Nyanza/Suba District Hospital	45%
South Rift/Nakuru PGH	42%
Western/St. Mary's Hospital Mumias	38%
Overall	48%

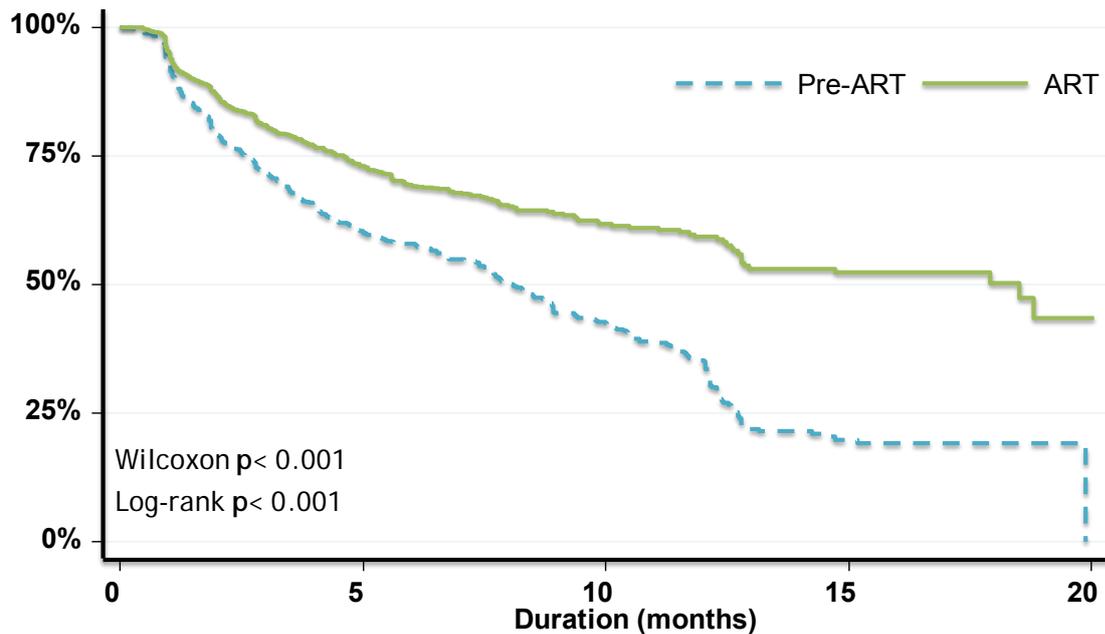
It was observed that public (GoK) facilities lost more clients (52.3 percent) than missionary-run hospitals (43.8 percent) and NGO-supported facilities (35.7 percent) (**Figure 5**). The reason for this difference was not clear, but if findings from other studies apply, differences in perceived quality of services could have been a contributing factor. However, caution is required in the interpretation of these findings because public facilities had higher workloads than missionary and NGO facilities and because the number of facilities sampled was relatively small.

Figure 5. LTF in the sampled facilities

LTF rates among pre-ART and ART clients were 56 percent and 38.5 percent, respectively ($p < 0.001$). Among pre-ART clients, 54.3 percent of females and 59.2 percent of males were LTF ($p = 0.011$). Among ART clients, LTF was similarly lower among females (36.9 percent) than males (41 percent) ($p = 0.049$). The gender difference among ART clients may be attributed in part to reported stigma, which makes men less willing to be seen carrying the food.

On average, LTF clients had poorer nutritional status than any other clients ($p = 0.015$). The median BMI at enrolment of LTF clients in both pre-ART and ART groups was lower than that of other clients by 0.16 kg/m^2 and 0.05 kg/m^2 , respectively. Thus, on average LTF clients weighed 0.5 kg to 0.2 kg less than all the other clients. The proportions of severely malnourished LTF clients were 58.9 percent and 41 percent in the pre-ART group and ART groups, respectively.

The median LOT for pre-ART LTF clients was shorter than that of the ART LTF clients (0, IQR 0, 35 days) vs. 14 (IQR 0, 64 days), ($p < 0.001$). Along with lower LTF among ART clients, longer LOT among ART clients was consistent with synergy between ART interventions and FBP (**Figure 6**). Longer LOT in ART clients could suggest poor response for several reasons including advanced disease due to late enrolment and poor adherence to the FBP instructions. It is noteworthy that these LTF clients received one to four prescriptions (median 1 [IQR 1, 2]). In this respect, a significant proportion of LTF clients could also have comprised poor responders to the interventions and those that may have taken leave from the visiting the clinic due to fatigue. Based on recent reports from Malawi (Yu et al, 2007) and anecdotal evidence from a Kenya Medical Research Institute (KEMRI)/FANTA study at FBP sites, many LTF clients may be unreported deaths that occur in the homes or in other facilities. In Malawi, it was estimated that 50 percent of the attrition/LTF was due to unreported deaths of ART clients. In this review, providers indicated that it took over two months before reports of deaths could reach the facility. Thus, actual mortality may not have been well reflected in this review due to possible poor reporting. On average, clients who died had received 3 (IQR 2, 4) prescriptions.

Figure 6. LTF, by ART status

From binary multiple regression analysis, gender, treatment group (pre-ART and ART groups), severity of malnutrition on enrolment (mild, moderate and severe) and LOT are significant predictors of LTF ($p < 0.05$). These predictors accounted for 29 percent to 38 percent of the variations in LTF events reported in this cohort. Holding all other variables constant, the model indicated that:

- Men were 1.18 (95 percent CI 1.06, 1.32) times more likely to become LTF than women ($p = 0.003$).
- Pre-ART clients were 2.04 (95 percent CI 1.83, 2.27) times more likely to become LTF than ART clients ($p < 0.001$).
- Severely malnourished clients were 1.2 (95 percent CI 1.06, 1.35) times more likely to become LTF than moderately and mildly malnourished clients ($p = 0.004$).
- Clients in facilities that became operational before September 2006 were 1.43 (95 percent CI 1.28, 1.59) times more likely to be LTF than those in facilities that became operational after September 2006 ($p < 0.001$).

3.3.2 Client perspectives about LTF

The review explored client perceptions about LTF in the FBP program and actions needed to reduce it. Clients perceived the causes of LTF to be centered on their ability to access FBP services.

The following factors emerged as the main contributing factors to LTF, according to clients:

- Reduced access following a change of residence as a result of job transfers
- Reduced access following a change of residence when clients move to stay with relatives who offer their assistance
- Poverty that leads to lack of money to meet transport costs, especially for clients who have relocated to places far from the facilities
- Poverty among the urban poor living in slums who require transport to the facility
- Employment demands for those traveling outside the facility area on assignments
- Being denied permission by the employer to revisit facility when the food prescription needs to be refilled
- The weight and bulk of the monthly food ration, which can be too heavy for some clients to carry home;
- Claims by some clients that side effects of the prescribed food were responsible for their health problems

- i. Client complaints that the porridge tasted bad
- j. Stigma associated with carrying the flour home or with eating the porridge

3.3.3 Providers' perspectives about LTF

During key informant interviews and FGDs, providers emphasized differences in client education and counseling intensity between ART clients and pre-ART clients as a possible factor in attrition. That is, they attributed lower LTF among ART clients to emphasis made in ART adherence counseling. The review was not able to capture differences in adherence counseling. There was general consensus among health workers that lack of food was a major hindrance to ART intake and that the FBP program had improved adherence to ART. Health workers also observed that pre-ART clients do not return for follow-up once they feel healthy, only to re-appear when they fall ill again.

Lack of alignment between client ART and FBP schedules may also contribute to LTF, though this was not a prominent factor identified by providers.

Suggested actions to reduce LTF:

- a. Use patient support groups to inform new patients about the benefits of supplementary food and to help trace defaulters and deaths in the community.
- b. Have social workers, CHWs and support group members conduct community visits to enhance tracing of defaulters.
- c. Decentralize FBP program activities beyond the district hospital and sub-district hospitals to improve access, similar to the process used by ART interventions.
- d. Provide transport incentives for very needy clients. Of all facilities included in this review, only Coptic Hospital gave a transport incentive. Based on assessment of client attrition data, it is possible that transport incentives may have contributed to reduced attrition.
- e. Allow helpers to collect food on clients' behalf. Clients requested that facilities that do not allow this to relax their rules; however, that would undermine the function of the program in terms of direct clinical examination, counseling and client education.
- f. Strengthen nutrition counseling to the same level as ART adherence counseling.

Synthesis of the quantitative and qualitative data yielded the matrix in **Table 12** that can guide strategies to reduce LTF.

Table 12. Synthesis of LTF issues, causes/consequences, actions and impact

Concern/issue	Cause/consequence	Suggested actions	Expected impact
Client out-migration (as a result job transfers, changing of residence to live with relatives)	Loss of a large proportion of adult clients	Strengthen/establish client referral system; improve access to FBP through treatment centers and facilitate effective linkages between them.	Increased participation of both pre-ART and ART clients
Cash poverty and inability to meet transport costs	Missed appointments, nutrition education and counseling sessions, and refill of FBP; inadequate alignment of FBP and ART visits	Integrate FBP in the decentralized system at all treatment centers to cut down on client travel.	Increased access to FBP services within the ART program
Employment demands (field assignments requiring travel or employees not granted permission to attend clinics)	Missed appointments, nutrition education and counseling sessions, and refill of FBP	Integrate nutrition interventions into workplace policy and activities; establish mechanism to allow helpers to collect food on clients' behalf	Reduced LTF and non-compliance due to interrupted use of supplemental food.

Client dropouts due to fatigue or unknown reasons	Inadequate networks of client/peer support groups; social support and defaulter tracing not well established	Establish/strengthen capacity and links of facility social support, client support groups, CORPs and CHWs	Improved group/home support, defaulter tracing and notification of deaths
Weight (9 kg per month) and bulk of the monthly food ration (too heavy for weak clients)	Package without handles makes transportation difficult	Design a reusable carrier bag with a handle; decentralize service delivery points; allow helpers to collect food on clients' behalf	Improved access to food and potentially greater access to food.
Stigma associated with the ration's packaging, carrying the food home and eating porridge	Community can tell from the packaging that the supplemental food is intended for PLHIV	Strengthen adherence counseling specific to FBP; review client satisfaction and food product options, e.g. expansion from flour to pastes, etc. is necessary; improve labeling of the food packages	Reduced stigma associated with FBP, which also can contribute to shorter treatment periods

3.3.4 Attrition in non-program facilities

From reviews of 33 ART patient cohorts from 13 African countries (including four program sites in Kenya), it was estimated that the client retention rate decreased from 79.1 percent at six months after enrolment to 61.6 percent after 24 months (Rosen et al., 2007). The same review found that LTF is the major cause of attrition, followed by death. An accurate estimate of LTF needs to be assessed at suitable points of time to understand and interpret trends over time in light of client attributes and changes in service delivery. Data from non-program sites lacked critical details to permit a reasonable comparison of LTF between FBP and non-FBP sites. This review underlines the need to integrate client retention measures in FBP programs. Activities may include assessing LTF risks, improving defaulter tracing procedures and possibly initiating ART earlier to reduce mortality (Yu et al., 2007; Rosen et al., 2007).

3.4 FBP ACTIVE CLIENTS GROUP

From a therapeutic standpoint, food prescriptions should be provided until clients achieve a healthy BMI of $\geq 18.5 \text{ kg/m}^2$, i.e., exceeding the admission criterion. However, the FBP program design at the time of the review allowed for continuation of supplementation until clients attained the graduation endpoint of BMI $\geq 20 \text{ kg/m}^2$, with a view toward minimizing the likelihood of relapse. To gain deeper insights into responses to supplementation after attaining BMI $\geq 18.5 \text{ kg/m}^2$, data from clients who had BMI $\geq 20 \text{ kg/m}^2$ were analyzed.

3.4.1 Characteristics of FBP active clients group

The majority of the FBP active clients (AC) group were female (210, 65.63 percent) with a mean age of 34.02 years. Male clients were significantly older than female clients (39.3 years vs. 34.02 years, $p < 0.001$). The AC group comprised 122 (38.13 percent) pre-ART clients and 198 (61.88 percent) ART clients. Although slightly older than the EC group, in most respects the AC group and EC group were similar. Examination of client enrolment rates showed a rapid build-up in numbers that peaked during the first three months after sites opened, followed by approximately steady enrolment rates.

3.4.2 Nutritional status

On enrolment, the median BMI in the pre-ART [17.8, IQR 17.3, 18.2 kg/m^2 , (n= 122)] and ART clients [17.5, IQR 16.7, 18.1 kg/m^2 , (n=198)] were comparable (**Table 13**), as was the median BMI of males and females in the AC group ($p=0.906$). However, the AC group was nutritionally better off than the EC group (17.10, IQR 15.8, 17.9 kg/m^2 vs. 17.6 IQR 16.8, 18.1 kg/m^2). Furthermore, the majority of AC clients (74.4 percent) were mildly malnourished at enrolment and the proportion with moderate and severe malnutrition was half that observed in the EC group (49 percent vs. 25.6 percent). On average, the proportions of moderately and severely malnourished AC clients were 13.75 percent and 11.88 percent, respectively. These findings indicate that the nutrition status at enrolment of the AC group was better than that of the EC group.

Table 13. AC group's median BMI at enrolment

ART Status	Severity of malnutrition (kg/m ²)			Initial BMI kg/m ²	
		n	%	Median	IQR
Pre-ART	Severe (< 16)	9	7.4	15.2	15.0, 15.8
	Moderate (16 -17)	14	11.5	16.6	16.23, 16.9
	Mild (>17- 18.5)	99	81.1	18.0	17.7, 18.3
	Total	122	-	17.8	17.3, 18.2
ART	Severe (< 16)	29	14.6	15.4	14.5, 15.8
	Moderate (16 - 17)	30	15.2	16.4	16.2, 16.9
	Mild (>17- 18.5)	139	70.2	17.9	17.5, 18.2
	Total	198	-	17.5	16.8, 18.1

3.4.3 Disease progression and severity of malnutrition of AC group

The standard approach in assessing disease progression includes use of the CD4 cell count. Enrolment CD4 cell count data were available for 45 percent and 68.2 percent of the pre-ART and ART AC group, respectively. The median CD4 count in the pre-ART group (283, IQR 103, 440 cells/ μ L) was higher than in the ART group (174, IQR 80,255 cells/ μ L), though the difference was not statistically significant. In both groups, a lower median CD4 count was evident in severely malnourished clients ($p=0.028$) (**Figure 7**). Overall, the median CD4 counts in the mildly malnourished clients were significantly higher than in the severely malnourished ($p=0.013$) but not significantly higher than in moderately malnourished clients ($p=0.642$). A positive correlation between baseline CD4 cell counts and baseline BMI was consistent with other reports of this correlation (**Figure 7**). The regression equation indicates that an increase of 44.2 cells/ μ L (95 percent CI 18.3, 70.1) was associated with an increase of one BMI unit ($p<0.001$). The lower average BMI and the larger proportion of severely malnourished ART clients than pre-ART clients (14.65 percent vs. 7.38 percent, $p= 0.051$) may in part be related to the higher occurrence of OI signs and symptoms among ART clients (73.7 percent vs. 50.8 percent, $p<0.001$).

Figure 7. Relationship between CD4 and BMI

3.4.4 Response to food supplementation in the AC group

The median total BMI increase of 1.43 (IQR 0.72, 1.90) kg/m² in the pre-ART AC group was comparable to the 1.56 (IQR 0.98, 2.6) kg/m² gain observed in the ART group. The estimated median rate of BMI increase in the pre-ART clients (0.35, IQR 0.18, 0.68 kg/m²/month of supplementation) was comparable to that of the ART clients (0.33, IQR 0.18, 0.66 kg/m²/month). From anthropometric data from the KEMRI/FANTA study, it was estimated that for the adult population, an increase of 0.37 kg/m² BMI units is approximately equivalent to a 1 kg body weight gain. Applying the estimated median rate of BMI increase (0.35 kg/m² /month) yields weight gain of 0.95 kg per month. Among advanced moderately and severely malnourished PLHIV, a BMI increase of at least 2 kg/m² (\approx 5.5 kg) would be required for the clients to reach the BMI cutoff point of 18.5 kg/m². As expected, LOT increased with increasing severity of malnutrition.

3.5 RE-ADMISSION OF CLIENTS INTO THE FBP PROGRAM

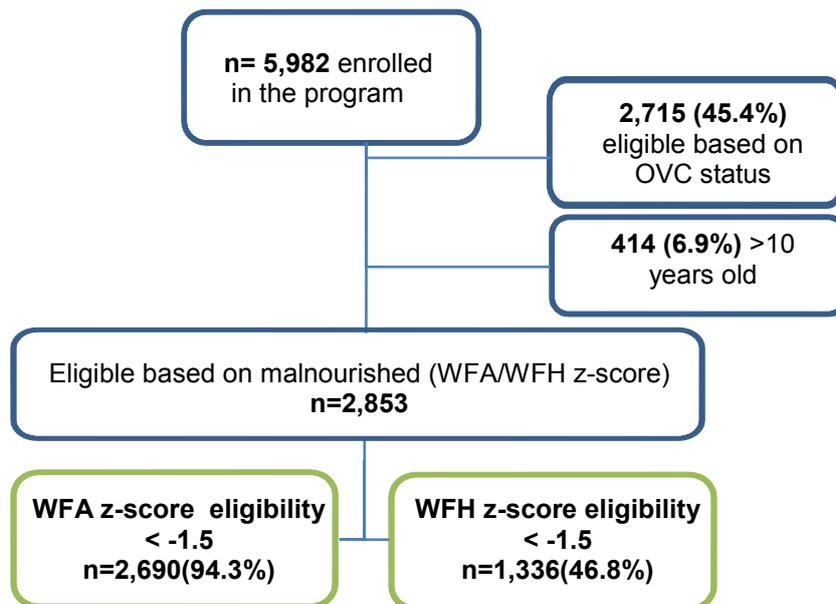
Client readmission entails enrolment of clients who had exited the program upon attaining BMI \geq 20 kg/m². Readmission indicates inadequate post-treatment maintenance of established nutritional normalcy. Relapse into malnutrition was assessed in a sub-sample of facilities. Overall, 9.8 percent of clients readmitted into the FBP program were ART clients and 18.3 percent were pre-ART clients. The lower relapse rate among ART clients could partly be accounted for by stabilization of disease as a result of treatment.

Assuming adequate control of OIs, relapse could be due to other factors, including inadequate continuation of nutritional interventions during client follow-up. The FGDs revealed that some clients largely depended on the food rations prescribed to them. Thus, with no clear measures to address poverty-related food insecurity, relapse may occur among food insecure clients. Therefore, the FBP program interventions should be linked to livelihood improvement interventions that can ensure access to adequate food in the post-graduation period. Since the graduation cutoff point of BMI 20 kg/m² was set to guide the pilot phase, prospective monitoring of relapse of malnutrition among clients is required to gauge its validity as a cutoff point for graduation. Furthermore, a mechanism is required for effective post-graduation follow-up and reporting for both pre-ART and ART clients.

3.6 ORPHANS AND VULNERABLE CHILDREN

3.6.1 Characteristics of OVC

OVC were the second-largest group 5,982 (41 percent) of clients in the FBP program. OVC clients comprised 6- to 23-month-olds (55.73 percent), 2- to 4-year-olds (20.71 percent), 5- to 10-year-olds (16.63 percent) and 11- to 17-year-olds (6.92 percent). The gender distribution of OVC indicated almost equal proportions of females and males (51.9 percent vs. 48.1 percent). A total of 2,715 (45 percent) OVC who were not yet malnourished were enrolled because of their vulnerability. OVC over age 10 (414, or 6.9 percent) were excluded from this analysis because of lack of standardized cutoff points for malnutrition. The remaining OVC (48 percent) had been enrolled into the program because they were wasted (low WFH) and/or underweight (low WFA) at < -1.5 z-score. The WFA z-score was the most common indicator reported (n=2690, or 94.3 percent) for malnourished OVC (**Figure 8**). In this subgroup, there were equal proportions of females and males. It is noteworthy that more than half of the enrolled OVC were from Nyanza Province and over 30 percent of these children were enrolled in Nyanza Provincial General Hospital. In addition, 25.1 percent (n=716) of all malnourished OVC were on ART.

Figure 8. OVC enrolled in the program

3.6.2 Nutritional status of OVC eligible based on malnutrition

The median WFA and WFH z-score for malnourished eligible children was -2.9 (IQR -3.9, -2.2) and -2.7 (IQR -3.6, -2.0), respectively. Based on a <-3 z-score cutoff, the proportions of children who were severely underweight or wasted were 47 percent and 39.4 percent, respectively (**Table 14**). The proportions of wasted or underweight children initiating FBP in the ART and pre-ART groups were comparable ($p>0.512$) (**Table 14**).

Table 14. Characteristics of eligible OVC clients enrolled in the FBP program

Client characteristics ^a	Overall	ART	Non-ART
Number of clients	2,853	716(25.1%)	2,137(74.9%)
Females	1,432	348(24.3%)	1,084(75.7)
Males	1,421	368(25.9%)	1,053(74.1%)
WFA z-score (underweight)			
Severe	47.0%	48.5%	46.5%
Moderate	34.9%	34.3%	35.1%
Mild	18.1%	17.2%	18.4%
WFH z-score (wasting)			
Severe	39.4%	41.7%	38.7%
Moderate	36.4%	36.1%	36.4%
Mild	24.2%	22.2%	24.9%

^aClient characteristics based on 716 ART clients and 2,137 pre-ART clients

On enrolment, severely malnourished OVC were 1.2 (95 percent CI 1.06, 1.4) times more likely to have OIs than mildly or moderately malnourished OVC ($p=0.006$).

3.6.3 Period of food supplementation for OVC

Among OVC who met exit criteria (≥ -1.0 z- score), the proportion of clients whose nutrition status had improved was greater in the ART group than in the pre-ART group ($p<0.001$) (**Table 15**). On average, LOT for children with low WFH z-score whose healthy nutritional status was restored was 3.9 (IQR 2.3, 5.7) months ($n=260$).

Table 15. Recovery from wasting and underweight based on WFH/WFA z-score

Client characteristics	ART	Pre-ART
WFH z-score (wasting)	n=331	n=973
Number of clients recovering	92	166
Females	43(30.5%)	98(69.5%)
Males	49(41.9%)	68(58.1%)
WFA z-score (underweight)	n=671	n=1997
Number of clients recovering	57	128
Females	28(29.5%)	67(70.5%)
Males	29(32.2%)	61(67.8%)

^aNot all data were available for final WFH/WFA z-score.

Among ART OVC, the recovery rate based on WFH z-score was approximately 27.8 percent (92/331) and the median LOT was 5.2 (IQR 3.3, 7.7) months. Among pre-ART OVC, median LOT was 3.8 (IQR 2.1, 5.3) months (p=0.002).

3.6.4 LTF among OVC

LTF among OVC was estimated at 45.5 percent. However, LTF seems to have been higher in high volume facilities, reaching over 70 percent in some facilities. LTF rates were similar at provincial hospitals (54.6 percent) and sub-district hospitals (54.8 percent) but lower at health centers (31.7 percent). Among LTF clients, the median number of prescriptions dispensed was one (IQR 1, 3), which suggests that many children did not return for follow-up.

3.6.5 Nutrition status of OVC who were not malnourished

The overall WFH and WFA z-score among OVC enrolled in the FBP on the basis of OVC status (i.e., not malnourished) were 0.53 (IQR -0.22, 1.42) (n=1,317) and 0.41 (-0.99, 0.32) (n=1452) respectively. Twenty percent of these children were on ART (Table 16). There were no overnourished children.

Table 16. Baseline characteristics for non-malnourished OVC (n=2715)

Client characteristics		Overall Median(IQR)	ART Median(IQR)	Pre-ART Median(IQR)
WFH z-score (wasting)	n		n=259	n=1058
Baseline characteristics	1317 ^a	0.53, (-0.22,1.42)	-0.4;(-0.33,1.12)	0.57;(-0.18,1.47)
Females	731(55.5%)	0.51, (-0.29,1.4)	0.48;(-0.35,1.18) ¹	0.52;(-0.22,1.44) ²
Males	586(44.5%)	0.57, (-0.21,1.45)	0.38;(-0.32,1.09) ³	0.62;(-0.14,1.49) ⁴
WFA z-score (underweight)			n=295	n=1157
Baseline characteristics	1452 ^b	0.41;(-0.99,0.32)	-0.68;(-1.14,-0.17)	-0.32;(-0.96,0.41)
Females	791(54.5%)	-0.39;(-0.97,0.36)	-0.68;(-1.17,-0.04) ⁵	0.48;(-0.35,1.18) ⁶
Males	661(55.5%)	-0.44;(-0.99,0.28)	-0.68;(-1.13,-0.24) ⁷	0.38;(-0.32,1.09) ⁸

^aNot all data were available for baseline WFH z-score.

^bNot all data were available for baseline WFA z-score.

N values: ¹ n=148; ² n=583; ³ n=111; ⁴ n=475; ⁵ n=160; ⁶ n=631; ⁷ n=135; ⁸ n=526

3.7 CHARACTERISTICS OF PREGNANT AND POSTPARTUM WOMEN

A total of 1,765 P/PP women were enrolled in the sampled facilities, accounting for 12% of the FBP clientele. Their mean age was 27.2 (range 15-50) years. Pregnant clients constituted 60.3% of the group, with the remainder postpartum. Nearly a third (31.8%, or 561) of the P/PP clients were on ART. The median number of dispensed food prescriptions was one (IQR, 1-2), and LTF was estimated to be about 59 percent.

3.8 FBP SERVICE DELIVERY SYSTEM

3.8.1 Food delivery to facilities

The food delivery system at the time of the review was based on a push system, where food is provided to the facilities based on demand forecasts established by the supplier. The system components included the facilities and Insta's factory and sales/marketing department, which served as distributor and retailer. The standard operating procedure required the facilities to send a demand

signal (order) to the distributor indicating that supplies are running out through mobile telephones or other convenient means at least two weeks ahead of the expected date of delivery of new stocks. In general these orders were not standardized and came through direct calls or short text messages. The system not only faced challenges because of late arrival of facility orders, but because the three food formulations that are currently distributed have a shelf life of nine months and storage space in the facilities is a major constraint. Shortfalls at the facility level were attributed to inadequacies in the inventory control system. It is noteworthy that the design of the FBP program recommended that commodities (food and water treatment kits) be managed through pharmacies. Experience on the ground showed that this recommendation was not universally implemented, particularly because of limited storage space in most pharmacies. In addition, the FBP program commodity management operated as a vertical system under the supervision of the facility nutritionist or assigned staff. Because of these challenges, the distribution system experienced routing difficulties in the delivery of the commodities. One issue that emerged is the responsiveness of the system to changes in demand and the effectiveness of inventory control in a scaled-up program.

3.8.2 Facility perspectives

Facility-level FBP program delivery systems varied across the sampled facilities. Nine performance areas were identified during this review to facilitate assessment of FBP sites (**Table 17**). The fundamental variations were in staffing--particularly with respect to nutritionists, who are considered pillars of the FBP program--and in default tracing mechanisms. With the exception of Gatundu Sub-District Hospital, no facility had aligned the FBP program client schedule with that of the ART program. Dispensing of supplemental food prescriptions was predominantly carried out in nutritionist stations and not pharmacies as initially expected. With the exception of Nyanza Provincial General Hospital and Coptic Hospital, storage was inadequate. Assuming equal importance of the nine performance areas (**Table 17**), a score of 1 (present) or 0 (absent) was assigned to each item. The sum of scores was used as a proxy indicator of the facility response or compliance with the FBP guidelines. Based on those scores, Coptic Hospital, Nyanza Provincial General Hospital, Bomu Mkomani Clinic and St. Mary's Hospital had the best organized service delivery systems.

Facility reviews indicated that where nutritionists were available, they directly took charge of the FBP program, including nutritional assessments, dispensing food and record-keeping. Nurses screened clients and in some cases conducted nutrition assessments while clinical officers made clinical observations. Counselors interacted with clients in the counseling stage and social workers conducted social assessments and sometimes follow-up in the community. With this organization of duties and responsibilities, it was clear that FBP services were delivered as a vertical program. Most CCCs visited had only one nutritionist, who tended to handle almost all the matters relating to FBP. Invariably, this could overburden the nutritionist and hinder program performance. In contrast, the findings of this review indicated that nutritionists have considerably smaller workloads in stations where pharmacists dispensed the food prescriptions. Without exception, full integration of FBP services into the ART program was not evident, underscoring the need to strengthen integration of FBP services at all service points to improve acceptance and optimization of their delivery. In this regard, it was noted that some facilities were enrolling clients with BMI of ≥ 18.5 kg/m². This practice was more widespread in public facilities (19.14 percent of clients). NGO- and missionary-supported facilities followed with 7.1 percent and 6.6 percent, respectively. Overall, admission of adult clients with a BMI > 18.5 kg/m² was 15.02 percent.

At all CCCs visited, the FBP service was associated with nutritionists. Consequently, with the exception of NPGH, FBP was managed as a stand-alone program of the nutrition section. This did not augur well for integration of planning and implementation. The perception of FBP as stand-alone needs to be addressed so that nutritional interventions, including FBP services, can be integrated within the wider context of an ART program. However, for effective integration, it is necessary to review staff shortages and especially ensure that CCC health staff have good knowledge and skills on nutrition and that FBP protocols are available. Explicit involvement of medical clinicians throughout FBP design, orientation, training and implementation is also an important step toward ensuring integration of FBP services with clinical HIV services.

The role of the facility supplies office was not evident in the sampled facilities. Similarly, it was noted that because of space shortages, food supplies were not stored in the pharmacies as initially recommended. This highlighted the need to review the facility protocols for management of the FBP

program. According to the design of the FBP program, facilities were expected to provide space for food storage and provisions for tracking patients. This expectation had not been realized in majority of the facilities visited (**Table 17**) and may be a common shortcoming across all participating facilities. Consequently, innovative approaches to address food storage and other infrastructural needs identified earlier will be required. It is noteworthy that the supply of ART and key pharmaceuticals to hospitals is almost fully based on a pull supply chain system, where production and distribution are demand driven so that they are coordinated with actual facility orders.

Provider FGDs showed that the ART delivery system was perceived to be better organized than the FBP program. The ART delivery system in most facilities was prompt and used computerized record-keeping and stock monitoring.

Table 17. FBP service delivery system in the sampled facilities

Implementation Strategies										
Facility	Client-Related Features				Facility-Related Features					Total score
	Defaulter tracing mechanism in place	Treatment helpers can collect food	Alignment of ART and FBP schedules	Provision of transport incentive	Program run by nutritionist	Involvement of volunteer staff	Food dispensed at main pharmacy	Food dispensed at nutrition office	Adequate storage capacity	
Coptic Hosp.	+	-	-	+	+	+	+	-	+	6
Nyanza Prov. Hosp.	+	-	-	-	+	+	+	-	+	5
FACES Kisumu	-	-	-	-	-	-	+	-	-	1
FACES Suba	-	+	-	-	-	+	-	+	-	3
Bomu Mkomani Clinic	+	+	-	-	+	+	-	+	-	5
Malindi Dist. Hosp.	-	+	-	-	-	+	-	+	-	3
Gatundu Sub-Dist. Hosp.	-	-	+	-	+	+	-	+	-	4
St Mary's Mumias Hosp.	-	+	-	+	+	+	-	+	-	5
R.Valley Prov. Hosp.	-	-	-	-	+	-	-	+	-	2

+ present; - absent

3.8.3 Challenges in the integration of FBP services

3.8.3.1 Integration of services

On a pilot scale, it would appear that the push system performed satisfactorily, though there may be limitations to this approach at scale. The distributor estimated that about 2 percent of food products were wasted because they expired. However, although stock-outs were reported at the more distant sampled facilities, the magnitude of this problem was not comprehensively assessed. Key issues such as precise estimation of facility requirements cannot be addressed in the existing system. Late arrival of prescription forms from facilities is also common. Key informant interviews and FGDs with providers identified the following challenges:

- Delays in supplies occasioned by late placement of orders
- Lack of supply chain management system to monitor stocks and expiration dates
- Limited storage capacity in CCCs and health facilities at large

- Failure to integrate FBP program activities into ART program at most facilities
- Failure of most facilities to align FBP and ART schedules.
- Lack of counseling space (hence weak counseling)
- Increased workload for the nutritionist
- Off-loading the supply from the truck into the store, especially where facilities do not have support staff
- Food packages that are too bulky and heavy for weak patients
- The USAID label on the package, which is viewed as stigmatizing FBP clients (communities around facilities are aware that it is a food donation to HIV-positive people)
- Distribution of rations every two weeks, which has cost implications as patients come for ARVs monthly or quarterly
- Lack of referral mechanisms to lower facilities, forcing clients who change residence to drop out of the program

These challenges are in part associated with inadequate integration of FBP commodity management into the facility supply system and shortage of storage space, especially at the pharmacy. Evidently, a review of the delivery system to facilitate adoption of a pull system is required, especially in scaling up the program. Review of facility inventory control system to enable effective daily or at least weekly stock assessment and reporting, standardized facility orders to the distributor, reduced delivery time and, above all, enhanced communication between the facilities and distributor are all required.

3.8.3.2 Client attributes

FGDs indicated FBP clients would prefer to pick up their food from the nutritionist rather than at the pharmacy to avoid long queues and delays. In addition, clients raised concerns about the design of the food package. For example, the package containing supplemental food lacked a handle. The dates of manufacture and expiration were not written in permanent ink, and the USAID label was often misread as "AIDS," thereby causing stigma. Clients also complained that the package was bulky and too heavy for weak patients. As observed in earlier sections, this concern could partly be addressed by using high-density food such as RUTF, along with strategies to deal with challenges of food supplement transportation.

In addition, integration of prescribed food in the home environment may pose a challenge to clients, given the social and interactive nature of food consumption in familial settings. This problem is particularly important because of stigma and low rates of disclosure of HIV status. To achieve good integration at home, greater efforts to reduce stigma among clients are required.

4. Conclusions and Recommendations

4.1 CONCLUSIONS

The FBP program was designed to address nutrition intervention gaps in HIV palliative care and support for vulnerable groups and to augment the ART program. The distribution of FBP services corresponds to established geographic patterns of HIV infection in Kenya (KDHS, 2003). Facilities in Nyanza province and provincial hospitals in general accounted for the majority of enrolled clients. These findings emphasize significant burdens of malnutrition among PLHIV and OVC. The review drew data from approximately half of all clients ever enrolled in facilities across the country as of September 2007. However, selection bias in the retrospective design of the quantitative aspect of this review, along with exclusion of non-eligible clients and LTF clients, may limit generalization of the findings and observations. Similarly, use of relatively new client cohorts in the FBP program and inability to access exited clients limited the extent to which issues such as LTF and food use at home were addressed. Nevertheless, the relatively large numbers of clients in the review allow conclusions pertinent to the FBP services and delivery system in the sampled facilities to be made.

The gender and age characteristics of PLHIV clients conformed to the established distribution patterns of HIV infection at community level. The majority of the PLHIV clients were in their fourth decade of life. The findings of this review indicate that over half of the PLHIV enrolled in FBP program were mildly malnourished. The remainder were nearly equally distributed between severe and moderate malnutrition. Approximately 75 percent of OVC were under 5 years of age. However, in the absence of data on complete nutrition assessment at the CCCs, the precise rates of malnutrition among PLHIV and OVC could not be estimated. Effective integration of nutrition services in CCCs require that height assessments of PLHIV be made and that FBP services be linked to form broad nutrition services at the service delivery point. In addition, provision of MUAC tapes is also required for effective data assessment of the P/PP clients.

The program resulted in an overall net weight gain among PLHIV. However, while LOT for the malnourished clients was three to four months of food treatment, the average rate of weight gain of 0.3 to 0.4 kg/m²/month was relatively low for clients with advanced malnutrition. This translated into an average of about 1 kg per month. Thus, individuals requiring a BMI increase of 2 kg/m² (\approx 5.5 kg) would require close to five months to reach the endpoint as defined in this program (BMI \geq 20 kg/m²). Another possible factor contributing to the long time to graduation is that only supplementary foods are used, not therapeutic foods that are designed for severely malnourished individuals.

Low adherence due to sharing of prescribed food and high LTF may have contributed to the overall response levels estimated in this review. The role of OIs in continued weight loss among clients could not be fully assessed because of lack of data from follow-up client revisits. A detailed investigation is needed to establish the roles of factors associated with weight loss among FBP clients and possible mitigating factors. In the meantime, mitigation of factors affecting adherence and prescription of higher-energy-dense food formulations during the first month or two of treatment may help improve recovery rates among FBP program clients.

Nutrition recovery among clients on ART and those in the pre-ART stages was similar. CD4 counts and severity of malnutrition appear to be predictors of response to the FBP interventions. Compared with pre-ART clients, a greater proportion of ART clients graduated from the FBP services and a smaller proportion were LTF, findings that were consistent with better responsiveness of ART clients. These findings may be accounted for by the biological benefits of ART, the greater incentive that ART clients have to return to the clinic to receive medications and the adherence counseling that ART clients receive.

LTF in the FBP program was unacceptably high. While LTF is a complex, multifactorial phenomenon, the findings in this review conformed to those in the KEMRI/FANTA study in the sense that the majority of clients were lost after enrolment. LTF ranged from 36 percent to 64 percent in different facilities, suggesting variations in service delivery factors or client behaviors across the sampled facilities. The predictors of LTF were male gender, pre-ART status, severe malnutrition and enrolment in the first nine months of the program. FGDs and key informant interviews identified migration, job transfers, poverty, employer restrictions, stigma and taste of porridge as key contributing factors to

LTF. It is useful that client enrolment process identifies risks for LTF and takes into account possible mitigating interventions.

At the service delivery level, FBP implementation guidelines were not strictly adhered to at either public or private facilities. Fifteen percent of enrolled clients did not meet admission criteria since they had BMI > 18.5 kg/m², and 20 percent of clients who graduated remained in the program long after attaining graduation requirements. In addition, the absence of complete client data was not uncommon. Efforts to improve data capture and reporting are required at the facility level.

Primary challenges to FBP service delivery were inadequate staffing and infrastructure for counseling and food storage. The presence of volunteers in the majority of facilities and the storage of food in offices underscored the determination of facilities to cope with program-related challenges. However, of immediate concern was limited capacity of volunteers to carry out anthropometric measurements and record observations correctly. In this review, a significant proportion of records had to be excluded from analysis because of incorrectly and incompletely recorded data. Measures to improve observance of guidelines and implementation of quality assurance procedures, adequately trained professional staff, capacity building for all frontline personnel, good data-capture tools and adequate functional equipment are required. In addition, while management at the central level and the facilities have supported the FBP program, its implementation is largely vertical. It is necessary to mainstream these services into the CCCs and other service points such as MCH clinics and hospital wards. Mainstreaming FBP services into programs supporting mitigation of HIV's impact in the community is also required, especially in care and support of OVC and other vulnerable groups, including post-graduation clients.

The production and distribution components of the FBP program were linked to facilities with a reasonably effective mobile phone communication arrangement. While the program uses a push supply system, performance was not plagued with the usual shortcomings of such systems, such as wastage. Stock-outs in some facilities were attributed to deficits in the facilities' inventory control system. Alignment of the FBP program activities with monitoring, reporting and commodity management systems for the ART program is required for optimal FBP service delivery. To accomplish this, a nutrition care and support algorithm and supporting standard operating procedures must be developed.

Large variations in facility reporting levels limit the extent to which this review's findings on LOT, LTF and reported deaths can be generalized. Moreover, the size of the usable dataset limited the extent to which cohorts recruited before and after review of the program guidelines could be analyzed. These data limitations necessitate caution in the interpretation and generalization of findings on service outcomes. The program history depicts an incremental improvement process. In addition, data on the use of food and point-of-use water treatment can be effectively captured only at the community level, and a process that facilitates such data collection may be valuable. It is likely that extension of the period under review could yield better numbers to permit deeper insights into program performance and identify best practices among facilities.

4.2 RECOMMENDATIONS

1. FBP program services are valued by providers as key strategy toward realization of the national objectives stated in GOK policy documents (Kenya National AIDS Strategic Plan and the National Health Sector Strategic Plan [2005-2010]). Emerging research findings and program experiences support optimization and scale-up of the program. It is necessary to develop policy guidelines that will ensure further integration of FBP services into existing programs and transition from a vertical system to alignment with ART and pre-ART patient management, ART inventory, data capture, analysis and reporting.
2. The LOT for the malnourished appears to be on average three months. Because of the relatively large nutritional deficits, treatment of severely and moderately malnourished PLHIV requires higher-density food formulations such as RUTF. Measures that ensure high adherence and compliance are also needed.
3. Client attrition is an important factor in FBP and ART services. This review underscores the need for measures to improve client retention after initiating food treatment. Interventions to strengthen

counseling services to address behavioral responses, support for decentralization of FBP services and establishment of community linkages to increase accessibility, forestall LTF and facilitate post-graduation follow-up are necessary.

4. Non-compliance and non-adherence to FBP instructions, especially due to sharing of food and skipping prescribed food due to stigma, are critical factors that undermine the success of the program. Innovative approaches to develop and use more efficacious individualized food formulations and escalate the fight against stigma are needed to improve treatment of malnutrition among vulnerable groups. In addition, a review of the branding on the food carrier bag and adding handles for easier portability would be helpful.
5. While the FBF formulations available in the program have a wide acceptance, the taste was a cause of concern for new entrants to the program. This complaint was associated with compliance and adherence problems. The concept of pre-cooked flour was new, and short cooking times did not yield the porridge that clients were familiar with. Group counseling and cooking demonstrations are required to help acclimate new clients to the porridge's taste.
6. Health providers may frequently experience difficulties in discharging FBP clients who have graduated but have low food security. Strong coordination of food-based interventions among stakeholders and strengthening capacity of relevant civil society organizations working in communities are required to provide continuity.
7. FBP program facilities had different levels of human resources, infrastructure and equipment. Support to ensure adequacy of these resources is central to mainstreaming nutrition care and support.
8. Decentralization of services to ensure easier access to centers with adequate capacity for simple anthropometric assessment could improve early detection and referral of high-risk clients.
9. The current food delivery system is based on a push system that is backed up by a reasonably efficient ordering system using mobile phones. Still, inventory control systems have not been uniformly developed across all program facilities. Capacity building to strengthen facilities' inventory control systems and data transfer to the distributor's system is required as part of development of a pull system.
10. While the measures outlined above are adequate for monitoring and process evaluation, subsequent phases of the program should include plans and strategies for integration of impact evaluation in the program design.

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ANNEX 1. Food and Water by Prescription Form



USAID
FROM THE AMERICAN PEOPLE

FOOD AND WATER BY PRESCRIPTION FORM



DATE: Site Name:

No259003

THIS SECTION **MUST** BE FILLED IN FOR ALL CLIENTS INCLUDING CHILDREN

NAME: _____

PATIENT FILE NO _____ AGE/DoB: _____

GENDER M F HEIGHT/LENGTH(cms) _____ WEIGHT(Kgs) _____ ARVs: Y N

CD4: _____ OPPORTUNISTIC INFECTIONS Y N NEW PATIENT IN CLINIC Y N IN-PATIENT Y N

MONTHS ON FBP: NO. OF FAMILY MEMBERS ENROLLED IN CLINIC

PRODUCT TYPE	CRITERIA	REASON <small>(Please tick one or more where applicable)</small>	QUANTITY <small>(MONTHLY RATION) <small>(Strictly distribute as indicated)</small></small>
1. ADVANTAGE	HIV POSITIVE PREGNANT	Trimester <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 MUAC (cms) Poor weight gain <input type="checkbox"/> Other signs of malnutrition <input type="checkbox"/>	2 bags <input type="checkbox"/> (300g per day)
	HIV POSITIVE POSTPARTUM <small>(Please tick the month)</small>	Month <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6	2 bags <input type="checkbox"/> (300g per day)
2. FIRST FOOD	ORPHANED OR VULNERABLE CHILD(OVC) <small>Age group: 6 - 24 months</small>	Underweight <input type="checkbox"/>	12 Sachets <input type="checkbox"/> (100g per day)
		Orphan <input type="checkbox"/>	
		HIV Positive Care giver <input type="checkbox"/>	
		HIV Positive status of Child <input type="checkbox"/>	
	Other.....		
	OVC Z - SCORE < - 1.5 <small>(Age group 2 - 4 yrs)</small>	<input type="checkbox"/>	24 Sachets <input type="checkbox"/> (200g per day)
	HIV+ Z - SCORE < - 1.5 <small>(Age group: 5 - 10 yrs)</small>	<input type="checkbox"/>	
3. FOUNDATION PLUS	HIV+ Z - SCORE < - 1.5 <small>(Age group: 11 - 17 yrs)</small>	<input type="checkbox"/>	2 Bags <input type="checkbox"/> (300g per day)
	HIV+ BMI < - 18.5 <small>(Age group: 18 and above)</small>	<input type="checkbox"/>	
	HIV+ MUAC (cms) <small>(For Bedridden Patients)</small>	<input type="checkbox"/>	
4. WATERGUARD	Have to be enrolled into FBP	No Access to clean and safe drinking water	1. Bottle* (150ml) <input type="checkbox"/> <small>(For 3 months per household)</small>

COMMENTS: _____

PRESCRIBING NURSE, CLINICAL OFFICER OR NUTRITIONIST'S NAME _____ SIGNATURE _____ DATE:

KEY: ARVs= Anti Retrovirals, CCC= Comprehensive Care Center, MUAC= Mid Upper Arm Circumference, BMI= Body Mass Index,
*1 bottle of water guard lasts for 3 months

COPY 1 = INSTE

ANNEX 2. Food by Prescription Discharge Form



USAID
FROM THE AMERICAN PEOPLE

FOOD BY PRESCRIPTION DISCHARGE FORM



DATE

SITE/FACILITY

No. 42702

THIS SECTION **MUST** BE FILLED IN FOR ALL CLIENTS INCLUDING CHILDREN

NAME: _____ PATIENT FILE NO: _____

AGE/DoB: _____ GENDER: M F HEIGHT / LENGTH (cms) _____ WEIGHT (Kgs) _____

ARVs: Y N CD4: _____ OPPORTUNISTIC INFECTIONS: Y N

NUMBER OF MONTHS HAVE BEEN ON FBP: _____

EXIT CRITERIA	TARGET GROUP	<input checked="" type="checkbox"/> (Please Tick One Applicable)
1. Z Score > -1.0	Ages 2 - 4 Yrs	<input type="checkbox"/>
	Ages 5 - 10 Yrs	<input type="checkbox"/>
	Ages 11 - 17 Yrs	<input type="checkbox"/>
2. BMI > 20	Adult > 18Yrs	<input type="checkbox"/>
3. Post - Partum > 6 months	Post - partum Mothers	<input type="checkbox"/>
4. MUAC > 24 (cms)	Pregnant Mothers	<input type="checkbox"/>
Other Reason(s) for discharge _____		

COMMENTS OR SUCCESS STORY ABOUT PATIENTS: _____

DISCHARGING NURSE,
CLINICAL OFFICERS' / NUTRITIONISTS' NAME: _____

SIGNATURE: _____

KEY: ARVs = Anti Retrovirals, CCC = Comprehensive Care Center, MUAC = Mid Upper Arm Circumference,
BMI = Body Mass Index, DoB = Date of Birth

COPY 1 = INSTA

ANNEX 3. Facilities Covered

Facilities covered in the qualitative enquiry and data collected

Province	Facilities covered	No. of client FGDs	No. of service provider FGDs	Key informant interviews with service providers
Nairobi	Coptic Hospital	1	1	1
	FACES Suba District	1	0	0
Nyanza	Nyanza Prov. Gen. Hospital	2	1	1
	FACES Kisumu	1	0	0
Coast	Bomu Mkomani Clinic	1	1	1
	Malindi District Hospital	1	0	1
Central	Gatundu Sub-District Hospital	1	0	0
Western	St. Mary's Hospital Mumias	1	0	1
Rift Valley	Rift Valley Provincial Hospital	1	0	1
Total		10	3	6

ANNEX 4. Age and Gender Characteristics

Age and gender characteristics of adult ECs

Intervention group	Client exit criteria	Females, age in years					Males, age in years				
		n	Mean	SD	Min.	Max.	n	Mean	SD	Min.	Max.
Pre-ART	Graduated	39	33.1	7.7	21	53	24	36.4	8.3	26	57
	LTF	117	34.3	9.5	19	65	59	37.3	9.1	21	63
	Deaths	17	33.4	8.4	20	50	14	42.1	10.0	31	62
	Total	173	34.0	9.0	19	65	97	37.8	9.1	21	63
ART	Graduated	97	36.4	9.7	19	65	52	38.4	9.9	18	79
	LTF	44	34.6	8.8	20	59	41	38.9	9.6	22	72
	Deaths	15	32.7	6.6	20	40	15	38.9	8.2	28	60
	Total	156	35.5	9.3	19	65	108	38.7	9.5	18	79