

Interim guideline:
**Nutritional care of
children and adults with**

EBOLA virus
disease

in treatment centres



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Glossary

CSB	corn–soya blend
CCC	community care centres
ETU	Ebola treatment unit
EVD	Ebola virus disease
HEB	high-energy biscuit
ICRC	International Committee of the Red Cross
IV	intravenous
LNS	lipid-based nutrient supplements
MAM	moderate acute malnutrition
MNP	micronutrient powders
MSF	Médecins sans Frontières
ORS	oral rehydration salts
PPE	personal protective equipment
RUIF	ready-to-use infant formula
RUSF	ready-to-use-supplementary food
RUTF	ready-to-use-therapeutic ¹ food
SAM	severe acute malnutrition
UNICEF	United Nations Children’s Fund
WHO	World Health Organization
WFP	World Food Programme

¹ For the purpose of this interim guideline, the use of the word “therapeutic” refers to therapeutic foods for the treatment of severe acute malnutrition, not to therapeutic foods for the treatment of Ebola virus disease.

Scope and purpose

This interim guideline provides recommendations on nutritional support to adults and paediatric patients in Ebola treatment unit (ETUs). They also apply to community care centres (CCCs) or to other centers where Ebola patients are receiving care and support. It is based on existing World Health Organization (WHO) evidence-informed guidelines previously approved by the Guidelines Review Committee, adapted to the current Ebola infection crisis (1–3). The existing nutritional care guidelines were used to guide this interim guideline, along with a rapid review of the available literature on Ebola virus disease (EVD) and guidelines on nutritional management of other viral haemorrhagic fevers (4–6). It highlights the key clinical problems in patients affected by EVD that may interfere with their nutritional status and overall clinical support. It also summarizes their nutritional needs and the optimal nutritional care and support that should be given to hospitalized patients in the context of the current Ebola crisis. It does not provide specific advice on fluid management in cases of vomiting, diarrhoea and dehydration (see reference (4) for guidance), or parenteral nutrition.

This interim guideline focuses on nutritional support in all EVD patients during treatment and convalescence in ETUs. It focuses on practical aspects of patients' nutritional care. It does not focus specifically on malnourished patients. The aim is to provide guidance to programme managers and relevant health staff of organizations that implement or contribute to EVD treatment programmes, as well as to ministries of health, particularly in low- and middle-income countries facing this Ebola crisis.

This document also lays out some basic principles of optimal nutritional care for patients with EVD. The application of the recommendations provided may vary with the context and capacity of treatment units. Treatment centres for EVD vary in the number of beds and patients attended; availability of resources and equipment; and number and training of health-care personnel.

This interim guideline should be adapted accordingly. It is anticipated that it will be updated within 6 months, as needed, in light of increased field experience, ongoing research and data analysis.

Background

Ebola virus disease

EVD is an acute infection caused by the Ebola virus that starts with a flu-like syndrome, fever and profound weakness (4). Table 1 provides an overview of the main symptoms. Most of the symptoms have a direct or indirect impact on nutrition. The pathogenesis and variability of the disease is not completely understood. Evidence from the field is that the diarrhoea experienced with EVD can be profound and, in addition to electrolyte loss, protein loss may occur. In many patients, diarrhoea and vomiting are not constant, but occur as intermittent episodes. Symptoms may appear anywhere from 2 to 21 days after exposure to Ebola virus, although onset in the first 2 weeks following exposure is considered to be most common (4). The mortality of EVD is high and no licensed specific antiviral treatment or vaccine is available for use in humans (5) at the present time. The majority of patients are adults. Patients may have a short or long hospital course. During this current epidemic, once a patient is admitted to hospital, the mean duration of hospital stay is 12 days for those who recover and 4 days for those who die (6).

The clinical management of EVD patients is similar to that for other diseases with severe sepsis or shock (7, 8). Treatment of complicating infections and pain relief are important.

Symptoms of Ebola virus disease that affect nutritional care and status

A lack of appetite, sore throat, and difficulty in swallowing and breathing may interfere with nutritional care. However, encouragement by health staff seems to have a positive effect in motivating patients to eat and drink. Vomiting also interferes with nutritional care and, along with diarrhoea, causes additional nutritional stress through rapid loss of electrolytes, protein, other essential nutrients and fluid.

Table 1. Signs and symptoms in EVD patients (4, 6, 7)^a

Most patients suffer from (approximate %)	Most patients suffer from (approximate %)
Fever (90) ^b	Abdominal pain (45) ^b
Fatigue (75–80) ^b	Muscle and/or joint pains (40) ^b
Vomiting (65–70) ^c	Difficulties in swallowing (30–35) ^b
Loss of appetite (65) ^b	Chest pain (35–40) ^c
Diarrhoea (65) ^c	Cough (30) ^c
Headache (55) ^b	Breathing difficulty (25) ^c
Nausea ^b	Conjunctivitis (20)
	Sore throat (20) ^b
	Bleeding: ^{c,d}
	• Specific haemorrhagic symptoms (≈5)
	• Unexplained bleeding (≈20)
	Confusion (10–15) ^c
	Hiccups (10–15)
	Jaundice (10)
	Impaired kidney and liver function

Nutritional status and Ebola virus disease

EVD patients may have varied nutritional priorities, depending on the stage of the illness and the individual patient's underlying nutritional status. It is unclear whether preceding nutritional status contributes directly to the outcome of the disease. Currently, it is unknown whether nutritional support contributes to patients' survival; however, it is believed that preceding nutritional status plays a role.

^a Other signs and symptoms that have been reported at a frequency of less than 10% in confirmed and probable EVD patients (with definitive clinical outcome in Guinea, Liberia, Nigeria and Sierra Leone) are reported in reference (6).

^b Typically early-onset symptoms. *Note:* There is often overlap with early- and late-onset symptoms (4).

^c Typically late-onset symptoms. *Note:* There is often overlap with early- and late-onset symptoms (4).

^d Despite a common belief that haemorrhage is a defining feature, visible bleeding is not universal. When present, bleeding is not typically an early presenting feature. Although it can present early, most often it appears late, in severely ill patients (4).

Assessment of feeding phases of patients with Ebola virus disease

Currently, field experience with EVD patients in treatment centres shows differences in their capacity to eat and drink. This interim guideline recognizes three feeding phases for EVD patients, in addition to an initial rehydration phase, where necessary – maintenance feeding, transition feeding and boost feeding (see Table 2 and Fig. 1).

The nature of the treatment of EVD (patients are put in isolated wards) does not allow family or friends to assist in physically feeding the patients unless they are trained to work under appropriate infection-prevention/control practices. Owing to the workload, health-care staff have no, or limited, time to assist the patients with eating or drinking.

Nutritional support to an EVD patient in a treatment centre is not likely to be for more than 2–3 weeks. These figures could be useful for planning the logistics and required quantities of food commodities (6).

Table 2. Feeding phases of EVD patients

Severity of illness	Description of patient's condition	Feeding phase	Suitable consistency of nutritional commodities
Critically ill	Severely dehydrated ^a	Rehydration phase ⁴	Not applicable
	Not severely dehydrated Poor or no appetite May or may not have eating difficulties ^b	Maintenance feeding phase	Liquid
III	Not severely dehydrated Some appetite May or may not have eating difficulties ^c	Transition feeding phase	Liquid Semi-solid Solid ^d
Convalescent or early symptomatic stage	Not severely dehydrated Good appetite No eating difficulties	Boost feeding phase	Liquid Semi-solid Solid

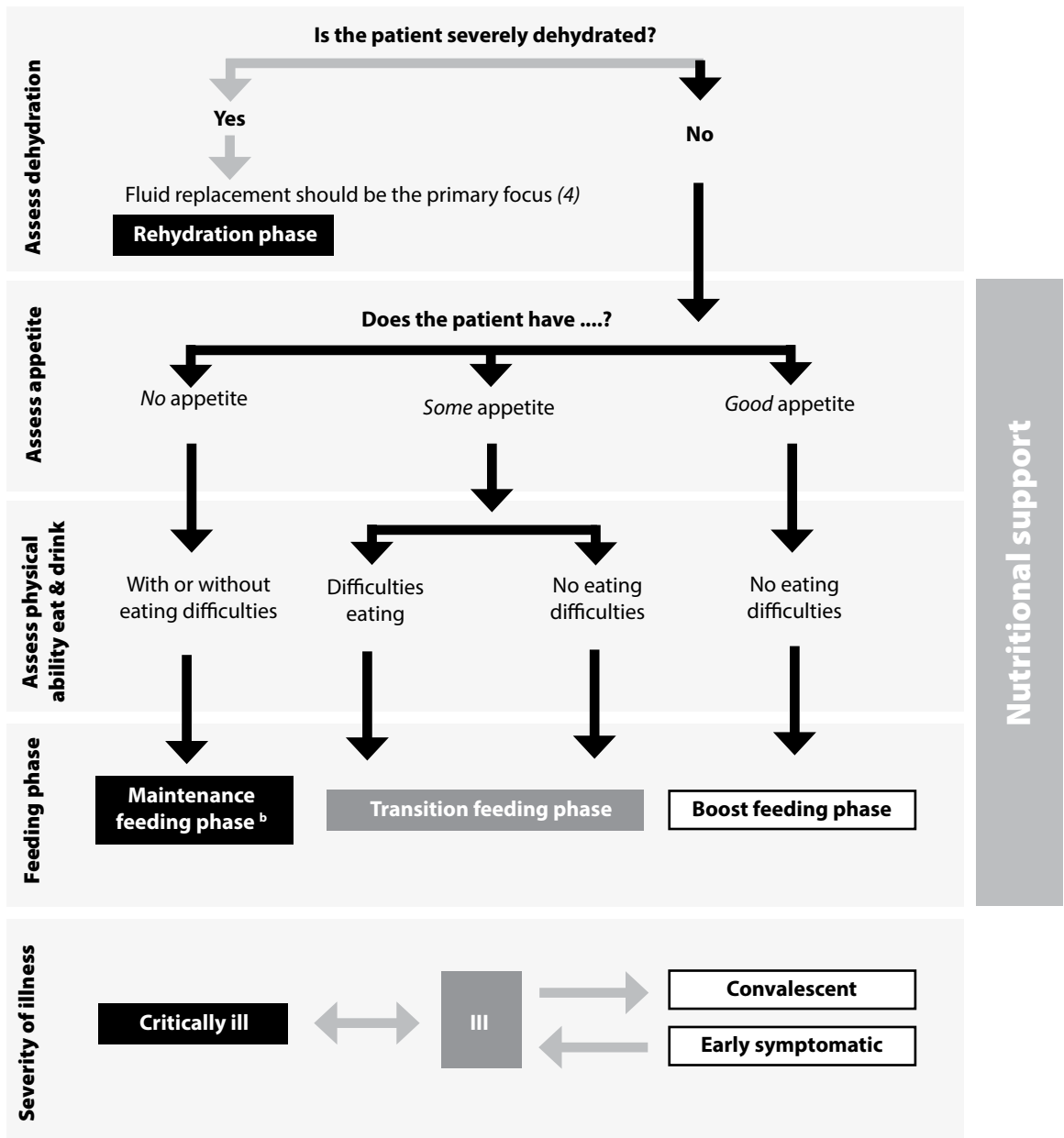
^a These patients would only have oral rehydration salts (ORS) (and intravenous [IV] fluids if needed). Fluid replacement should be the primary focus in this phase and so patients in this phase do not fall within the scope of this interim guideline.

^b Irrespective of the presence or absence of eating difficulties, nutritional care will be the same.

^c The presence or absence of eating difficulties will determine nutritional care.

^d For patients with no eating difficulties.

Figure 1. Decision tree to ascertain patients' feeding phase^a



^a It is very important to maintain hydration with ORS, particularly in the maintenance feeding phase.

^b "Maintenance feeding phase" refers to maintaining vital body functions.

Table 3 proposes a nutritional care protocol for adults and children aged over 6 months, with examples that take into account individual nutritional needs and various patient feeding phases. An example menu with an indicated timetable is included as Annex 2. For patients in the boost feeding phase, normal meals (common family foods) can be catered for by treatment centres, as well as by families that have expressed a willingness and capacity to provide prepared meals. Guidance for those families can include recommendations on foods and snacks, which should ideally include potassium-rich foods (see Annex 1).

Table 3. Nutritional care protocols for adults and children aged 6 months and older with Ebola virus disease

Severity of illness	Description of patient's condition
Rehydration phase,^a severely dehydrated	<ul style="list-style-type: none"> • ORS (and, if needed, IV fluids)
Maintenance phase,^b not severely dehydrated, poor or no appetite, may or may not have eating difficulties	<ul style="list-style-type: none"> • Milk-based fortified diets (F-75)^c • For adults: "sip feeds" (low renal solute load, low-osmolarity options) (9)
Transition phase, not severely dehydrated, some appetite, may or may not have eating difficulties	<p><i>No eating difficulties:</i> Any one or combination of any of the following:</p> <ul style="list-style-type: none"> • ready-to-use fortified nutrient-rich biscuits/bars (can also be offered as a porridge or paste) • 1–2 porridges per day of fortified cereal legume blends with added sugar (adults) and added sugar and milk (children) • common family meal (plus micronutrient powders [MNP], if no fortified food is given); preferably offer lipid-based nutrient supplements (LNS) in addition to common family food; LNS must be eaten separately <p><i>Eating difficulties:</i> as for those with no eating difficulties, except that:</p> <ul style="list-style-type: none"> • common family meal should be offered as mashed food or as soups • LNS are not suitable for patients with swallowing difficulties • ready-to-use fortified nutrient-rich biscuits/bars should be offered as porridge <p>In addition, the following commodities are also suitable:</p> <ul style="list-style-type: none"> • milk-based fortified diets (F-100)^c • for adults: "sip feeds" (low renal solute load, low-osmolarity options) • For adults: "Sip feeds" (low renal solute load, low-osmolarity options)
Boost phase, not severely dehydrated, good appetite, no eating difficulties	<p>Any one or combination of any of the following:</p> <ul style="list-style-type: none"> • ready-to-use fortified nutrient-rich foods (as a paste, porridge or biscuit/bar) • 1–2 porridges of fortified cereal legume blends with added sugar (adults) and added sugar and milk (children) • common family meal (plus MNP, if no fortified food is given); preferably offer LNS in addition to common family food; LNS must be eaten separately^d • snacks: for example high-energy biscuits (HEBs) <p>Convalescent patients usually need (and want) more food: do not limit the quantity of food, and provide extra ready-to-use fortified nutrient-rich foods.</p>

^a These patients would only have ORS (and IV fluids if needed). Fluid replacement should be the primary focus in this phase and so patients in this phase do not fall within the scope of this interim guideline.

^b It is very important to maintain hydration with ORS, particularly in the maintenance feeding phase.

^c Suitable for any patient (even adults), but particularly for children. F-100 should only be used if F-75 is not available.

^d In order to optimize the bioavailability of nutrients in the LNS.

Programmatic experience and summary of existing evidence

The existing nutritional care guidelines, as well as a rapid review of the available literature on EVD, and guidelines on nutritional management of other viral haemorrhagic fevers, were used to inform this interim guideline (4). The evidence was the same as that used to inform existing guidelines, complemented with reports and experiences from the field staff and implementing agencies working in the Ebola crisis. A well-documented case-study of a patient who contracted the disease in Sierra Leone provided limited evidence on the baseline fluid and nutritional management of Ebola cases, particularly in terms of the need to provide maximal supportive measures with a primary goal of restoring and maintaining volume and electrolyte balance (10). In this severe case, persistently low potassium levels necessitated continuous intravenous substitution of 8–10 mmol of potassium chloride per hour. Oral fluids used included water, tea and oral nutrition (low-fibre standard formula providing 1 kcal/mL). This case highlighted the need to stabilize the patient's condition as a first step (10). Experience with the clinical management of patients has served to inform decisions and allow the use of field experience from experts (6, 10, 11). The evidence that served to inform existing WHO guidelines on the management of severe acute malnutrition, and other guidelines cited in the reference section, can provide additional detailed information (1, 12–14).

Recommendations

General management, diet and feeding of children and adults with Ebola virus disease

1. Patients should be provided with food if they are conscious and can swallow.
2. The nutritional needs and approach to nutritional care in any individual will be determined by the patient's preceding nutritional status, severity of illness and age.
3. The food that is offered to the patient should ideally be palatable and attractive; be nutrient dense; be liquid, semi-solid or solid (depending on the patient's condition); be easy to ingest and not require assistance from health-care staff when the patient eats (as they have limited time to help); carry limited risk of bacterial contamination when kept at the bedside for 2–3 h; and not require many eating utensils, as these can be a source of contamination.
4. Whenever possible, an assessment should be done on patients, to indicate what they can and prefer to eat, in order to bridge the gap between what is nutritionally needed and what the patient wants to eat.
5. The intake of high nutrient-dense foods (e.g. ready-to-use-therapeutic food [RUTF] and ready-to-use-supplementary food [RUSF]) may be important in patients in the early phase of the disease who still have appetite and no eating difficulties; in patients who are ill for longer time periods (e.g. up to 3 weeks); in the convalescence phase; and following discharge.
6. Food commodities to be considered for each feeding phase for EVD patients (adults and children over 6 months) in ETUs are presented in Table 4. Enteral feeding products are not listed, as the use of nasogastric tubes is not currently recommended for the treatment of EVD in most field settings (see Box 1). However, when patients tolerate nasogastric tube placement, exceptions can be made for treatment centres that are fully equipped with sufficient and appropriate staff and material, good infection-prevention/control practice, and good waste-disposal management.

Information on feeding infants who have EVD, or whose mothers have EVD, is presented in the section "Infant feeding and Ebola outbreak" in the [en-net](#) (15).

Box 1. Reasons not to use nasogastric tubes for EVD patients

- There are barriers to verification of tube placement in the isolation setting.
- Nasogastric tubes are difficult to monitor, as health staff have limited time.
- Patients with sore throat complain about the pain they cause (there is a risk that patients remove them, creating an infection risk).
- Some patients oppose insertion and retention of the nasogastric tube (or are confused); this decreases the likelihood of benefit versus the risk to staff, and increases the risk of tearing staff protective gear, as well as the risk of spray during removal.
- Severely ill patients who are bleeding may experience harm from placement of the tube.
- Many treatment centres have insufficient trained staff to insert and maintain nasogastric tubes.

Table 4. Food commodities to be considered for each feeding phase for Ebola virus disease patients in Ebola treatment units^a

Food commodity	Advantages	Comments	Feeding phases
Milk-based fortified liquid diets , e.g. F-75, F-100	Offered as a liquid drink, easy to ingest	<ul style="list-style-type: none"> • Requires a clean preparation area and regular distribution • A small, largely theoretical, risk of milk intolerance in adult patients taking large amounts • Risk of bacterial contamination if kept on the ward for >3 h • These milk-based products could not be used if the patient has gastrointestinal effects due to lactose intolerance 	Maintenance (F-75) Transition (with eating difficulties; F-100)
Sip feeds (liquid diets) <ul style="list-style-type: none"> • Containing protein, carbohydrate and vegetable oils with micronutrients • Designed for special medical purposes (21) • Includes low renal solute load, low-osmolality options 	<ul style="list-style-type: none"> • Hygienic, ready-to-use individual portions • Offered as a liquid drink, easy to ingest • Suitable as a sole source of nutrition for patients who cannot consume sufficient quantities of everyday food and drink to meet their nutritional requirements 	<ul style="list-style-type: none"> • Only designed for adults • Risk of bacterial contamination if kept open on ward for >3 h 	Maintenance Transition (with eating difficulties)

^a Enteral feeding products are not listed, as the use of nasogastric tubes is currently not feasible in most field settings.

Food commodity	Advantages	Comments	Feeding phases
Fortified biscuits/bars <ul style="list-style-type: none"> Ready-to-use fortified nutrient-rich biscuits/bars RUTF in biscuit/bar form RUSF in biscuit/bar form Other: HEBs 	<ul style="list-style-type: none"> Hygienic, individual portions, easy to eat Do not need preparation if used as dry biscuit/bar and can be positioned at bedside; can be made into porridge by adding water 	<ul style="list-style-type: none"> If offered as biscuit/bar, plenty of water should be offered separately^b Depending on the severity of the patient's eating difficulties in the transition phase, offering these products as porridge may be applicable Risk of bacterial contamination if kept open on ward for >3 h 	Transition (with or without eating difficulties) Boost
Fortified cereal legume flours , e.g. corn-soya-blends (CSB or SuperCereal); SuperCereal with added sugar and oil; SuperCereal Plus, i.e. including milk powder, sugar and oil	<ul style="list-style-type: none"> Likely to be locally available Suitable for small children 	<ul style="list-style-type: none"> Requires clean preparation in a cooking area and regular distribution In a few adult patients, a milk-free diet maybe warranted due to milk intolerance Risk of bacterial contamination if kept open on ward for >3 h 	Transition (with or without eating difficulties) Boost
Fortified spreads/pastes^c <ul style="list-style-type: none"> LNS; ready-to-use foods),^d e.g. RUTF in paste form; RUSF in paste form 	<ul style="list-style-type: none"> Hygienic, individual portions, easy to eat Do not need preparation and can be positioned at bedside with relatively low risk of bacterial contamination if consumed within 12 h RUTF is nutritionally balanced and complete 	<ul style="list-style-type: none"> Plenty of liquid should be offered separately^b 	Transition (no eating difficulties) Boost
Common family foods (mashed or solid, depending on eating difficulties), e.g. rice-gruel or rice porridge, fufu, mashed carrots, millet, okra, palava sauce, etc.	<ul style="list-style-type: none"> Locally available, based on local food customs and habits 	<ul style="list-style-type: none"> This might be nutritionally insufficient if this is the only food offered MNP or LNS will need to be added Risk of bacterial contamination if kept open on the ward for >3 h Preferably offer LNS in addition to common family food. LNS must be eaten separately^e 	Transition (with or without eating difficulties) Boost
Potassium-rich foods , e.g. unsweetened juices, mashed fruits. (see Annex 1)	<ul style="list-style-type: none"> Locally available 	<ul style="list-style-type: none"> Along with potassium, other electrolytes such as sodium, calcium, magnesium or phosphorous may also be very important for EVD patients 	Transition (with or without eating difficulties) Boost

^b RUTF/RUSF as biscuit/bar or paste, should be given only to those who are able to drink sufficient water by themselves (a minimum ratio of 1 mL of water for each kcal of the diet).

^c Details on the recommended nutritional composition of these products are summarized in references (12, 13).

^d The term LNS refers generically to a range of fortified, lipid-based spreads, including products like RUTF used to treat SAM, RUSF used as supplementary foods to treat MAM, and others that are used for "point-of-use" fortification to improve diets and aiming to prevent malnutrition.

^e In order to optimize the bioavailability of nutrients in the LNS.

Volume and electrolyte repletion

1. The standard practice when diarrhoea is present aims particularly at strategies dealing with volume and electrolyte repletion. When it is not contextually possible to address this with parenteral repletion, ORS solution should be used.
2. Anti-emetic medications may provide some relief and facilitate oral rehydration if nausea and vomiting are common.
3. In critically ill patients *with severe dehydration*, nutritional support should not interfere with the strategies for volume and electrolyte repletion, as nutritional requirements will temporarily be of a lower priority.
4. Even in critically ill patients *without severe dehydration*, excess energy or protein is not needed, and an excess could further compromise liver and kidney function.
5. As soon as appetite starts to return, patients need sufficient energy (kcal) and essential nutrients, in addition to fluid electrolytes.
6. While, ideally, electrolyte repletion occurs through ORS intake, sometimes patients will be eating and drinking small amounts but not tolerate substantial volumes of ORS solution. Consequently, potassium in particular, as well as other electrolytes, should be elements considered in food/fluid selection.

Avoiding renal solute load/high osmolarity

1. Ready-to-use fortified nutrient-rich foods (e.g. RUTF and RUSF), and, to a lesser extent, milk-based fortified diets (e.g. F-100) should only be given to those patients who are able to drink sufficient water by themselves (a minimum ratio of 1 mL of water for each kcal of RUTF).
2. F-100 in general has sufficient water for older children and adults, but patients should be encouraged to take additional water to satisfy their thirst.
3. Foods with a very high osmolarity should not be given to patients with diarrhoea. It is not recommended that RUTF is mixed with F-100 (or with insufficient quantities of water), as this creates food with a very high osmolarity. Such foods may exacerbate diarrhoea and render patients at high risk of developing hyperosmolar syndrome, owing to the excessive renal solute load (16, 17).
4. Owing to the high osmolarity of sugary carbonated beverages or juices, it is important that they are not given to patients with diarrhoea (18). These products are low in electrolytes and nearly all essential nutrients; therefore, they should only be offered during the boost feeding phase.

Provision of food

1. Until further evidence is available, patients should be provided with a minimum of the recommended daily allowance for each nutrient.
2. Under no circumstances should patients be force-fed (e.g. by nasogastric tube) more than their maintenance requirements for energy (100 kcal/kg per day for children and 35 kcal/kg per day for adults).
3. During convalescence, patients should be encouraged to eat as much as they can (19).

4. Food should be prepared in an allocated space and not on the Ebola isolation ward. Food could be offered in: (i) bowls with cutlery that is kept on the patient's ward and allocated to a single patient (at the bedside), with chlorination procedures in place to clean utensils; and/or (ii) disposable materials (for single use only: plastic, polystyrene, straws, wooden/paper/plastic spoons, foil), which should be burned after use. This is only possible in conjunction with the facility's strict waste-disposal management for contaminated materials.
5. It is recommended that a choice of solid foods, semi-solid foods and liquid diets be offered.
6. As most patients lose their appetite, soft foods and fluids are easier to tolerate.
7. Small, frequent meals are often better tolerated.
8. Ideally, choices should be presented to each patient. This increases the likelihood that the patients will eat, but is logistically only likely to be manageable in smaller treatment centres that are well resourced.
9. Food intake should be promoted in a way that supports the patient and avoids adding stress.
10. If swallowing is difficult, the patient should be positioned upright for feeding or, if necessary, in a semi-supine ("half-sitting") position. Offering liquid food via a straw may facilitate intake.
11. For patients in the boost feeding phase, normal meals (common family foods) can be catered for by treatment centres, as well as families that have expressed a willingness and capacity to provide prepared meals. Guidance for those families can include recommendations on foods and snacks, which should ideally include potassium-rich foods (see Annex 1).
12. In patients with negligible food intake for more than 5 days, the introduction of food needs to be carefully managed to avoid developing refeeding problems, and foods should have an adequate content of bioavailable phosphorus, potassium, magnesium and zinc (20).

Considerations for nutritional care of infants and children

1. For children aged from 6 to 59 months, mid-upper arm circumference (using disposable tapes) and the presence or absence of oedema could be used to screen for malnutrition, if feasible.¹
2. Treatment should be applied according to the national protocol for severe acute malnutrition, while simultaneously taking into account the principles of treatment for EVD.
3. For the breastfed infant of an Ebola-infected mother where the infant is asymptomatic, it is recommended that the infant is separated from the mother and is replacement fed.
4. For the breastfed infant of an Ebola-infected mother where the infant has developed Ebola or is a suspected Ebola case, the risks of not breastfeeding (considering community infection control and infant nutrition) outweigh any possible benefits of replacement feeding. If the mother is well enough to breastfeed, she should be supported to continue to do so. If the mother is too ill to breastfeed, then replacement feeding is needed.
5. The safest replacement feeding in the current context for infants aged less than 6 months is ready-to-use infant formula (RUIF). Wet nursing is not recommended.

¹ Anthropometry has not been a standard procedure when patients enter the treatment centres: weight-for height or body mass index measurements are difficult to conduct, as tools are not available throughout the treatment centres and the tools pose a contamination risk.

Discharge

1. When patients have recovered from EVD, before they are discharged, it is important to screen for acute malnutrition, using the criteria in the national protocol for the diagnosis and management of severe acute malnutrition (SAM) and moderate acute malnutrition (MAM).
2. It is recommended to discharge malnourished patients with commodities as suggested in the nutritional treatment protocols for acute malnutrition from the ministry of health. If such a protocol does not exist, it is recommended to discharge the patient with RUTF (for patients with SAM) and a fortified cereal legume blend, or RUSF (for patients with MAM). The amount supplied should be sufficient for 1 month. If there are operational centres that treat acutely malnourished individuals, referral to existing treatment facilities is recommended when the patient is no longer contagious.
3. Regardless of the presence or absence of acute malnutrition in the discharged patient, he or she should receive adequate support, in order to cover the food needs for the whole family. Depending on the context, the recovered patient and his or her family should receive cash, vouchers and/or food rations that are nutritionally adequate and sufficient for the whole household for 1 month.
4. Each discharged patient who is not malnourished should be provided with a supply of 500–1000 kcal of fortified nutrient-rich foods (e.g. RUTF biscuits/bars, RUTF or RUSF in paste form, fortified cereal legume blend) per day, for 2 weeks.
5. Several potential food commodities that can be considered during treatment and convalescence of EVD patients, taking into account the nutritional requirements and patients' limitations, are presented in Table 4.

Implications for future research

Discussions with members of the guideline development group and the involved stakeholders highlighted the limited evidence available in this area, meriting further research as knowledge evolves, in particular in the following areas:

- food intake and the efficacy and effectiveness of nutritional care of EVD patients. In order to optimize the patients' survival, as well as relieving some of their symptoms and suffering, such research is recommended;
- nutritional care of, and specific recommendations for, pregnant and lactating women (14);
- the relevance of providing antioxidants, as well as the specific needs concerning, for example, zinc, iodine, magnesium, selenium and thiamine; this is currently being investigated;
- the type and extent of biochemical abnormalities and their requirements (i.e. sodium, potassium) in EVD patients in the acute phase;
- the role of vitamins D and E. One trial in the case of Dengue, with vitamin E supplementation, improved platelet counts and reduced thrombocytopenia (22);
- micronutrient requirements of EVD survivors with anaemia, particularly for iron, folate and vitamin B₁₂;
- nutritional care in various age groups (for age categories such as 6–23 months and 24–59 months), and possibly treatment protocols for severely malnourished EVD patients;

- the proportion of admitted adult EVD patients who are malnourished and therefore require special nutritional care;
- assessment of anthropometric measurements without risk of EVD transmission;
- nutrient requirements of EVD patients experiencing protein-losing enteropathy;
- risks and/or benefits of ways in which EVD survivors can contribute to staffing needs in ETUs, in terms of the nutritional care of admitted patients. A potential benefit is that these individuals would be able to alleviate some of the workload that is currently conducted by health-care workers wearing prohibitive personal protective equipment (PPE). A potential risk is that if EVD survivors are working in the isolation area without wearing PPE, they may pose a transmission risk outside the isolation area, if very strict decontamination procedures are not followed upon leaving the isolation area.

Dissemination, adaptation and implementation

Dissemination

This interim guideline will be disseminated through multiple channels, including the WHO Nutrition mailing lists, social media, the [WHO nutrition website](#) (23), the [WHO Ebola website](#) (24) and agency mailing lists. In addition, the guideline will be disseminated through other relevant channels and web-based platforms, including the [Global Nutrition Cluster](#) (25) and the [en-net](#) (15) function of the Emergency Nutrition Network.

Particular attention will be given to improving access to this guideline for stakeholders that face more, or specific, barriers in access to information, or that play a crucial role in the implementation of the recommendations of this interim guideline, including, for instance, appropriate versions of this guideline translated into the languages used by the health workers dealing directly with the epidemic.

Adaptation and implementation

As this is a global interim guideline, it should be adapted to the context of each Member State, at national and subnational level. Health authorities can ensure that the recommendations contained in this guideline are adapted and adopted where appropriate, including addressing the need for clear information and training, if needed, to programme managers and health workers caring for patients with EVD.

In order to avoid fear and stigmatization of both patients with EVD and the health staff caring for them, particular attention should be given to the acceptability of the recommendations by health workers. Acceptability and adoption are better achieved if they are accompanied by simple and easy-to-access information that can be understood by all health-care staff.

The implementation of these recommendations must include appropriate dissemination among health-care staff working with patients with EVD. It must be ensured that this guideline is not only understood, but also perceived as appropriate, as this increases the likelihood of adherence and compliance.

As food and nutrition are very sensitive areas of social practice, in terms of preferences, religious beliefs, culture and social values, implementers of this guideline, and health-care staff in general, should be aware of this aspect. This is important both while caring for the patients at health-care centres and after discharge, as some of the recommendations include, when

possible, the provision of foods, fortified foods and other foods, which might require certain information for their preparation, consumption or use. Therefore, sound coordination of the discharge process is essential to maintain adequate nutrition status of the discharged patients.

Monitoring and evaluation of guideline implementation

It is recommended to register as much information as possible from the patients, as this will contribute to bridging the research gaps in this respect and because this can also contribute to a posteriori evaluations, including equity assessments of services provided. The interim guideline will be updated within 6 months, as needed. Feedback on the guideline should be sent to nutrition@who.int and to nutrition@unicef.org.

Guideline development process

This interim guideline was developed following, as closely as possible, the WHO evidence-informed guideline development procedures, as outlined in the [WHO handbook for guideline development](#) (26) for rapid advice guidelines. An informal consultation with the WHO Guideline Review Committee Secretariat was carried out, to define the process leading to an urgent interim guideline for nutritional care for patients with EVD.

Advisory groups

The steering committee for this guideline (see Annex 3), led by the Department of Nutrition for Health and Development, was established in September 2014 with representatives from WHO and UNICEF. This steering committee met throughout the process and both guided and provided overall supervision of the guideline development process.

A guideline development group for this interim document was established. In selecting members for the panel, it was decided to include several important stakeholders: clinical, programmatic and clinical nutrition experts, and field implementers, as well as representatives of key stakeholders (United Nations agencies, nongovernmental organizations and representatives from affected countries). Two teleconference calls were convened from Geneva, Switzerland, on 12 September 2014 and 7 October 2014. Two face-to-face meetings were convened on 18 September 2014 and 14 October 2014 in Geneva, Switzerland, involving representatives from Médecins sans Frontières (MSF), the International Committee of the Red Cross (ICRC) and some members of the guideline development group. Detailed minutes of all the meetings were recorded and are on file. Participants to the meetings relevant to this guideline are listed in Annex 3. Its role was to advise WHO on the choice of important outcomes for decision-making, and on interpretation of the evidence and field experience to be summarized and included in the interim guideline. Efforts were made to include content experts, methodologists, representatives of affected countries (such as managers and other health professionals involved in the health-care process), and technical staff from WHO and the partner organizations. Representatives of commercial organizations may not be members of a WHO guideline group. The WHO Ebola clinical management team also commented on this guideline.

Four external experts (see Annex 3) peer-reviewed the draft guideline and provided technical input.

Scope of the guideline, evidence and programmatic experiences appraisal and decision-making

An initial set of questions (and the components of the questions) to be addressed in the interim guideline was the critical starting point for formulating the recommendations.

The development of these recommendations was founded on the application of existing guidelines for EVD and extrapolation from guidelines for nutritional management of other conditions. The draft recommendations were discussed by the steering committee and at subsequent teleconferences with the guideline development group. The procedures for decision-making were established at the beginning of the meetings, including a minimal set of rules for agreement and documentation of decision-making. The members of the guideline development group openly discussed the pros and cons of the approaches, as well as their experience in the implementation of existing guidelines on nutritional care in the field. All the discussions were recorded. Subsequent deliberations among the members of the guideline development group were summarized and presented to the wider group. WHO staff were also consulted on the recommendations, as well as other external technical experts involved in nutritional care in the affected areas. Before being finalized and endorsed by the respective agencies, the draft interim guideline was shared with the guideline development group for several rounds of comments. In addition, an earlier draft was shared on the [en-net](#) (15) for comments and technical feedback.

Four external experts (see Annex 3) peer-reviewed the draft guideline. After all the feedback was received, WHO staff then finalized the guideline and submitted it for clearance by WHO before publication.

Management of competing interests

According to the rules in the WHO [Basic documents](#) (27), all experts participating in WHO meetings must declare any interest relevant to the meeting, prior to their participation. The declarations of interest statements for all guideline development group members were reviewed by the responsible technical officer and the relevant departments, before finalization of the group composition and invitation to attend a guideline development group meeting. All guideline development group members, and participants of the guideline development meetings, submitted a declaration of interests form, along with their curriculum vitae, before each meeting. Participants of the guideline development group meetings participated in their individual capacity and not as institutional representatives. It was considered that none of the declared interests were of relevance for this interim guideline.

Plans for updating the guideline

It is planned to review this interim guideline formally within 6 months, as required. The Department of Nutrition for Health and Development at the WHO headquarters in Geneva, Switzerland, along with its internal and external partners, will be responsible for coordinating the guideline update, following the formal procedures of the [WHO handbook for guideline development](#) (26). WHO welcomes suggestions regarding additional questions for evaluation in the future version of the guideline, particularly its implementation in the field.

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Annex 1. Provision of extra potassium through food

Dietary measures for extra provision of potassium include:

- additional snacks (ready to eat), such as fruits and nuts (see table below) or fruit juices;
- family meal including one or more of the following foods:
 - starchy roots;
 - beans, peas, lentils;
 - green leaves, tomato paste;
 - fish/egg;
 - goat, pork, rabbit meat.

Some principles for food processing

- Cereals may be rich in potassium when raw, but they lose a lot during processing.
- If food is boiled, an important part of the potassium is lost in the water (unless it is used for soup and the patient also consumes the water in which the vegetables have been boiled).
- Fish should preferably be grilled rather than boiled and green leaves should be cooked in a saucepan for a short time and then added to the sauce or the meal.

Table A1 can help in selecting the type of foods according to availability and cultural habits and to advise families on which food they could offer to their family members.

Table A1. Examples of foods that are rich in potassium^a

Food	Classification (potassium mg/100 g edible portion)		
	High (250–499)	Very high (500–750)	Extremely high (751–1190)
Starchy roots, tubers			
Cassava flour		X	
Cassava tuber dried		X	
Cocoyam tuber, raw or boiled	X		
Potato, boiled	X		
Sweet potato, boiled	X		
Yam tuber, boiled		X	

^aSource: Adapted from reference (28).

Food	Classification (potassium mg/100 g edible portion)		
	High (250–499)	Very high (500–750)	Extremely high (751–1190)
Legumes			
African yam bean, boiled	X		
Bambara groundnut, dried, boiled	X		
Bambara groundnut, dried, raw			X
Beans, white, boiled	X		
Peas, boiled	X		
Soya beans, boiled		X	
Vegetables			
Garlic, raw		X	
Green leaves (amarante, baobab, cassava, roselle, spinach, veronica), raw or boiled ^b	X		
Parsley, fresh		X	
Tomato paste, concentrated			X
Fruits			
Avocado, pulp	X		
Baobab fruit/monkey bread (pulp)			X
Coconut milk/water	X		
Dates (dry)		X	
Dattock dried pulp			X
Dattock pulp, raw	X		
Figs (dry)			X
Mango pale orange/deep orange	X		
Melon	X		
Orange	X		
Papaya	X		
Plantain, ripe, raw		X	
Plantain, ripe, boiled	X		
Tamarind fruit, ripe, raw		X	

^b Around 50% is lost through boiling (unless cooked as a soup and the patient also eats the cooking liquid). Preferably cook for a short time in a saucepan.

Food	Classification (potassium mg/100 g edible portion)		
	High (250–499)	Very high (500–750)	Extremely high (751–1190)
Nuts and seeds			
Cashew nuts, raw		X	
Coconut, kernel, dried, raw		X	
Coconut, mature kernel, fresh, raw	X		
Groundnut, shelled, dried, raw		X	
Melon seeds		X	
Sesame seeds	X		
Meat and poultry			
Goat meat, boiled or grilled	X		
Pork meat, grilled	X		X
Rabbit meat, grilled	X		
Fish			
Most fish, especially anchovy, carp, mackerel and sardine, preferably grilled, rather than boiled		X	

Annex 2. Examples of meal schedules in a treatment centre

Note: This schedule is based on the possibility of daytime feeding only.

8:00	Breakfast Maintenance feeding phase: Transition feeding phase: Boost feeding phase:	milk-based fortified diets (F-75), or "sip feeds" ^a (adults) fortified nutrient-rich porridge fortified nutrient-rich porridge or HEB
10:00	Snack Maintenance feeding phase: Transition feeding phase: Boost feeding phase:	milk-based fortified diets (F-75) or "sip feeds" ^a (adults) fortified nutrient-rich porridge fruits + nuts, fortified biscuits/bars, ready-to-use fortified nutrient-rich foods
12:00	Family meal (lunch) Maintenance feeding phase: Transition feeding phase: Boost feeding phase:	milk-based fortified diets (F-75) or "sip feeds" ^{28a} (adults) family foods (solid, soft, or mashed depending on eating difficulties) ^b family foods (solid, soft, or mashed) ^b
14:00	Snack Maintenance feeding phase: Transition feeding phase: Boost feeding phase:	milk-based fortified diets (F-75) or "sip feeds" ^{28 a} (adults) fortified nutrient-rich porridge fruits + nuts, fortified biscuits/bars
16:00	Maintenance feeding phase:	milk-based fortified diets (F-75), or "sip feeds" ^a (adults)
18:00	Dinner Maintenance feeding phase: Transition feeding phase: Boost feeding phase:	milk-based fortified diets (F-75) or "sip feeds" ^a (adults) fortified nutrient-rich porridge ready-to-use fortified nutrient-rich foods or HEB
20:00	Snack for the night Maintenance feeding phase: Transition feeding phase: Boost feeding phase:	milk-based fortified diets (F-75), or "sip feeds" ^a (adults) fortified nutrient-rich porridge fortified nutrient-rich porridge or HEB
All day	ORS according to prescription	

Notes:

1. This schedule is a "template" example and should be adapted according to centre and human resources, as well as patient load. The rationale behind this example is:
 - the need for small and frequent meals;
 - for the maintenance feeding phase: milk-based fortified diet (e.g. F-75) is given every 3 h, to ensure someone is collecting the remains and milk is not staying more than 3 h at the patient's bedside. If different staff are responsible for hygiene, they can collect the remains of milk, and meals can be given every 3 h.
2. Keep one ready-to-use fortified nutrient-rich food for the night at the patient's bedside (easy to handle by the patient and limited risk of bacterial contamination).
3. For patients who do not need feeding assistance, or if staff are overloaded, the snacks can be given at the same time as the main meals and patients should be instructed to eat these later.

^a Low renal solute load, low-osmolarity options.

^b If fortified food is not given, the addition of MNP is needed (or preferably LNS).

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