

Ready-to-Use Therapeutic Food (RUTF) as a Food Supplement for Treating Severe Acute Malnutrition (SAM) in Children in Cambodia

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National Center for HIV/AIDS, Dermatology and STI (NCHADS)
and
Clinton Foundation HIV/AIDS Initiative -- Cambodia



Severe Acute Malnutrition (SAM) and HIV

- Acute malnutrition is a reduction in weight-for-height due to a short-term nutritional deficit
- Severe Acute Malnutrition (SAM) and HIV infection often go hand-in-hand
- Addressing SAM provides opportunity to increase HIV case finding, improve treatment outcomes and save costs
- Additionally, ARV treatment is markedly improved in HIV+ children who are properly nourished

SAM and HIV

- Children with severe acute malnutrition present with “AIDS-like” symptoms: anemia, anorexia, weight loss, immunocompromised status
- Globally, 30% of severely malnourished patients with complications are HIV+
- HIV+ children often become acutely malnourished as HIV induces hyper-metabolic state



- Malnutrition treatment programs are important in HIV case-finding
- **Ready-to-Use Therapeutic Food (RUTF) has been shown to be effective in nutrition rehabilitation of HIV+ and HIV- children**
- **RUTF may improve the overall treatment outcome when used in combination with ART in HIV+ children**
- Treating acute malnutrition can result in cost savings

Outpatient Therapeutic Care (OTC)

- Outpatient Therapeutic Care (OTC) connects treatment in the health facility with follow-up in the home and community mobilization. It involves close monitoring by clinicians and strong coordination between hospitals and home-based care teams.
- **OTC is a component of the WHO-recommended approach for treating SAM**
- Currently, only Inpatient Care is used to treat SAM children in Cambodia. However, elsewhere OTC has reduced case-fatality rates (from >50% to <10%) and increased coverage rates (from 10% to 70%) when compared to the traditional inpatient approach

What is Ready-to-Use Therapeutic Food (RUTF)?

- Energy-dense lipid paste
- Plumpy'nut – the “original” RUTF product contains peanut butter, milk powder, oil, sugar and mineral/vitamin and protein mix.
- **Similar nutrient composition to F100**
- Does not need to be cooked / prepared
- Specifically designed as a food supplement to treat severe acute malnutrition (SAM) with no complications
- **It is not on-going nutritional support**



What is Ready-to-Use Therapeutic Food (RUTF)?

	Per Mega Joule (MJ)	
	F100	RUTF (Plumpy'nut)
Macronutrients		
Protein (g)	6.0	6.0
Lipid (g)	12.2	15.8
Minerals		
Potassium (mg)	513.6	487.3
Calcium (mg)	140.9	140.9
Phosphorus (mg)	140.9	152.9
Magnesium (mg)	38.2	40.6
Zinc (mg)	5.0	6.2
Copper (mg)	0.7	0.7
Iodine (ug)	33.4	47.8
Selenium (ug)	9.6	14.3
Iron (mg)	1.0	5.0

Source: Diop et al 2003

	Per Mega Joule (MJ)	
	F100	RUTF (Plumpy'nut)
Vitamins		
Thiamine (mg)	0.2	0.2
Riboflavin (mg)	0.7	0.7
Vitamin B-6	0.2	0.2
Vitamin B-12	0.7	0.7
Vitamin C (mg)	23.4	23.2
Folic acid (ug)	93.2	93.2
Niacin (mg)	2.4	2.4
Biotin (ug)	28.7	28.7
Pantothenic acid (mg)	1.4	1.4
Retinol (ug)	372.7	398.9
Vitamin D (ug)	6.9	6.9
Vitamin K (ug)	6.9	9.3
Vitamin E (mg)	9.3	8.8

Benefits of Peanut-Based RUTF

- Faster recovery rates than F100
 - Weight gains obtained with Plumpy'nut are higher than those obtained with F100 therapeutic milk in the nutritional rehabilitation phase of severely malnourished children (Diop et al 2003).
- Higher acceptability than F100
- Very dense—only small quantities need to be given



Benefits of Plumpy'nut

- No water required
 - Microbiologically safe
 - Can be stored at room temperature for long periods
 - Long shelf life, even without refrigeration (24 months)
- Eaten uncooked / without preparation
 - Micronutrients not destroyed by cooking
 - Fuel/water/labor demands are minimized
 - Easy to Administer

References:

WHO/WFP/SCN/UNICEF Joint Statement. March 2007

Plumpy'nut Certificates of Analysis and Conformity



Benefits of Peanut-Based RUTF

- Plumpy'nut is effective at treating SAM
- Plumpy'nut is a great means of identifying HIV+ children. HIV+ children usually take longer to show improvement after starting Plumpy'nut.
- In SAM HIV+ children, using Plumpy'nut and improving nutrition can delay the onset/need for ARV treatment



Global Support for RUTF

- Approval for use globally by UNICEF, WHO, SCN and WFP¹
- On June 7, 2007, the policy-making UN Standing Committee on Nutrition formally endorsed the RUTF approach
- Nutriset holds international Good Manufacturing Practices (GMP) certification for Plumpy'nut

1. WHO/WFP/SCN/UNICEF Joint Statement. "Community-Based Management of Severe Acute Malnutrition." March 2007



Identifying Severe Acute Malnourished Children

Identifying Severe Acute Malnourished Children

- Children can come to Outpatient Therapeutic Care from different places:
 - **Referral from community**
 - **Referral from home-based care teams**
 - **Referral from another health center (HC), referral hospital (RH) or clinic**

Identifying Severe Acute Malnourished Children

Every child should be assessed by clinician or nurse for Severe Acute Malnutrition

- The assessment includes a history of the child's condition, taken from the caregiver
- The healthcare worker gives the child a full medical examination to rule out complications requiring inpatient care

Identifying Severe Acute Malnourished Children

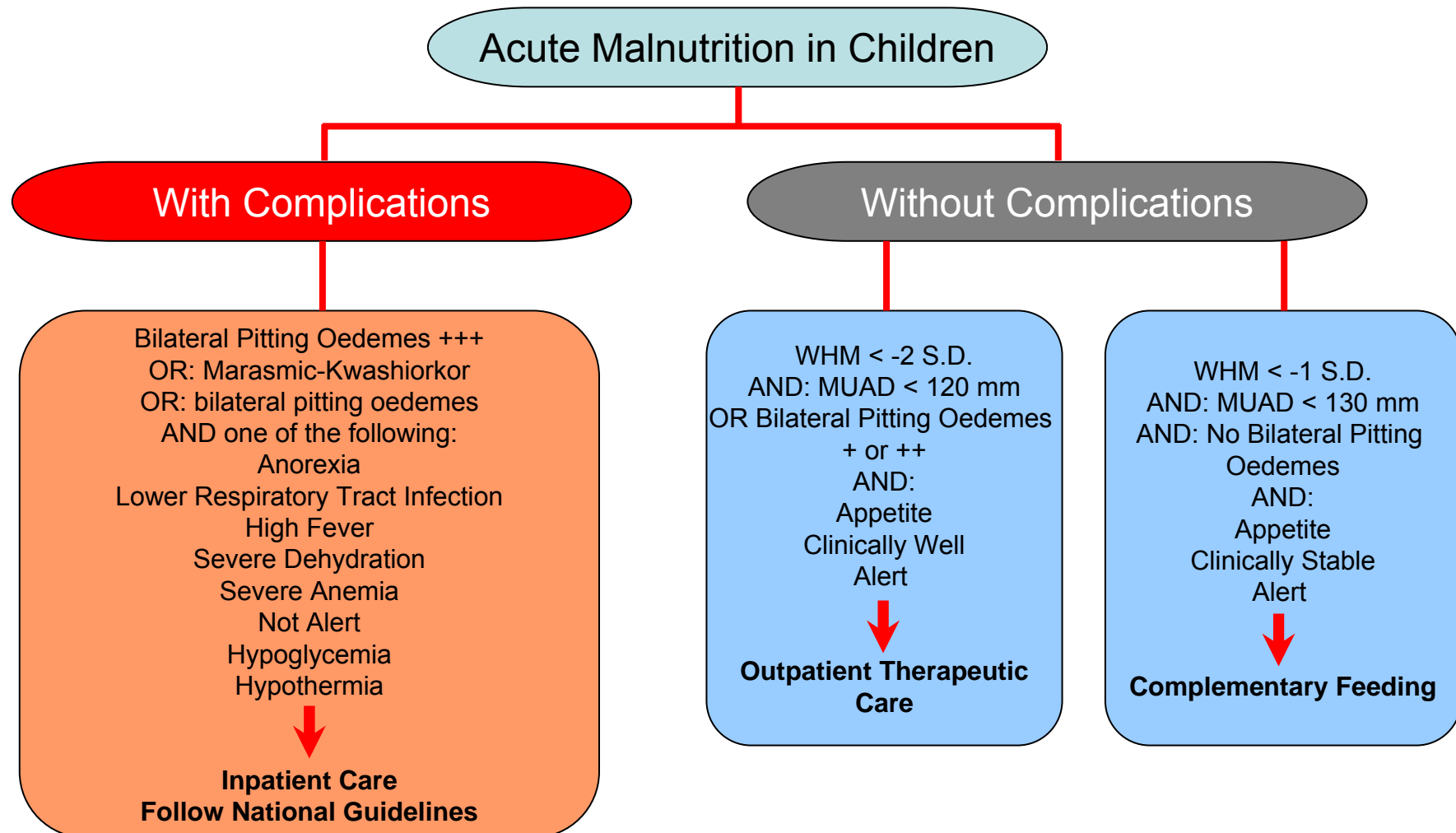
Every child should be assessed by clinician or nurse for Severe Acute Malnutrition

- The examination includes checks for **ALL** complications, including:
 - Oedemes
 - Anemia
 - Appetite
 - Superficial infections
 - Vomiting
 - Alertness
 - Temperature
 - Hydration status
 - Respiration rate

Identifying Severe Acute Malnourished Children

Grades of oedemes	Definition
Absent	Absent
Grade +	Mild: both feet/ankles
Grade ++	Moderate: both feet, plus lower legs, hands or lower arms
Grade +++	Severe: generalized oedemes including both feet, legs, hands arms and face

Identifying Severe Acute Malnourished Children



Identifying Severe Acute Malnourished Children

- If the child exhibits the following conditions, then they have ***SAM without complications***, and they should be referred to ***Outpatient Therapeutic Care***:
 - Middle-Upper Arm Circumference (MUAC) < 120mm
 - ***< -2 S.D. (<80%) Weight-for-Height (WHM)***
 - Considered “Wasting”

Or:

- Bilateral pitting oedemes + or ++

And:

- Has appetite
- Eating
- Alert

Identifying Severe Acute Malnourished Children and HIV

- For those children known to be HIV+, **severe Acute Malnutrition is defined the same as for HIV- or HIV-unknown children.**
- For children with < -3 S.D. WHM, special care must be taken to determine eligibility for OTC.
 - National Guidelines for Severe Malnutrition: A child with < -3 S.D. WHM should be enrolled in Inpatient Care until stabilized.
 - A few children may exhibit < -3 S.D. WHM without any other complications. In this case, the clinician must make the decision about enrollment in OTC.

Identifying Severe Acute Malnourished Children and HIV

Due to the high prevalence of HIV in SAM children, and following the protocol for Provider-Initiated Testing and Counseling (PITC) developed by NCHADS:

For children who are diagnosed with Severe Acute Malnutrition and whose HIV status is unknown:

- Refer to the nearest VCCT services for HIV testing and counseling**
- If <18 months old, refer for HIV PCR testing**

Outpatient Therapeutic Care and Treating Severe Acute Malnourished (SAM) Children

Entering Outpatient Therapeutic Care

- When an eligible child is referred to Outpatient Therapeutic Care, the healthcare worker fills out an **OTC card**
- All OTC cards should be kept in the patient file, which stays at the RH/HC/clinic

Entering Outpatient Therapeutic Care

Explanation about how to fill out OTC Card

Treating SAM Children through Outpatient Therapeutic Care

- After diagnosed with SAM, give child RESOMAL solution or other ORT solution to aid general hydration
 - Give ORT solution to SAM child at every clinic visit
 - In addition, immediately give solution to ALL children refusing Plumpy'nut or being transferred to inpatient care
- Use clean drinking water (slightly warm if possible to help dilution)

Treating SAM Children through Outpatient Therapeutic Care

- **Assess appetite by giving small amount of Plumpy'nut to child**
 - Child may refuse to eat Plumpy'nut because it is unfamiliar or because child is in a strange environment.
 - In this case, the caregiver and nurse should move the child to a comfortable setting and slowly encourage child to try Plumpy'nut
- ***You MUST observe child eating Plumpy'nut before child can be accepted for outpatient care***

Treating SAM Children through Outpatient Therapeutic Care

- ***Child who refuses to eat Plumpy'nut should be referred to RH or HC for inpatient care until appetite is re-established***
- Appetite for Plumpy'nut must be tested each time the child visits RH/HC/clinic
 - Lack of appetite may indicate deterioration of nutritional status as well as poor liver or gastrointestinal function

Treating SAM Children through Outpatient Therapeutic Care

- Determine proper dose of Plumpy'nut for child
 - 200kcal per kilogram of body weight per day (200kcal/kg/day)
 - Number of packets consumed per day is based on weight of child and simplified to make adherence easier for caregiver



Treating SAM Children through Outpatient Therapeutic Care

Dosing Chart for Plumpy'nut

(92g packets containing 500 kcal)

(average 200kcal/kg/day)

Weight of Child (kg)	Packets per Day	Packets per 2-Week Supply
3.5 – 3.9	1.5	22
4.0 – 5.4	2	28
5.5 – 6.9	2.5	36
7.0 – 8.4	3	42
8.5 – 9.4	3.5	50
9.5 – 10.4	4	56
10.5 – 11.9	4.5	64
12.0-13.5	5	70
>13.5	Based on 200kcal/kg/day	Based on 200kcal/kg/day

Treating SAM Children through Outpatient Therapeutic Care

- Give caregiver ***TWO-WEEK SUPPLY of Plumpy'nut*** for the child (see “Dosing Chart”)
 - Give extra “buffer stock” in case Plumpy'nut runs out before next clinic visit (two weeks later)
 - Give 5 extra packets if giving <50 packets for Two-Week Supply
 - Give 10 extra packets if giving ≥ 50 packets for Two-Week Supply
 - Asks caregiver to return empty packets of Plumpy'nut at each visit

Treating SAM Children through Outpatient Therapeutic Care

- Demonstrate to the caregiver about how to eat Plumpy'nut
- Teach caregivers how to open packet of Plumpy'nut—tear at one corner and eat paste from packet or on a spoon
- Describe to caregiver the dosing of Plumpy'nut
 - Explain that Plumpy'nut should be given to child in small amounts frequently—usually from 5-8 times daily
 - Define how much should be given to the child every day and at each dose
 - Usually about $\frac{1}{2}$ packet per dose
 - Explain that remaining Plumpy'nut in the packet should be put in sealed plastic bag until next dosing (to reduce chance of contamination)

Treating SAM Children through Outpatient Therapeutic Care

- Explain that **clean water** must always be given to the child while eating Plumpy'nut so that the child stays hydrated
- Caregiver must give generous amounts of clean water to the child
 - The child should drink **at least** 1 cup (100 mL) of clean water for each dose of Plumpy'nut
 - If child wants more, let the child drink as much clean water as he/she wants

Treating SAM Children through Outpatient Therapeutic Care

- Explain that Plumpy'nut does not need to be refrigerated, but it should be kept out of the sun
- Plumpy'nut will not spoil in the two weeks between care visits if properly kept

Treating SAM Children through Outpatient Therapeutic Care

- **Plumpy'nut and Nutritious Eating**
 - If child is breastfeeding, caregiver may continue breastfeeding and give Plumpy'nut immediately after breast milk
 - For all other children, make sure that caregiver understands that ***Plumpy'nut must always be given before any other food***
 - If the child is still hungry after eating the correct dose of Plumpy'nut, the child may be given a small amount of a balanced, nutritious meal until the child is full

Treating SAM Children through Outpatient Therapeutic Care

- Explain that Treating SAM children with Plumpy'nut requires adherence
 - The child should be the only one eating the Plumpy'nut while the child is on the Plumpy'nut regimen
- Plumpy'nut cannot be shared with other members of the family or community who may be hungry
 - Keep Plumpy'nut out of reach of other children in the house

REMEMBER:

Plumpy'nut is used for treating the sick child. Only the sick child should eat it. If the doctor gives you antibiotic therapy for a sick child, the mother and father and all neighbors do not eat the antibiotics instead of the sick child! This is the same. It will only help the child if the child eats all of it.

Treating SAM Children through Outpatient Therapeutic Care

- Provide routine medicines to all children admitted for Outpatient Therapeutic Care and at each OTC visit
 - Provide additional medicines upon clinical diagnosis
- Give feeding counseling at each OTC Visit
 - Provide information and education to the caregiver on how to prepare cheap, balanced and nutritious meals for the child
 - Provide kitchen demonstration where possible
 - Always follow National Nutrition Program's Guidelines on Nutrition Education
- Give education on basic hygiene
 - Explain need to wash hands and face of child and hands of caregiver before feeding of Plumpy'nut

Treating SAM Children through Outpatient Therapeutic Care

- Fill out standard *Patient Booklet* and include food supplementation for treating SAM
 - The Patient Booklet remains with the caregiver as a record of the child's progress
 - In the Patient Booklet, you must include:
 - The daily dosing of Plumpy'nut
 - The number of total packets given out at that visit
 - The date of RH/HC/Clinic visit two weeks later

Treating SAM Children through Outpatient Therapeutic Care

Health Complications noticed by the Caregiver:

- Explain that the child should not stop taking Plumpy'nut when child has mild diarrhea. Rather, give extra Plumpy'nut and extra clean water
 - If child has serious diarrhea, vomiting, fevers, or swelling again, caregiver must bring the child back to the RH/HC/clinic for review **AS SOON AS POSSIBLE**
 - With these symptoms, caregiver must also temporarily **STOP GIVING Plumpy'nut**
 - May start Plumpy'nut regimen again only on Doctor's instruction, when child is stabilized
- If caregiver runs out of Plumpy'nut before next Outpatient Therapeutic Care visit, caregiver must return to RH/HC/Clinic immediately

Treating SAM Children through Outpatient Therapeutic Care

Safety Protocol

- Allergies
 - Though unlikely, small chance of allergic reaction to the peanut butter in Plumpy'nut. Allergy may cause reactions in the form of rashes, hives, skin infections, swelling, shortness of breath, or anaphylactic shock.
 - For any of these symptoms, the caregiver must discontinue dosing of Plumpy'nut and bring the child to the nearest health facility immediately.
 - If the child presents with symptoms of an allergic reaction, healthcare workers should follow national protocol for the treatment of allergic reactions.

Treating SAM Children through Outpatient Therapeutic Care

Safety Protocol

- Choking
 - The caregiver should be assured that the child will not choke when eating Plumpy'nut.
 - Caregiver should also be instructed that if the child starts to choke on Plumpy'nut, the child should be brought into the nearest health facility immediately.

Follow-Up within Outpatient Therapeutic Care

Follow-Up within Outpatient Therapeutic Care

- Monitor progress of child (weight gain, indicators of improved health) with **visits to OTC site at RH/HC/clinic every two weeks.**
- At each OTC visit, provide feeding counseling and instruct caregiver on balanced, nutritious food preparation, to sustain the child's nutritional health after Plumpy'nut regimen has completed.
- Update OTC Card and Patient Booklet at each visit. Caregiver should bring the Patient Booklet to the RH/CH/clinic for every scheduled visit.
- If deterioration in child's condition, refer to appropriate inpatient facility / hospital **immediately.**

Follow-Up within Outpatient Therapeutic Care

- ***Home-Based Care (HBC) teams should make WEEKLY VISITS to home of SAM child***
 - HBC team checks on child's progress, adherence to Plumpy'nut regimen, and the child's overall health status
 - HBC team refers child back to Outpatient Therapeutic Care at RH/HC/clinic before next scheduled visit if indicated by child's health symptoms
 - HBC team provides feeding counseling on proper nutrition
 - HBC team refers child to inpatient facility when appropriate
 - HBC team follows up with caregiver after all absences from regularly scheduled Outpatient Therapeutic Care visits in order to gain an understanding for absence and to encourage return visits

Follow-Up within Outpatient Therapeutic Care

- ***If the Home-Based Care (HBC) team notices any of the following symptoms, refer child to inpatient facility immediately:***
 - Bilateral pitting oedemes +++
 - Anorexia
 - Lower respiratory tract infection
 - High fever
 - Severe dehydration
 - Severe diarrhea
 - Severe anemia
 - Hypoglycemia
 - Hypothermia
 - Lack of alertness

Follow-Up within Outpatient Therapeutic Care

Sample Schedule for Outpatient Therapeutic Care

Week 0 (Initial Visit)	RH/HC/Clinic Visit, HBC Visit
Week 1	HBC Visit
Week 2	RH/HC/Clinic Visit, HBC Visit
Week 3	HBC Visit
Week 4	RH/HC/Clinic Visit, HBC Visit
Week 5	HBC Visit
Week 6	RH/HC/Clinic Visit, HBC Visit
<i>This pattern should continue until child is discharged</i>	

Follow-Up with Plumpy'nut

- At the end of each week, the healthcare worker in charge of Plumpy'nut at each site fills in the “Weekly Totals for OTC” sheet that records Plumpy'nut dosing and outcomes
 - The number of children registered in the program is checked against the number of “active” cards in the file (not including discharges)
 - All children given Plumpy'nut in both inpatient and outpatient care should be included (see section on Inpatient Care below)
 - The weekly totals will be used for monitoring and evaluation

Discharge from Outpatient Therapeutic Care

Discharge from Outpatient Therapeutic Care

- The child can be defined as “cured” of severe acute malnutrition (SAM) if they exhibit the following:
 - **Minimum of 4 weeks in the program**
 - (minimum 3 RH/HC/clinic visits, including the initial visit)
 - **> -1 S.D. (>90%) WHM for two consecutive health facility visits**
 - **MUAC > 130 mm**
 - **No oedemes for two consecutive health facility visits**
 - **Sustained weight gain for two consecutive health facility visits**
 - **Clinically well—no complications**

Discharge from Outpatient Therapeutic Care

OTC Discharge Criteria	
Discharge Cured	<ul style="list-style-type: none">•Minimum of 4 weeks in the program•> -1 S.D. (90%) WHM for two consecutive visits•MUAC > 130 mm•No oedemes for two consecutive visits•Sustained weight gain for two consecutive visits•Clinically well
Defaulted	Absent for two consecutive OTC visits—child may reenter OTC program if meets entrance criteria, but should fill out new OTC card
Died	Died during time registered in OTC
Transferred to Inpatient Care	Condition has deteriorated and requires inpatient therapeutic or hospital care
Non-cured	Has not reached “discharge cured” criteria after 3 months – refer to inpatient care

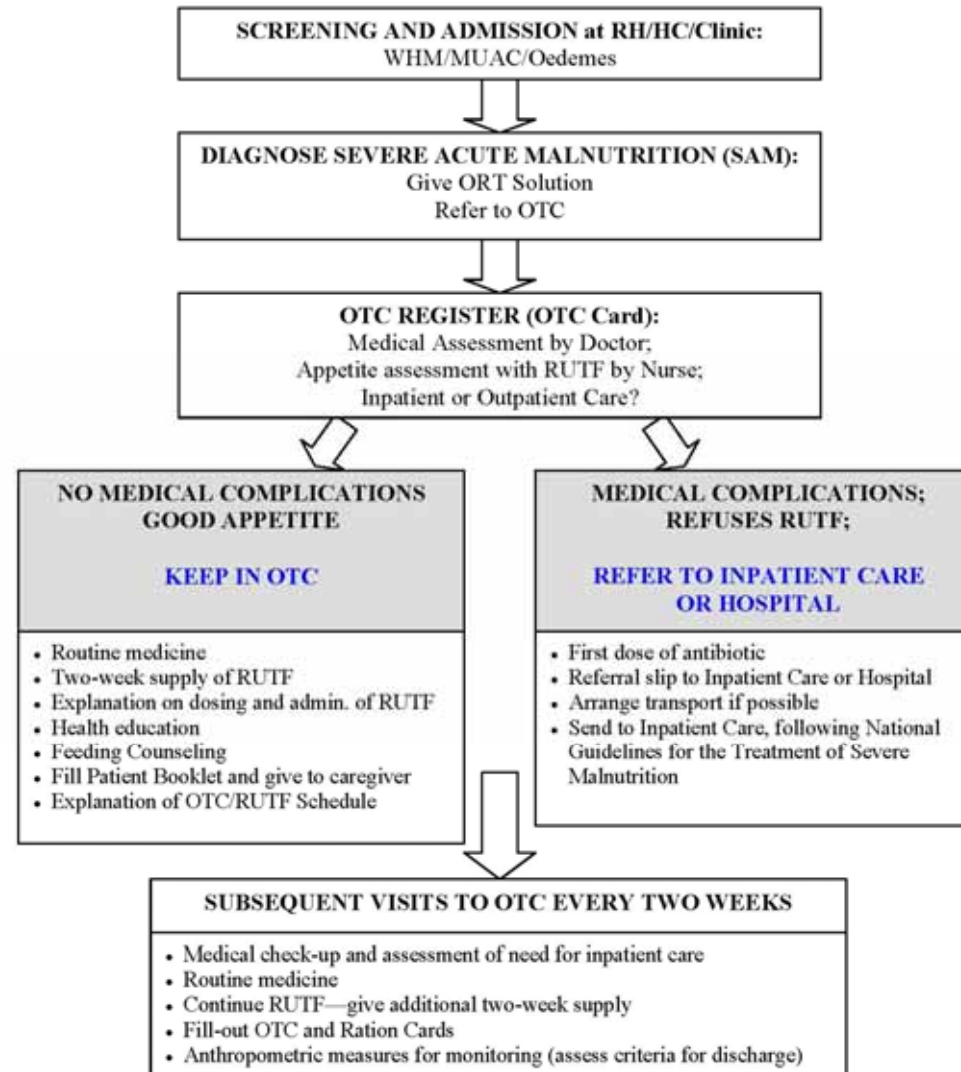
Discharge from Outpatient Therapeutic Care

- For all OTC “discharge cured” children, provide **ONE WEEK SUPPLY** of Plumpy'nut to the child upon discharge.
- Transfer OTC “discharge cured” children to standard complementary feeding care for a minimum of two months after discharge
 - Final OTC visit and complementary feeding care should provide feeding counseling on good nutrition, including demonstrations to caregiver on how to prepare cheap, balanced and nutritious meals.
 - This is essential to sustaining the child’s nutritional health after Plumpy'nut regimen has completed.

Discharge from Outpatient Therapeutic Care

- Discharged non-cured children should also receive complementary feeding care, including feeding counseling
- Discharged non-cured children can be readmitted to Outpatient Therapeutic Care if they fulfill entry criteria again

Summary Diagram of OTC Procedures



Plumpy'nut for Severe Acute
Malnourished (SAM) Children in
Inpatient Care

Treating SAM Children in *Inpatient Care*

- **Plumpy'nut can also be used in Inpatient Care as a substitute for F100 in SAM children without severe complications**
 - Doctor's or nurse's choice whether to give Plumpy'nut
 - Child's appetite must first be assessed—child must be given small dose of Plumpy'nut first to determine whether child will eat it
 - Follow national guidelines for administration of F100 regarding duration of treatment and monitoring
 - Dosing of Plumpy'nut is the same as for Outpatient Therapeutic Care (see “Plumpy'nut Dosing Chart”)
 - Small and frequent doses
 - Fill out standard monitoring forms for severe malnutrition (not OTC card) to monitor progress of any child receiving Plumpy'nut in Inpatient Care

Case Studies

Case Study #1

A 6-year-old child comes to the pediatric ward and is very skinny. The child is measured to be -2 S.D. WHM and weighs 8 kg. What should you do to determine if the child is eligible for Plumpy'nut through Outpatient Therapeutic Care? If the child meets those requirements, what referrals should you make, and what counseling should you give the caregiver?

Case Study #2

A 12-year-old child comes into the pediatric ward and exhibits -3 S.D. WHM. The child has unknown HIV status and refuses to eat Plumpy'nut when given a small sample. Where should the child be referred? Should the child eat Plumpy'nut? What should you tell the caregiver?

Case Study #3

A 10-year-old child comes to the pediatric ward. He is between -2 and -3 S.D. WHM and has many complications. This child has already been tested and is HIV-. Where should the child be referred? Should Plumpy'nut be given? What should you tell the caregiver?

Case Study #4

An 8-year-old child comes to the pediatric ward. The child is exactly -2 S.D. WHM and has no complications. This child has already been tested and is HIV+. Where should the child be referred? Should Plumpy'nut be given? What should you tell the caregiver?

Thank You!