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# Nutritional Status Of Pediatric Inpatients In Kigali, Rwanda

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NUTRITIONAL STATUS OF PEDIATRIC INPATIENTS  
IN KIGALI, RWANDA

A Thesis Submitted to the  
Yale University School of Medicine  
in Partial Fulfillment of the Requirements for the  
Degree of Doctor of Medicine

by

Maria Francesca Nardell

2014

## **NUTRITIONAL STATUS OF PEDIATRIC INPATIENTS IN KIGALI, RWANDA**

Maria Nardell and Linda Arnold, MD. Department of Pediatrics, Yale University School of Medicine and Department of Pediatrics, Centre Hospitalier Universitaire de Kigali, Kigali, Rwanda.

*Background:* In many resource-limited hospital settings, families struggle to pay for both food and medical expenses. To date, no study has looked at the nutritional status of pediatric inpatients in resource-limited countries or at factors related to food access in this vulnerable population.

*Aims:* This study investigates nutritional status and food intake of pediatric inpatients at Centre Hospitalier Universitaire de Kigali (CHUK) in Rwanda to identify children at risk for food insecurity.

*Methods:* Caregivers of patients > 6 months of age and hospitalized for  $\geq 1$  week completed a validated food diversity survey. Individual Food Consumption Scores (FCS) were calculated, reflecting diet quality and caloric intake. Weights charted on admission and at one week were converted to WHO weight-for-age z-scores (WAZ) for children <10 yrs of age as measures of nutritional status. WAZ, FCS, weight loss and changes in meal frequency were analyzed and compared between groups, and regression analysis was used to identify correlations.

*Results:* During a 6-week period from July-August 2013, anthropometric data was available for 40 children (mean age 4.6 years, SD 4.6), 33 of whom were < 10 years of age. WAZ scores on admission for 45% of this group fell  $\geq 2$  SD below the mean, meeting WHO criteria for wasting. Over the first week of hospitalization, 55% of all children (n=40) lost weight, 37% gained and 8% had no change, with greater percentages of weight loss on the malnutrition ward (82% of n=11) and children <3 yrs of age (82% of n=22.) While dietary surveys for 80% of children (n=75) had FCS in the "acceptable" range, 53% reported eating fewer meals/day at the hospital compared to home, which correlated with greater home distance from CHUK.

*Conclusions:* Nearly half the children in our study met WHO criteria for wasting, and the majority lost weight and had decreased meal frequency during the first week of hospitalization. Our findings suggest very young children and inpatients on the malnutrition ward are at increased risk for weight loss during hospitalization, and children hospitalized farther from home at greater risk for food insecurity. Further study is needed to assess nutritional status and food intake among a larger sample over longer periods in order to better characterize the nutritional needs of these children.

## **Acknowledgments**

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Thank you to our collaborators in Rwanda: Dr. Angeliqe Karambizi, Dr. Emmanuel Ruzingiza, Dr. Paterne Mizero, and Dr. Natalie McCall for their guidance and kindness.

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Thank you to the Department of Student Research and Department of Pediatrics for supporting the project's funding.

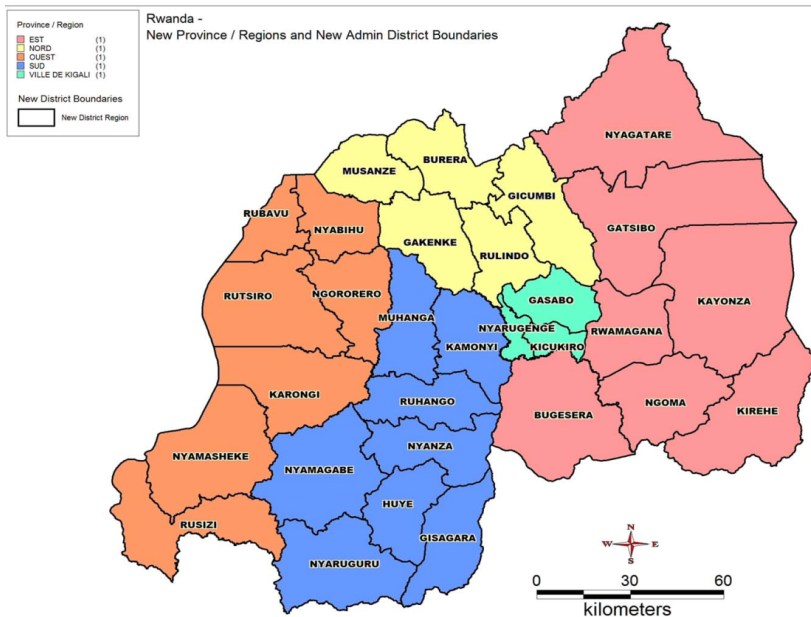
Lastly, thanks and love as always to my family, and dedicated to the many families in Rwanda who I had the privilege to meet. May they eat well.

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## Introduction

Despite its impressive gains in rebuilding its economy, civil society, and healthcare system in the twenty years since the genocide in 1994, Rwanda continues to face many healthcare challenges, including high levels of chronic malnutrition and food insecurity. A national survey, The Comprehensive Food Security and Vulnerability Analysis (CFSVA) and Nutrition Survey, has been jointly administered by the World Food Programme and the National Institute of Statistics in Rwanda three times, most recently in 2012 (1). Looking at food insecurity nationally at the household level, it found that while there had been overall improvements in food access since the 2009 survey and acute malnutrition among children between six months and five years fell within “acceptable” limits (3.6%), the prevalence of chronic



malnutrition  
(stunting)  
among children  
between six  
months and  
five years is  
still “very high”  
at 43%.

Figure 1. Map of Rwanda by province and district.

While this survey is useful for analyzing trends at the household level and identifying factors associated with household food insecurity, it does not speak to food insecurity experienced when children and their families are displaced from their home environments. This situation occurs when sick children and their families from rural areas travel to country's main public referral hospital (Centre Hospitalier Universitaire de Kigali or "CHUK") for advanced-level care in the capital of Kigali (shown in green on the map on the previous page.) CHUK, like many public hospitals in resource-limited countries, does not have a formal food delivery program for inpatients. In the Rwandan health care system, nutritional support (in the form of nutrient paste mixes like Plumpy'Nut, F75 and F100, which include varying mixtures of peanuts, milk, sugar, oil and a vitamin and mineral mix) is only given to inpatients by the hospital if the patient is identified as meeting specific indications by social workers, physicians or the nutrition department. According to a former employee of the nutritional department at CHUK (2), nutritional support is free for inpatients with help from The Global Fund for patients with HIV/AIDS and with support from UNICEF and the World Food Programme for patients who are malnourished.

There is a malnutrition ward at CHUK, though it is reserved for patients who have a serious illness in addition to malnutrition, or for refractory cases of malnutrition that could not be effectively treated at the district hospital level. Not all of the patients on CHUK's malnutrition ward receive nutritional support from the CHUK nutrition department. For those patients who do receive nutritional support, it

remains the responsibility of families to access and provide daily meals for their children and for themselves. The exceptions to this are the minority of families supported by a specific NGO (eg Partners in Health), which covers the cost of daily meals at the hospital restaurant, or those supported by Rwanda's government program which provides aid to Tutsi families affected by the genocide (3).

Access to food during hospitalization represents an enormous challenge for many families, already burdened by costs of transportation to CHUK and medical care. Moreover, they are faced with the additional challenge of accessing food in restaurants or markets in Kigali, where food is more expensive than in rural regions. Several NGOs and religious organizations have alleviated food insecurity at CHUK by providing some meals throughout the week. Their contributions provide an enormously appreciated, though nonetheless unreliable, source of nutrition for families on the wards. Despite the important contributions of these organizations, many pediatric patients and their families still lack access to a consistent source of nutrition.

In the literature, a definition of food security is a state in which "all people at all times have physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life" (4). Three fundamental elements of this definition are (5): 1) Adequate food availability; 2) Adequate access to food by all people; and 3) Appropriate food utilization/consumption. Though specifically addressing the situation of a family in a household in contrast to a patient in a



hospital, this definition nonetheless provides a useful framework for thinking about standard methods of measurement of food security as applied to the unique population in this study.

The first measure, adequate food availability, is typically measured by food balance sheets at the national level for a comprehensive picture of the pattern of a country's food supply during a specified reference period. Though an important component contributing to a patient's nutritional status, an analysis of food patterns at a national level is beyond the scope of this study.

Second, there are various validated scales to measure food access, which consider both food quality and quantity. These scales are typically administered at the household level, and there are no validated scales for the inpatient setting. In the United States, the 18-item Household Food Security Survey (HFSS) is a standard measurement of food security (6,7,8). In developing countries, the Food Consumption Score (FCS) and Household Hunger Scale (HHS) are two-commonly used scores. The FCS is an internationally-used World Food Program standard score used in the most recent Comprehensive Food Security and Vulnerability Analysis (CFSVA) and Nutrition Survey, administered in Rwanda in 2012 (1). It is calculated by assessing the frequency of consumption (number of days over the recall period of the past one week) of different food groups by a household, and it is designed to assess potential regularities in both diet quantity and quality (9).

The Household Hunger Scale is another commonly used proxy indicator for food access (5). A version that demonstrated the potential for cross-cultural validity included three items in a recall period of four weeks: 1) No food to eat of any kind in your household; 2) Go to sleep at night hungry; and 3) Go a whole day and night without eating.

Anthropometric indicators are a standard method of measurement of food utilization and consumption, the third element of food security. Addressing food security at the individual level, anthropometry uses weight, height, age and gender information, and it is a widely used, inexpensive and non-invasive measure of general nutritional status of an individual or a population group. Studies have demonstrated that applications of anthropometry include who will benefit from interventions, identifying social and economic inequity, and evaluating responses to interventions (10). The indices used most commonly are weight-for-age (used in this analysis), height-for-age, and weight-for-height, and they are used for different purposes. Weight-for-age is a measure of being underweight for a specific age, which is a measure of both past (chronic) and/or present (acute) undernutrition. Height-for-age (or length-for-age for children under age 2) is a measure of past undernutrition or chronic malnutrition but does not measure short-term changes in malnutrition. Deficits in height-for-age are referred to as stunting. Weight-for-height is a measure of current or acute undernutrition (also called wasting) and useful for examining short-term effects in food supply or short-term nutritional stress.

There is a limited body of literature on hospital food services in developing countries. In 1983, a group of researchers including JR Turnlund and RI Tannous published a three-part series of articles in the Journal of American Dietetic Association focused on hospitals in the Middle East, Lebanon and Bangladesh (11,12,13). They found that food service personnel in most hospitals studied had no training in nutrition, dietetics or food service management, and often incorrectly planned and used therapeutic diets. The authors suggested a need for training food service personnel, but they did not specifically address the impact of a lack of inpatient meal services on the nutritional experience of patients and families.

Research shows that a significant proportion of deaths in young children worldwide are attributable to low weight-for-age (14), and UNICEF and WHO data estimate that undernutrition is linked to approximately 45% of global child deaths (15). One subset of this problem in which the role of nutritional services has received particular attention has been in the HIV/AIDS community. The large impact of nutritional status on survival and the necessity of addressing the nutritional needs of persons living with HIV/AIDS has been recognized since the early decades of the epidemic and continues to be studied both in the United States and in East African settings such as rural East Africa (16,17,18).

In the hospital setting, a European forum in 2001 called "Food and Nutritional Care in Hospitals: Acting Together to Prevent Undernutrition," addressed themes

including better recognition and management/treatment of undernutrition in European hospital (19). One speaker, Professor Peter Fürst, commented on significant rates of undernutrition in British hospitals, with a prevalence of up to 50% reported on admission (20). However, few comments from the forum commented on the additional challenge of inpatient nutrition in facilities that lack an inpatient meal service program, such as at CHUK. Moreover, it did not focus on a pediatric population. The literature on children and food in Rwanda has also focused on chronic malnutrition in home rather than inpatient settings (1) and on means to increase rates of diagnosis in health facilities (21).

Thus, while the literature points to factors both complicating and underlying the importance of studying inpatient food access, including high rates of baseline undernutrition and the underdiagnosis of malnutrition in certain settings and populations, this is the first study focused specifically on the availability of food in the inpatient setting in a developing country public hospital.

### **Statement of Purpose: Hypothesis and Aims**

This project described in this descriptive study comprises two parts of a three-part triangulation mixed methods study including both quantitative and qualitative methods. The aims of this thesis are to examine whether pediatric patients are at risk for food insecurity while at CHUK, which factors are associated with greater inpatient food insecurity (such as greater travel distance from home, patients on the

malnutrition ward and younger patient age), and which factors may help mitigate challenges in food access (such as increased access to aid organization meals or more social support in Kigali.)

In addition to the aims of this thesis, the purpose of the qualitative component of the complete study is to better understand subjective changes in nutritional habits and challenges in food access for patients on the wards. Other goals of the qualitative interviews are to assess means of support and communication with family at home, the effect of the hospital stay on the family at home, and caregiver suggestions for improving support for hospital food access. The coding analysis of the qualitative transcripts is ongoing and not discussed in detail in this thesis. However, preliminary themes are discussed where they help to illuminate possible explanations for results of the quantitative data.

The short-term goal of the study is to help inform the practices of physicians, nutrition workers, nurses, and social workers to better support the nutritional needs of patients and their families while they are hospitalized at CHUK, as well as at other hospitals where patients face similar challenges. The long-term goal is to share these results with individuals and organizations seeking to develop tailored assistance efforts to alleviate food insecurity and improve the nutritional status of patients and caregivers at CHUK and other hospitals.

## **Methods**

As discussed above, this thesis is part of a triangulation mixed methods study including quantitative and qualitative components. Several methods were used to assess nutritional habits and food access, including change in weight, change in meal frequency, change in dietary diversity, and subjective reports of changes and challenges in inpatient food access and intake.

Inclusion criteria included all patients of at least 6 months of age, on the pediatric wards for at least one week, and accompanied by a caregiver able to give consent for their own participation and for the child to participate. Exclusion criteria included children in the Intensive Care Unit, children with conditions that prevented them from eating, children who were NPO for their treatment, and children exclusively breastfed.

Study participants (caregivers and children) were enrolled in July and August 2013. All eligible subjects were approached on the wards and invited to participate in the study. All participating caregivers were given a consent form in Kinyarwanda to sign and an assent form for the children in Kinyarwanda (see Appendices.) HIC approval was obtained in the United States from the Yale University HIC committee (both adult and pediatric) and from the CHUK Research Committee.

### *Anthropometric Methods*

The first method consisted of chart weight and height measurements on admission and at one week to assess changes in a patient's weight one week into his or her hospital stay. In addition to these measurements, the patient's ward<sup>1</sup> was recorded along with the patient's age, home district and home province.

Given the low patient census during the period of data collection (approximately 70-80 patients), the period of one week was chosen to balance the time needed for a change in weight to be observed with the ability to capture more patients.

Measurements were taken from the charts, rather than directly assessed by the investigator, due to time constraints for the period of data collection and the inconsistent availability of patients on the wards during periods when data collection was possible (ie not during rounds.) This introduced limitations including a potential variation in methods due to differences in which nurse took the measurement (e.g. clothing worn), possible changes in the calibration of the scale used, and human error. However, one advantage of this method is that it reflects the same anthropometric data that physicians and nurses have available to them when making their clinical decisions on the wards.

Anthropometric data analysis involves calculation of World Health Organization weight-for-age z-scores (WAZ scores) to analyze the baseline nutritional status of

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<sup>1</sup> There are seven pediatric wards at CHUK: surgery, chronic disease, oncology, intensive care unit, malnutrition, oxygen-dependent, and cardiology. Patients were included from all wards except the intensive care unit, given the more serious nature of their diseases, which would more likely affect their nutritional habits and status.

patients entering the hospital. The WHO Global Database on Child Growth and Malnutrition uses a Z-score cut-off point of less than two standard deviations to classify low weight-for-age as moderate and severe undernutrition (22). Descriptive statistics characterize which patients lost weight, and chi square tests are used to compare weight changes in the group as a whole as compared to the subgroups on the malnutrition ward and among the population of patients younger <3 years of age.

### *Survey Methods*

The second quantitative method used in this study was a survey designed to address food access, which was administered to the patient's primary caregiver. Seventy-five subjects accepted; one eligible subject refused to participate. The survey included the Food Consumption Score (FCS), items about meal frequency and demographic items. For the FCS, the unit of measurement was consumption by the individual patient, not the household. Otherwise the method of analysis was similar to that used by the 2012 CFSVA and Nutrition Survey, with the different food items reorganized into specific food groups. The seven food groups in the FCS are the following: starches and cereals (including potatoes and other root vegetables like cassava, rice, and breads), pulses (beans, legumes, nuts), vegetables, fruits, oils and fats, milk and dairy products, and other animal proteins (meat, fish, eggs). These groups are weighted based on their "nutrient density" based on caloric density and micro- and macro-nutritional content (9). They are then assigned a value that distinguishes consumption levels in three categories: 'poor,' 'borderline,' and



'acceptable.'<sup>2</sup> An example calculation for one hypothetical subject is shown in the table below, and a more detailed explanation of the weighting schema is in the footnote on the previous page.

**Figure 2.** Food Consumption Score example calculation.

	Reported food frequency (days/week)	Food group weight	Weighted Score (food frequency x weight)
Starches and cereals	7	2	14
Pulses	4	3	12
Vegetables	4	1	4
Fruits	3	1	3
Oils and fats	3	0.5	1.5
Milk and dairy products	5	4	20
Animal protein	1	4	4
Total			58.5

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<sup>2</sup> Aggregate Food Groups and Weights to Calculate the FCS:

Main staples: 2 (Energy dense, protein content lower and poorer quality than legumes, micronutrients, bound by phytates)

Pulses: 3 (Energy dense, high amounts of protein but of lower quality than meats, micronutrients inhibited by phytates, low fat)

Vegetables: 1 (Low energy, low protein, no fat, micronutrients)

Fruit: 1 (Low energy, low protein, no fat, micronutrients)

Meat and fish: 4 (Highest quality protein, easily absorbable micronutrients, no phytates, energy dense, fat. Even when consumed in small quantities, improvements to the quality of diet are large.)

Milk: 4 (Highest quality protein, micronutrients, vitamin A, energy. However, milk could be consumed only in very small amounts and should then be treated as condiment, and therefore reclassification in such cases is needed.)

Sugar: 0.5 (Empty calories. Usually consumed in small quantities.)

Oil: 0.5 (Energy dense but usually no other micronutrients. Usually consumed in small quantities.)

The advantage of the FCS survey tool is that it is already used in the Rwandan context (1). The use of the tool has been studied in Burundi (9), a neighboring country to Rwanda that shares many of its features, including a similar physical landscape, climate, high population density, ethnic composition, predominantly agrarian economy, language, and aspects of its history (23). The validation study observed “robust, medium-sized, positive correlations between calorie consumption per capita and WFP’s FCS in Burundi (rural areas),” though the authors concluded that it remains an imperfect tool with room for improvement in regard to the quantity of food consumed, “nutrient density” weights, and cut-off levels. One of their conclusions was that, with no quantity restriction (such as excluding consumption quantities of 15 grams or less) on the foods reported, higher cut-offs in Burundi better match prevalence of caloric deficiency. Given the challenge for interviewees to accurately recall and distinguish between varying amounts of food intake (hence making quantity restrictions difficult to employ), these adjusted cut-offs (<37 for “poor” and <47 for “borderline” profiles) were used to analyze FCS survey data in this thesis as well. The authors of the FCS validation study also noted that correlations improve when frequency of consumption is considered in addition to the diversity of diets.

Given this as well as other recommendations for measuring frequency of consumption to better characterize patterns of food intake, the survey instrument used in this thesis also included questions about the child’s average number of meals per day during the preceding week at the hospital, and the average number of

meals per day in a typical week at home. Limitations of these questions include reliance on subjective recall and varying definitions of the size of a meal, both between respondents and within different contexts (ie a child may regularly have two large meals per day but multiple smaller “meals” in the hospital to accommodate a change in appetite or eating patterns.)

A version of the Household Hunger Scale was originally included in the study design. However, given concerns among local collaborators about the cultural acceptability of asking caregivers questions related to their child’s hunger and possibly provoking shame about their inability to provide for their family, this scale was not included in the final version of the survey.

Demographic variables were collected on the survey as well, including district and province of origin, household size, education level of primary caregiver, and land and animals owned. With the FCS and meal frequency data, regression analysis was performed to determine possible associations among these data and demographic variables that were hypothesized to correlate with nutritional habits. Analysis was performed using frequencies, chi square tests, paired-sample t-tests, and regression analysis with SPSS Statistics version 19.

### *Qualitative Methods*

The qualitative component of the larger study (not included in this thesis) was a survey administered to patient caregivers by the author with a Kinyarwanda

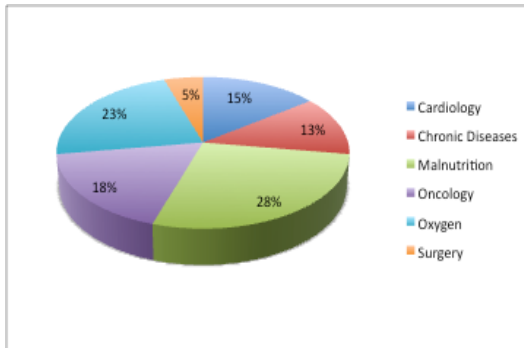
interpreter. Interviewees were asked about their child's access to food and nutritional habits while in Kigali in five main categories: 1) Challenges in food access at the hospital; 2) Changes noted in nutritional habits at the hospital as compared to home; 3) How the hospital stay affects the family at home; 4) Means of food-related support while at the hospital; and 5) Suggestions for improving support for families. The surveys were transcribed with the interpreter re-listening to the original Kinyarwanda recording and translating to English. Coding the data in an iterative process to identify themes and sub-themes is ongoing with a team including the Rwandan interpreter and faculty at Yale familiar with the study.

## **Results**

### *Anthropometric Demographics*

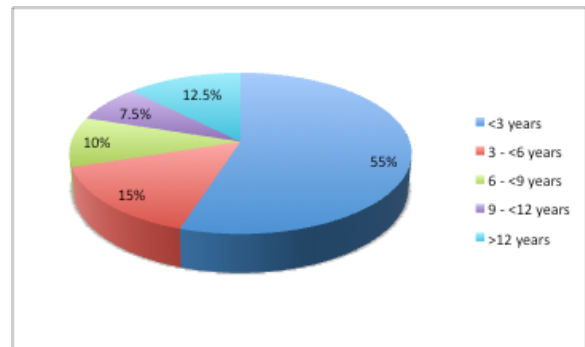
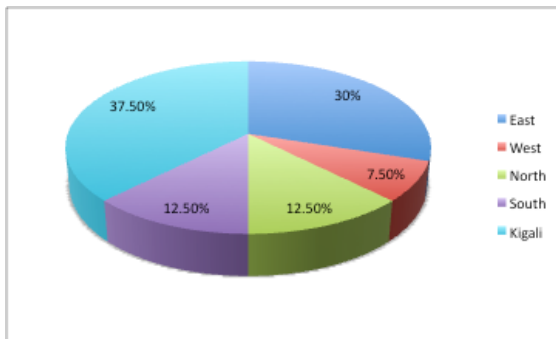
Data was collected over a 6-week period from July-August 2013. For the anthropometric portion of the study, 40 measurements were collected based on availability of chart data during the six-week period (ie eligible patients for whom weight was recorded on admission and at one week.) An insufficient number of height measurements were recorded in the charts to be included in the analysis. Of the 40 subjects in this analysis, just over a quarter (11) were on the malnutrition ward. Of the remaining 29 measurements, 9 were on the oxygen ward, 7 on the oncology ward, 6 on the cardiology ward, 5 on the chronic disease ward, and 2 on the surgery ward. The largest represented province of origin was Kigali, with 15 patients. Second to Kigali was the Eastern Province, with 12 patients, followed by 5

patients from the Northern and Southern Provinces each, and 3 from the Western Province.



Patient ages ranged from 0.5 to 16.0 years with a median of 4.6 years (SD 4.6.)

Admission weights ranged from 2.30 kg to 52.7 kg with a median of 11.88 kg.



**Figures 3,4 and 5.** Distribution by ward, province and age of patients in anthropometric sample.

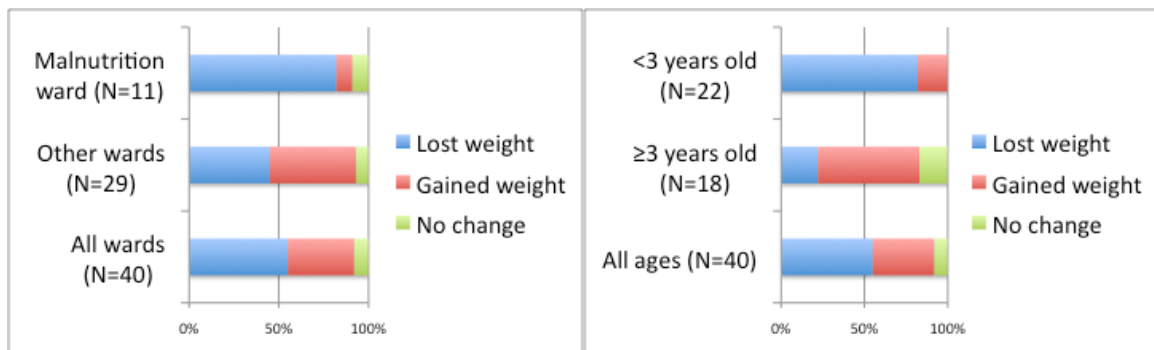
### *Anthropometric Results*

Thirty-three of the 40 patients were under age 10, allowing for the calculation of weight-for-age (WAZ) standard deviation scores<sup>3</sup>. Of these 33, 15 fell below two standard deviations, and of the nine of the 33 on the malnutrition ward, 3 of those patients fell below two standard deviations, meeting WHO criteria for moderate and severe undernutrition.

<sup>3</sup> The World Health Organization does not have reference values for standard deviation scores for weight-for-age to be calculated above age 10.

Twenty-two of the 40 patients were recorded to have some degree of weight loss during the first week of admission, while 3 had no change in weight and 15 gained weight. Of the 22 patients who lost weight, the maximum weight lost was 3 kg (a 6% decrease from that patient's admission weight) and the median amount of weight loss was 0.3 kg.

A chi square test comparing patients who lost weight on the malnutrition ward (9 or 82% of the total of 11 on the malnutrition ward) with those who lost weight in the group overall (22 of 40 on all wards in the total sample) was significant with  $\chi^2(1, N = 40) = 4.4, p < .05$ . The range of patient ages in this group on the malnutrition ward ranged from 0.6 to 12.5 years with a median of 1.5 years. Admission weights in this group ranged from 4.93 kg to 26 kg with a median of 9.0 kg.



**Figures 6 and 7.** Percentage of weight loss by ward and by age.

Also significant was the comparison of patients age 3 and under (23 of 40 of all ages in the total sample) who lost weight (18 or 78% of the 23 subjects aged 3 and under) to those over 3 years who lost weight (5 or 22%), with  $\chi^2(1, N = 40) =$

11.8,  $p < .001$ . In the group of children age 3 and under, the median admission weight was 7.7 kg with a range of 2.3 kg to 13.7 kg.

### *Survey Demographics*

The survey was administered to 75 patient family members in the same 6-week period from July-August 2013. The study group represents all caregivers in the hospital for at least a week with a patient who fulfilled all eligibility requirements as stated.

As shown below, the median interviewee age was 33 years, ranging from 14 to 73 years. The ages of the children they represented ranged from 6 months to 15 years, with a median of just over 5 years. Most patients (61%) had been hospitalized for one week, with a range of 5 to 30 days. The interviewees came from families with a mean of just under 4 children, ranging from 1 to 11. The mean number of people at home was 6, with a range of 2 to 11. Interviewees were predominantly women (63 female to 12 male), though the patients they represented were more evenly split between genders with 40 girls and 35 boys. Interviewees were most commonly mothers (55), followed by fathers (11) sisters (4), cousins (2), and grandmothers (2) were less common. One 14-year-old patient was without a caregiver and responded to the survey on her own.

	<b>Patient age (yrs)</b>	<b>Interviewee age (yrs)</b>	<b>Days patient hospitalized</b>	<b>Children in family</b>	<b>People currently at home</b>
<b>N</b>	75	75	75	75	75
<b>Mean</b>	6.102	33.35	8.92	3.83	5.99
<b>Std. Error of Mean</b>	0.4918	1.053	0.47	0.213	0.232
<b>Median</b>	5.25	33	7	4	6
<b>Std. Deviation</b>	4.2588	9.12	4.066	1.841	2.01
<b>Range</b>	14.5	59	25	10	9

Figures 8 (above), 9 and 10 (below). Subject demographics in the survey sample.

	<b>Patient gender</b>	<b>Interviewee gender</b>
<b>Female</b>	40	63
<b>Male</b>	35	12

	<b>Interviewee relationship to patient</b>
<b>Mother</b>	55
<b>Father</b>	11
<b>Sister</b>	4
<b>Cousin</b>	2
<b>Grandmother</b>	2
<b>Self</b>	1

Most patients (84%) had not been hospitalized before, and the majority of patients were not currently receiving nutritional support from the nutrition department in the hospital (85%).

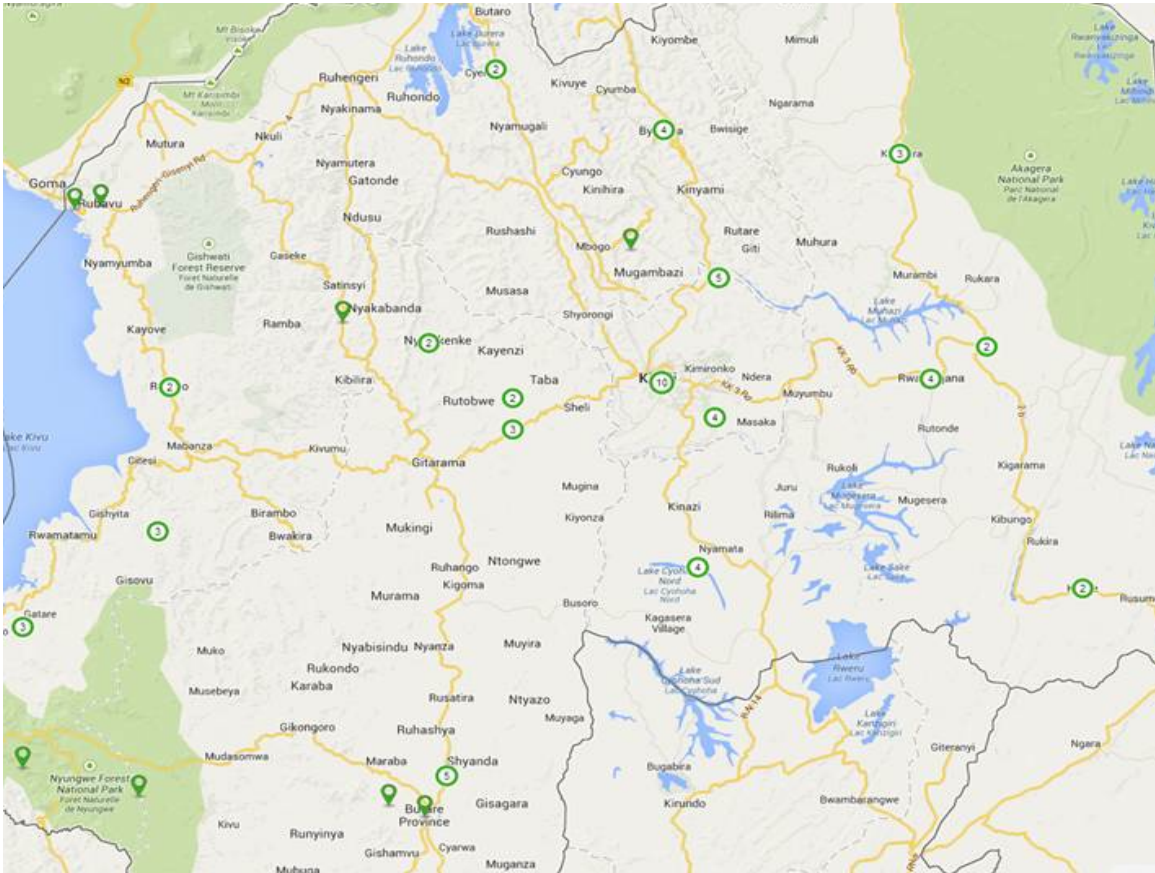
The group of interviewees represented all five provinces, with 19 from Kigali, 25 from the Eastern Province, 14 from the Western Province, 7 from the Northern Province, and 8 from the Southern Province. Interviewees and their children traveled a mean of 3 hours to get to CHUK from their homes, with a range from 0.5 hours to 12 hours<sup>4</sup>. The map on the following page shows the distribution of families

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<sup>4</sup> Distance in hours is self-reported and depends not only on distance but also on the means of transportation. For instance, two families from the same area may have reported differing travel times based on whether they had to walk, take a bus, take a motorcycle or taxi, if they had a car, or some combination thereof. For the purposes of this analysis, distance is relevant in considering the relative ease or difficulty for a caregiver to return home during the hospitalization or for others from home to come to the hospital to provide additional support. It could be the case that another member



from different regions of the country, with green circles representing one family and green circles with numbers representing additional families from the same area.



**Figure 11.** Representation of survey subjects by home location.

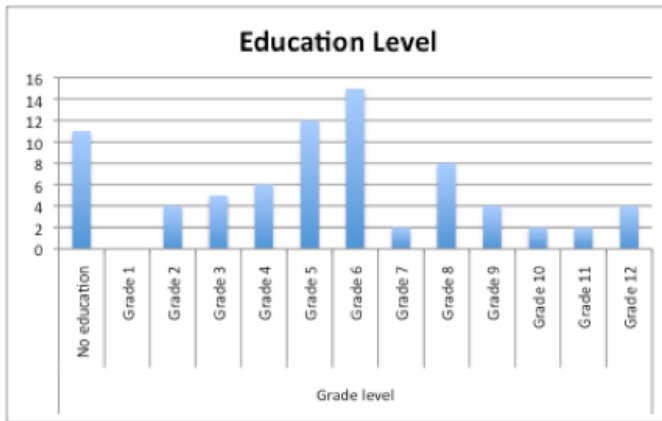
As the graph on the following page depicting education level shows, interviewees had a range of education levels, from no education through grade 12 and a median of grade 5. Most interviewees denied owning land (70%) though they were fairly even in terms of animal ownership with 48% reporting that they owned at least one animal. A majority had friends or family in Kigali (63%).

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of the family would have a different means of travel to the hospital than reported by the caregiver who participated in the interview. Nonetheless, since the vast majority of interviewees used public transportation, it is likely that the means of transportation for other family members would be similar to that of the interviewees.

	Province
<b>Kigali</b>	19
<b>East</b>	25
<b>West</b>	14
<b>North</b>	7
<b>South</b>	8
	(N=73)

	Distance from home to hospital (hrs)
<b>Mean</b>	3.0233
<b>Std. Error of Mean</b>	0.2718
<b>Median</b>	3
<b>Std. Deviation</b>	2.3539
<b>Range</b>	12
	(N=75)



Figures 12, 13, 14 (above) and 15 (below). Subject demographics in the survey sample.

	Own land	Own animals	Friends or family in Kigali
<b>N</b>	73	73	75
<b>Yes</b>	21	35	47
<b>No</b>	52	38	28

*Survey Results*

For the inpatient FCS score (one-week recall of food items in seven groups weighted by nutrient density and categorized by cut-off values as described in the methods section), 9 patients were in the “poor” category (12%), 6 were in the “borderline” category (8%), and 60 were in the acceptable category (80%). The scale ranged from scores of 7 to 108.5, with a median of 64.5 for the total of 75 interviewees.

The home FCS scores showed a fairly similar distribution as the FCS inpatient scores with 10 patients in the “poor” category (17%) and 7 patients in the “borderline” category (12%). (As with home meal frequency, N=60 for this item because the first 15 interviewees were not questioned about food group frequencies at home until a re-assessment of the survey tool.) Using a paired sample t-test to compare the mean of patients’ home weighted FCS scores with the mean of their inpatient scores (only for the 60 patients with both home and hospital scores) also did not show a significant difference, with  $t(59)=-1.15$ ,  $p=.253$  and mean home and hospital scores of 65.2 and 65.5 respectively.

Of the 7 patients with a hospital score of “poor” who also reported a home score, 3 had a home score of “poor” as well, one had a home score of “borderline,” and the other three had home scores that were “acceptable.” Of the 4 patients with a hospital score of “borderline,” just one had a home score of “borderline” as well, whereas the other three had home scores in the “acceptable” category.

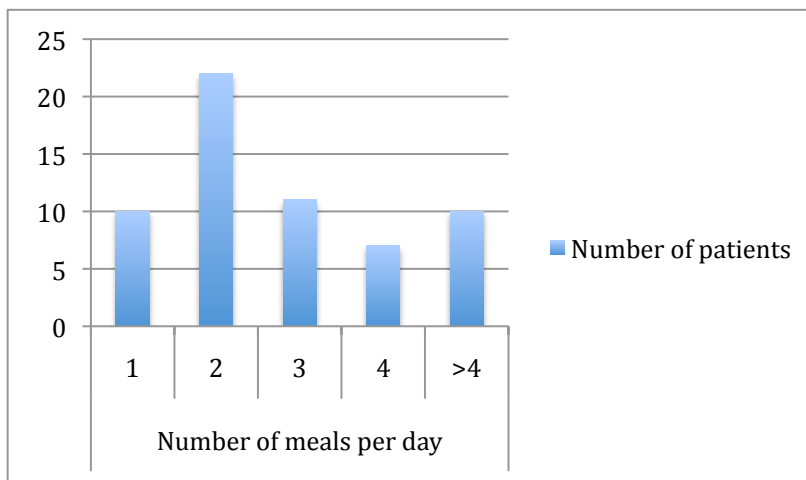
There were no significant associations found among inpatient FCS scores (both weighted and unweighted) and variables including distance from the hospital, days aid organization meals were received (per week), support in Kigali, and meal frequency per day at home. Nor were significant associations found with these variables and the percentage changes in FCS scores at the hospital and home (both weighted and unweighted.)

Within specific food groups, starches, pulses and vegetables were most commonly consumed at home, with 83%, 85% and 77% (50, 51 and 46 respondents of N=60) reporting daily intake by their child at home. In the hospital, starch and vegetable consumption remained high with 73% and 71% respectively (55 and 53 respondents of N=75) reporting daily starch and vegetable intake. However, only 64% (48 respondents of N=75) reported daily pulse intake in the hospital, and the mean pulse intake in the hospital for the group as a whole decreased significantly as compared to home with  $t(59)=3.253$ ,  $p=.002$ . Oils were also frequently consumed daily in the hospital (75%), particularly in meals prepared by the hospital restaurant or aid organizations, though somewhat less frequently consumed daily in cooking at home (52%), a finding also noted in the qualitative interviews.

In contrast to starches, pulses, vegetables (typically eaten together on one plate), and oils, the frequencies of reported milk and protein intake showed a more bimodal distribution. At home, the majority of respondents reported intake of either zero days (40% and 28% respectively) or seven days a week (30% or 24% respectively.) Similarly in the hospital, 25% of respondents reported zero days of milk per week at home and 40% reported daily milk intake. For protein, 24% reported zero weekly intake and 21% reported daily intake in the hospital (vs. 35% reporting an average of zero days per week of protein consumption at home and 30% daily consumption at home.)

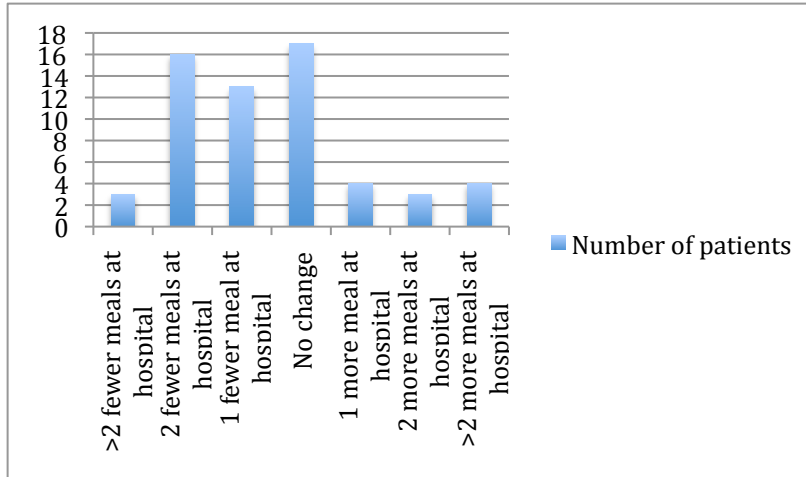
Looking at means for the group as a whole who reported both home and hospital consumption, fruit, oil and milk intake increased in the hospital as compared to home, with  $t(59)=-4.059$ ,  $p=.000$ ,  $t(59)=-2.549$ ,  $p=.013$ , and  $t(59)=-2.042$ ,  $p=.046$  respectively.

Reported meal frequency in the hospital revealed a median of 2.5 meals per day with a range of 7.0 meals per day.



**Figure 16.** Meal frequency in hospital for hospitalized children of survey participants.

Just over half of interviewees (53%) who reported both patient meal frequencies at the hospital and at home (N=60) reported fewer meals at the hospital (typically one or two fewer meals as shown in the chart below or a difference in the mean of 3.3 meals/day compared to 3.0 meals/day.) Seventeen (28%) reported no change in meal frequency from home to the hospital, and 11 (18%) reported an increase in meal frequency at the hospital compared to home.



**Figure 17.** Change in meal frequency at hospital as compared to home for patients as reported by their caregivers in the survey sample.

A regression analysis was used to test if average number of patient meals per day at the hospital was significantly correlated with dependent variables including days per week aid meals were received at the hospital, presence of friends or family in Kigali, the average number of meals per day at home, and distance in hours from the hospital. The results of the regression indicated that only one variable of the four – distance from the hospital – was a significant predictor of meals per day at the hospital ( $p < .05$ ).

In summary, results reveal the following:

- 1) Baseline weight-for-age z-scores for eligible patients on admission reveal 45% of the total and 33% on the malnutrition ward meeting WHO criteria for moderate and severe undernutrition.

- 2) Weight loss over the period of one week since admission for over half of the 40-patient sample size, with a disproportionate representation of patients who lost weight on the malnutrition ward and in patients aged three and under.
- 3) Below “adequate” food consumption in 20% of patients surveyed as defined by the validated Food Consumption Score cut-offs reflecting both caloric intake and dietary diversity.
- 4) No significant change overall between the means of home and hospital FCS scores, but a drop in category from home to the hospital (for example from “acceptable” to “borderline” or “borderline” to “poor”) for seven patients.
- 5) Just over half of interviewees reported at least one fewer meal per day at the hospital as compared to home.
- 6) As compared to home consumption, changes in inpatient dietary intake including decreased pulse intake and greater fruit, oil and milk intake.
- 7) Decreased inpatient meal frequency associated with greater distance from hospital, even with standardizing for number of aid organization meals received, home meal frequency per day, and support in Kigali.

## Discussion

This is the first study of its kind that investigates the nutritional status of pediatric inpatients in a teaching hospital in a developing country. The primary aims of this descriptive study are to examine whether pediatric inpatients at CHUK are at risk for food insecurity, which factors are associated with greater inpatient food insecurity, and which factors may help mitigate challenges in food access.

### *Anthropometric Sample*

The data from the anthropometric measurements showed that on admission, baseline weight-for-age z-scores for eligible patients showed 45% of the total and 33% on the malnutrition ward meeting WHO criteria for moderate and severe undernutrition. Thus, though patients on the malnutrition ward are already identified to have special nutritional needs, this finding suggests that pre-existing undernutrition is not limited to patients on this ward. In addition, both of these percentages are higher than the national prevalence of underweight at 12%<sup>5</sup>, highlighting that this is a population at risk for nutritional challenges.

Data also showed that over half (22 of 40 or 55%) of the patients captured by the data collection – for whom weight was recorded by a nurse in the chart both on admission and at one week – lost some amount of weight in the one week period (median amount of weight loss = -.30 kg, range = 2.97 kg). Possible causes for

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<sup>5</sup> de Franchis L. CFSVA and Nutrition Survey, Rwanda. WFP 2012.



inpatient weight loss include not only changes in food access but also effects of illness, a change in appetite or a change in volume status. Nonetheless, the results highlight the need to closely report and track weight patterns throughout a patient's stay to ensure that even a slight decrease in weight is not the beginning of a downtrend of further weight loss.

Also notable was disproportionate weight loss among patients age 3 and under and patients on the malnutrition wards. Given that patients on the malnutrition ward are those who came to the hospital with a diagnosis of malnutrition, it is possible that this may reflect pre-existing challenges for these families in accessing and/or choosing appropriate foods for their children. It may also speak to challenges that healthcare personnel face in reversing a chronic problem in the short course of one week. Still, this finding not only underlines the pre-existing nutritional challenges for these children, but also their ongoing vulnerable status as reflected by their challenges in gaining weight. They may benefit from increased attention from the nutritional department, and, as tolerated and recommended by their clinical teams, priority in receiving meals. The greater percentage of weight loss among children age 3 and under as compared to their older peers suggests that they too are a vulnerable population who may benefit from more monitoring of their weight and nutritional and food support where necessary.

Families of young children and on the malnutrition ward may also derive benefit from inpatient education and counseling on nutrition. Rwanda's recent "Thousand

Days in the Land of a Thousand Hills” campaign to eradicate malnutrition (24) has been described by State Minister for primary and public healthcare, Dr. Anita Asimwe, as a campaign aimed to “change the behavior of people and to eradicate illnesses associated with malnutrition.” In addition to the scheduled door-to-door visits to educate families across the country about nutrition and health, families on CHUK’s malnutrition ward may be particularly receptive to targeted efforts to improve their families’ nutritional habits given the immediacy of their present situation.

#### *Survey Sample*

The results from the Food Consumption Score suggest that 20% of patients fell below the acceptable category and 12% were in the “poor” category during their first week of admission as determined by the score cut-offs used in the FCS validation study. Certainly these scores are just one measure of a complete nutritional picture, and the degree to which the FCS is an accurate proxy for diet quality and caloric intake remains under study. Particularly challenging is that it is difficult to account for small quantities of foods which may not significantly contribute to overall dietary sufficiency in either nutrients or calories but are included in the score. This challenge is relevant in the hospital context given that many patients receive aid organization meals, which typically include at least a few food groups to varying quantities. Therefore, it is possible that the FCS in this setting in fact results in higher scores that underestimate the true extent of challenges in diet quality and caloric intake that it is designed to measure. At the same time, given

the different nature of selecting subjects for the anthropometric measurements than for the survey, the FCS cannot be linked to objective weight loss. Regardless, below-adequate scores for 20% of the patients – including the 7 for whom their inpatient category is lower than their baseline at home – suggest that available aid and support mechanisms may not fully address the nutritional needs of all patients.

The finding of increased fruit consumption in the hospital is unsurprising in light of local beliefs regarding the healing properties of fruits (25). Red fruits, such as passion fruits and beets, are believed to increase hemoglobin. Therefore, families seek to increase their children's intake of these fruits in particular during a period of illness. The increase in oil intake is supported by qualitative interviews in which caregivers report more oil in the hospital kitchen and aid organization meals than used in their home cooking. The increase in milk use may reflect the fact that it is not available in many homes, but it is brought by several of the aid organizations as it is believed to be an adjuvant to medications (25). The decrease in pulses (primarily beans) may be due to the fact that beans are a staple item in Rwandan home cooking that may not be as consistently available in the hospital meals, and unlike fruits or milk, harder to buy and eat without being able to cook them.

Over half of the interviewees reported decreased average daily meal frequency in the hospital versus at home for their children. Although certainly subjective in definition of meal size as well as recall as discussed, this finding is supported by the preliminary qualitative findings as well. Particularly notable are the results of the

regression analysis, which suggest that distance from home (in hours from the hospital as described previously) is significantly correlated with decreased meal frequency in the hospital, even when other variables – aid organization meals per week, number of meals at home, and support in Kigali – are standardized. This implies not only that the longer it takes for families to get to CHUK, the more at risk they may be for inpatient nutritional challenges, but also that means of support which were hypothesized to be protective, including the aid organization meals and friends and family in Kigali, may be insufficient to overcome the additional challenges that these families face.

The challenges faced by families coming from further reaches of the country are numerous, many of which were elucidated during the qualitative interview portion of the full study. The further patients must travel, the more money they must spend on transport. This leaves fewer funds available for hospital expenses, which include not only food, but also medications and laboratory tests. Once at the hospital, these families are at a greater distance from their home support networks, which makes it more challenging for other family members to personally bring support in the form of food or money. It is possible for families to use mobile money transfers to send money, but there is a fee of approximately 500 Rwandan francs – close to \$1 or the amount the many rural families earn per day – associated with each transfer, which makes it impractical for those for whom the fee would constitute too large a percentage of the amount to be transferred. For families with friends or family in Kigali to provide support, these challenges may be alleviated. However, the results

suggest that even these local support mechanisms may not compensate for not being closer to home.

Another significant challenge for these families is that the rural environment most come from is significantly different than the capital of Kigali. For most caregivers at CHUK, cultivating land is their primary means of accessing food, whether directly on one's own or a neighbor's land, or as a means of work in exchange for food. In Kigali, however, food is available primarily via a cash economy at prices significantly higher than in the rural villages. Especially for those in Kigali for the first time, knowing where to find cheaper markets outside of the hospital proves an additional barrier to healthy nutritional habits.

For families without sufficient cash to purchase food while at CHUK, aid organization meals are an indispensable mechanism of support. Yet families coming from further away may still face additional challenges in accessing those meals. Given the distance for these families to get to CHUK, caregivers may be more likely to come on their own without the additional support of a second caretaker in the hospital. This makes it more difficult to leave a child on the ward to wait in line for aid organization meals, which can result in either missing the meal entirely or being too far back in line to receive food before it has been dispersed. The fact that even with aid organization meals standardized, greater distance is still associated with decreased meal frequency suggests that these meals likely serve as a supplemental means of support for families with other resources (ie some money to buy food or

close enough to home to receive additional food.) Whereas for some families receiving the same number of aid organization meals, it constitutes the only source of meals that they receive.

#### *Possible Interventions and Future Directions*

In summary, the results of this study demonstrate the ongoing vulnerable status in terms of nutritional habits and food access for a subset of children on the pediatric wards, as well as several potential avenues for intervention and future study. As mentioned, families may also be particularly receptive to education and counseling on nutrition while in the hospital, particularly those on the malnutrition ward.

Another intervention is to identify possibly vulnerable families as those coming to the hospital from greater distances and to take steps to ensure that they receive an early visit from a social worker to ensure that they are aware of the nutritional options both within and outside the hospital. Also important is to ensure that these caregivers are able to receive aid organization food when it is available, for example by physicians rounding earlier in the morning on those patients so that their caregivers are first in line.

As they continue to expand their fundraising efforts and capacity to serve more meals, aid organizations may consider incorporating a greater diversity of foods into their meals where possible, including more beans, vegetables and proteins.

Lastly, this pilot study has the potential for longitudinal work to extend to the nutritional habits of other populations such as breastfeeding mothers. Should time and funding permit, it may be helpful to expand upon the anthropometric study to include a greater sample size over a longer period of time as well as better control for other explanations for weight loss.

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## Appendix

1. Quantitative measurements survey questionnaire – *Urupapuro rubarizwaho ibibazo* - Kinyarwanda and English

1. Patient #

*Umurwayi #*

2. Gender of child

*Igitsina cy'umwana*

3. Age of child

*Imyaka y'umwana*

4. DOA

*Italiki yinjiriyeho*

5. Admission Height

*Uburebure yari afite yinjira mu bitaro*

6. Admission Weight

*Ibiro yari afite yinjira mu bitaro*

7a. What is your relationship to the patient? (eg parent, sibling, neighbor, other caretaker etc?)

7b. Gender of interviewee

8a. How many children are in the family?

8b. How many people do you live with at home?

*Igitsina cy'umurwaza*

9. Age of interviewee

*Imyaka y'umurwaza*

10. # prior hospitalizations at CHUK

*Inshuro zingaha uyu mwana yaba yararwariye muri CHUK?*

11. Receiving nutritional supplement from hospital (No=0, Yes=1), (eg Plumpynut, F75, F100)

*Hari ibiryo cyangwa ubundi bufasha muhabwa n'ibitaro*

12. # days in past week patient received meal from aid organization

*Iminsi ingaha mu cyumweru gishize, umurwayi yaba yarabonye ibiryo bizanywe n'abagiraneza?*

13. # times/day the caregiver ate

14a. District (*Akarere*)

Province (*Intara*)

14b. How far is your family from CHUK? (in hours)

15. Own land (No=0, Yes=1)

*Mwaba mufite ubutaka mwihariye cyangwa umurima?*

16. Types of animals owned (0, 1, 2-3, 4-7)

*Haba hari amatungo se mworora mu rugo? (0, 1, 2-3, 4-7)*

17. Education level of primary caregiver (illiterate, no formal, nursery, primary, secondary, university)

*Mwaba mwaragize amahirwe yo kujya mu ishuri (umurwaza)?*

*[ntiyize, ay'incuke, abanza, ayisumbuye, Kaminuza]*

18. Family members or other support network in Kigali (No=0, Yes=1)

*Ese hari abo mu muryango wanyu baba inaha i Kigali cyangwa se ubundi bufasha buturutse ku bantu baba mu Mujyi wa Kigali (Oya = 0, Yego = 1)*

19a. Usually at home, how many meals a day does the child eat in a day?

19b. During the first week of admission, how many meals does the child eat in a day on average?

20. At 1 week at home (on average) vs 1 week at hospital: # of times ate \_\_\_:

i. Starches or cereals (*Ibinyamafufu bikungahaye mu isukari yitwa amido*)

ii. Pulses (*Ibishyimbo, amashaza, n'ibindi bisa nabyo*)

iii. Vegetables (*Imboga*)

iv. Fruits (*Imbuta*)

v. Oils (*Amavuta*)

vi. Milk (*Amata*)

vii. Animal Proteins (*Ibindi bikomoka ku nyamaswa: amagi, inyama, ifi, foromage*)

## Ila. Caregiver Consent Form with Signature - Kinyarwanda

GUHABWA URUHUSA RW'UMURWAZA, UMUBYEYI CYANGWA SE UNDI URERA UMWANA MU  
KUGIRA URUHARE MURI IYI NYIGO

KAMINUZA YA YALE, ISHAMI RY'UBUVUZI - IBITARO BIKURU BYA KAMINUZA BIRI I KIGALI

Inyito y'ubushakashatsi: "Kureba uburyo ki imirire yifashe mu barwayi muri CHUK"  
Umushakashatsi w'ibanze: Maria Nardell

**Kwemera kugira uruhare muri ubu bushakashatsi**

Wowe ndetse n'umwana urwaje, murasabwa kuba mwagira uruhare muri ubu bushakashatsi. Impamvu nyamukuru y'ubu bushakashatsi ni ukumenya niba abarwayi barwariye mu Bitaro by'abana bya CHUK niba babasha kubona indyo ihagije mu gihe bamara mu bitaro ndetse n'ukuntu imiryango yabo ibafashamo kubona ibyo biryo. Ibibazo bibazwa hano, bisubizwa muri buryo butatu. Uburyo bwa mbere bushingiye mu gupima uburebure n'ibiro by'umwana wanyu igihe ku nshuro ya mbere yinjiraga mu Bitaro. Hanyuma hakongerwa gupimwa ibiro n'uburebure bwe buri cyumweru gikurikira iyinjira rye mu bitaro. Ikibazo cya kabiri ni ukumenya imirire y'umwana wanyu mu cyumweru gishize: indyo ye uko ingana, ubwoko bw'ibiribwa yariye. Ikibazo cya gatatu ni ukumenya uburyo n'aho mukura amafunguro yo guha umwana wanyu igihe muri hano muri CHUK / Kigali.

Kugira uruhare muri ubu bushakashatsi ni ku bushake, nta gahato kandi tugusezeranije ko ntacyo bizabangamiraho imivurirwe y'umwana wanyu. Abaganga babavura ntibazamenya abitabiriye cyangwa se batitabiriye ubu bushakashatsi. Muri ubu bushakashatsi, nta mafaranga duha abemeye gukorana na twe.

Mu gihe musubiza bimwe mu bibazo, mushobora guterwa ipfunwe na bimwe muri ibyo bibazo kuko bishobora kugusaba kuvuga n'akari imurori. Uramutse ugize ikibazo tukubajije wumva utifuza gusubiza wakireka; kandi uramutse wumvise ko utifuza gukomezanya na twe ubu bushakashatsi, nabyo ni uburenganzira bwawe bwo guhagarika.

Tukwijeje kukubikira ibanga kandi tukwizeza neza ko ibisubizo utanze hano bizabikwa neza n'ukuriye ubu bushakashatsi ahantu hizewe. Imyaka yawe ndetse n'isano ufutanye n'umurwayi nabyo bizabikwa neza hakoreshejwe imibare yabugenewe. Izina ryawe ndetse n'ibindi bikuranga ntaho bizagaragara mu bushakashatsi. Hazakoreshejwe imibare y'ibanga izaba ihuye n'izina ryawe ikazabikwa ahantu hizewe kandi nta wundi wemerewe kuhagera uretse uyoboye ubu bushakashatsi ndetse n'abandi bamugaragiye.

Wemerewe gusobanuzwa igihe icyo ari cyo cyose umushakashatsi mukuru ariwe Maria NARDELL kuri telefone 0787611611 cyangwa se ugahamagara Mizero Paterne (mu Kinyarwanda) kuri 0788221070 mu gihe hari icyo udasobanukiwe kuri ubu bushakashatsi.

Kuba wemeye rero gutangira gusubiza ibi bibazo, bivuze ko wiyemereye ku bushake, nta gahato kugira uruhare muri ubu bushakashatsi.

Bikorewe i Kigali,...../...../2013

Umukono w'umushakashatsi Maria Nardell

(werekana ko yasabye uruhushya rwo kubaza ibibazo bijyanye n'ububushakashatsi) :-----

Umukono w'uko nyiri ukubazwa yiyemereye kujya muri ubu bushakashatsi: -----

Iib. Caregiver Consent Form with Signature – English

**SHORT FORM ORAL CONSENT FOR CHILD’S PRIMARY CAREGIVER AND PARENTAL PERMISSION FOR CHILD’S PARTICIPATION**

**YALE UNIVERSITY SCHOOL OF MEDICINE – CENTRE HOSPITALIER UNIVERSITAIRE DE KIGALI**

**Study Title:** *Assessing Food Insecurity at CHUK in Kigali, Rwanda*

**Principal Investigator:** *Maria Nardell*

Consent to Participate in Research

You and your child are being asked to participate in a research study. The purpose of this study is to determine if patients on the pediatric ward at CHUK have enough food to eat during their hospitalization and how their families are able to get food for them. There will be three ways we will try to answer this question. The first is to measure your child’s height and weight when he or she first comes to the hospital and his or her weight every subsequent week that he or she is in the hospital. The second is to ask you about your child’s hunger over the past week and about how much and what types of foods he or she has eaten. The third is to ask you about where and how you are able to acquire food for your child while you are in Kigali.

Your participation in this study is entirely voluntary and in no way affects the quality of treatment that your child receives. The doctors taking care of your child do not know who participates in the study and who does not. There is no compensation for participating in this study.

The risks involved are minimal and include possible discomfort with answering questions and a small risk of a breach of confidentiality. If at any point you do not feel comfortable answering a question, you may decide not to answer. You will not be penalized if you refuse to participate or decide to stop.

Your confidentiality is important and the answers you provide will be held securely by the lead investigator of the study, either with me or in a locked room. Your age, gender and relationship to the patient will be recorded and linked to a code number. Your name or other identifying information will only be matched to that code number on one document that I will keep securely within my possession and will not share with anyone else. Any coded data collected will only be shared with other researchers involved in the study.

You may contact  Maria Nardell  at  0787611611  any time you have questions about the research or what to do if you are injured.

Giving your oral consent means that the research study, including the above information, has been described to you orally, and that you voluntarily agree to participate.

IIIa. Child Assent Form - Kinyarwanda

**URUPAPURO RUSOBANURIRA UMWANA UKO INYIGO ITEYE  
IBITARO BIKURU BYA KAMINUZA BIRI I KIGALI (CHUK)**

**Inyito y'ubushakashatsi:** *Kureba uko Imirire yifashe mu Bana barwariye mu Bitaro bya CHUK*

**Umushakashatsi:** *Maria Nardell*

**Kwemera kugira uruhare muri ubu Bushakashatsi**

***Kubera iki ndi hano?***

Uyu muni, twifuzaga ko wagira uruhare muri iyi nyigo kugira ngo turushaho kumenya ibijyanye n'imirire y'abana igihe barwariye hano mu Bitaro ndetse n'uburyo imiryango yabo ibona ibyo kubagaburira igihe muri mu Bitaro.

***Ni iki kiza kumbaho se?***

Niwemera kugira uruhare muri iyi nyigo, turareba uburebure n'ibiro byawe igihe winjiraga mu Bitaro ndetse n'icyumweru kimwe nyuma y'uko winjiye mu Bitaro. Turaza kubaza ababyeyi cyangwa se abandi barwaza bawe ingano n'ubwoko bw'ibyo bakugaburira. Turabaza kandi ababyeyi cyangwa abandi barwaza bawe uko babigenza kugira ngo babashe kubona ibigutunga igihe uri hano mu Bitaro.

Ubu bushakashatsi bwashobanuriwe ababyeyi/abarwaza bawe batwemerera ko nta kibazo twakubaza niba wakwemera kugira uruhare muri ubu bushakashatsi. Ubishatse wabanza ukabibaganirizaho mbere y'uko ufata icyemezo. Ni uburenganzira bwawe kumva ko wagira uruhare cyangwa nturugire rwo kudufasha muri ubu bushakashatsi. Nuramuka uhisemo kutagira uruhare muri ubu bushakashatsi, urakomeza uvurwe nk'uko abandi bana bemeye kugiramo uruhare bavurwa nta kibazo. Abaganga bakuvura ntibamenya uwitabiriye cyangwa se uwanze kugira uruhare muri ubu bushakashatsi. Nta gihembo giteganyirijwe abemeye kugira uruhare muri ubu bushakashatsi kandi nta n'igihano ku banze kwitabira ubu bushakashatsi.

***Ese muri ubu bushakashatsi, ntabwo nza kubabara?***

Ushobora kuza kumva usa n'ubangamiweho gato igihe twaba turi kugupima ibiro cyangwa uburebure. Igihe icyo aricyo cyose wumva utanogewe n'uku gusuzumwa, wemerewe guhitamo guhagarika gukomezanya natwe muri ubu bushakashatsi. Nta gihano giteganyirijwe uwanze gukomeza kugira uruhare muri ubu bushakashatsi.

Kugira ngo kandi amakuru waduhaye akomeze arindwe neza, turandika imyaka yawe, igitsina cyawe, uburebure n'ibiro gusa, hanyuma hakoreshwe umubare w'ibanga uzwi nanjye gusa ku buryo nta muntu wemerewe kumenya izina ryawe. Ibindi byose bikwerekeyeho, bizaba byabonywe muri ubu bushakashatsi bishobora kubonwa n'abandi dufatanyije, ariko nta n'umwe ushobora kubona amakuru agaragaza uwo uri we urugero nk'izina ryawe.

***None se ndamutse mfite ibibazo?***

Ushobora kubaza ibibazo byose ushatse byerekeye ubu bushakashatsi. Uramutse ugize ikibazo nyuma, udufite ubu, wahamagara Maria NARDELL kuri 0787611611 cyangwa Paterne MIZERO kuri +250788221070 cyangwa se ukambaza ubutaha ngarutse. Kuba rero utwemeraye ko dukora ubu bushakashatsi, ushingiyeye ku bisobanuro wahawe haruguru, ibi bisobanuye ko wemeye kugira uruhare muri ubu bushakashatsi nta gahato.

IIIb. Child Assent Form - Kinyarwanda

**SHORT FORM ORAL ASSENT FOR CHILD (PATIENT)**

**YALE UNIVERSITY SCHOOL OF MEDICINE – CENTRE HOSPITALIER UNIVERSITAIRE DE KIGALI**

**Study Title:** *Assessing Food Insecurity at CHUK in Kigali, Rwanda*

**Principal Investigator:** *Maria Nardell*

Assent to Participate in Research

Why am I here?

We are asking you to take part in a research study because we are trying to learn more about if children in this hospital have enough food to eat while they are in the hospital and how their families are able to get food for them.

What will happen to me?

If you agree to be in this study, we will measure your weight and height when you first come to the hospital and your weight every week that you are in the hospital. We will ask your parents or caregivers about how hungry you are over the past week and about how much and what types of foods you have eaten. Your parents or caregivers will also be asked about where and how they find food for you while you all are in the hospital.

This study was explained to your parents and they said that you could be in it. You can talk this over with them before you decide. It is your choice whether or not you would like to be in this study. If you choose not to be in the study, you will receive the same treatment and quality of care as children who do choose to participate. The doctors and nurses taking care of you do not know who participates in the study and who does not. There is no reward for participating in this study or punishment for not participating.

Will the study hurt?

You may feel uncomfortable having your height and weight measured. If at any point you do not feel comfortable with these measurements, you may decide to stop participating in the study. There is no punishment if you refuse to participate or decide to stop.

There is also a small risk that someone else beside me will see your name and other information in my study. To help protect your information, I will record your age and gender with your weight and height measurements, and I will give you a code number for the study so that I am the only person who sees your name. Any information about you that is collected will only be shared with other researchers involved in the study, but I will not share identifying information like your name.

What if I have any questions?

You can ask any questions that you have about the study. If you have a question later that you didn't think of now, you can call me Maria Nardell at 0787611611 or interpreter Paterne MIZERO at +250788221070at or ask me next time. Giving your verbal consent means that the research study, including the above information, has been described to you, and that you agree to participate without anyone forcing you to participate.