

Update since 2017 meeting – the interim protocol for children with SAM and dehydrating diarrhea



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Fluid management in children with confirmed or suspected Cholera*

*Indications of Cholera: profuse watery diarrhoea with severe dehydration during cholera outbreak or positive stool culture for *Vibrio Cholerae* O1 or O139

1. Determine whether child is severely acutely malnourished (SAM)**

**SAM criteria: Mid-upper arm circumference <11.5 cm (only for 6-59 months) OR weight for height z score < -3 OR Bilateral oedema

2. Classify dehydration[†]

3. Follow treatment plan below based on patient's nutrition and hydration status

SAM children

Treatment Plan [A]:

Shows no signs of dehydration [†]

- Replace fluid losses with standard WHO (low-osmolarity) ORS (NOT ReSoMal):
 - <2 years old: ~~50-100~~ **30 ml per loose stool** | >2 years old: ~~100-200~~ **ml per loose stool**
- As soon as possible, initiate F-75 feeding. Follow WHO SAM management guidelines. Use F-75 reference card to determine amount per feed (for patients who have been successfully rehydrated, use rehydrated weight). When patient shows signs of readiness for transition, initiate RUTF and F75, or F100 feeding.

Treatment Plan [B]:

Shows signs of some dehydration [†]

- Step 1: Rehydrate slowly with standard WHO ORS (NOT ReSoMal), orally or by nasogastric tube (only if the child is unable to drink): **5 ml/kg every 30 min for the first 2 hours.**
- Step 2: If dehydration persists, administer 5 -10 ml/kg WHO ORS until child is fully rehydrated (up to a maximum of 10 hours); alternating with F75 is recommended. Adjust ORS volumes to compensate for ongoing fluid losses in high output stooling.

Note: there is serious risk of overhydration among children with SAM. Check for signs of improved hydration status or overhydration [‡] every 30 mins for the first 2 hours, then hourly. Stop ORS if overhydration signs appear. Breastfeeding and therapeutic milk should continue throughout rehydration.

- Once patient is successfully rehydrated, re-screen for SAM and follow treatment plan [A] either for SAM or non-SAM children depending on nutritional status.

Treatment Plan [C]:

Shows signs of severe dehydration [†]. For children with SAM, the only indication for intravenous (IV) infusion is circulatory collapse caused by severe dehydration or septic shock when the child is lethargic or unconscious.

- Administer IV fluids, 15ml/kg over 1 hour using either Ringer's lactate solution with 5% glucose or half-strength Darrow's solution with 5% glucose. If neither is available, use 0.45% saline + 5% glucose.

Note: monitor every 5-10 min for signs of over hydration [§] and signs of congestive heart failure. Stop IV therapy immediately if these develop.

- If child improves, repeat same amount of IV fluids for a second **hour and start administration** of 5 -10 ml/kg standard ORS until child is fully rehydrated (up to a maximum of 10 hours). Alternating with F75 is recommended. Adjust ORS volumes to compensate for ongoing fluid loss in high output stooling.
- Initiate oral antibiotics [§] as soon as vomiting stops.
- Once patient is successfully rehydrated, re-screen for SAM and follow treatment plan [A] either for SAM or non-SAM children depending on nutritional status. If the patient is non-SAM after successful rehydration, observe the patient for at least six hours before discharge while the mother administers WHO ORS (by mouth) to replace ongoing losses, as per treatment plan [A] for non-SAM.

Non-SAM children

- Replace fluid losses with standard WHO (low-osmolarity) ORS (NOT ReSoMal):
 - <2 years old: 50-100 ml per loose stool up to approximately ½ liter per day
 - 2-10 years old: 100-200 ml per loose stool up to approximately 1 liter per day
 - >10 years: a much fluid as they want up to approximately 2 liters per day
- The patient's usual diet should continue during diarrhoea.

- Administer standard ORS in the first 4 hours. Approximate amounts are listed in the table below (use age if weight is unknown). If the patient wants more ORS, give more. Adjust to compensate for ongoing fluid losses in high output stooling.

Age ¹	Less than 4 months	4-11 months	12-23 months	2-4 years	5-14 years	15 years or older
Weight	Less than 5 kg	5-7.9 kg	8-10.9 kg	11-15.9 kg	16-29.9 kg	30 kg or more
ORS solution in ml	200-400	400-600	600-800	800-1200	1200-2200	2200-4000

Note: monitor the patient frequently to ensure that ORS is taken satisfactorily and that signs of dehydration are not worsening. Breastfeeding and therapeutic milk should continue throughout rehydration. Provide food as soon as the patient is able to take it.

- After 4 hours, re-assess the patient. If there is still 'some dehydration', repeat ORS and offer food and other fluids. Or follow treatment plan [C] if shows severe dehydration signs or [A] if successfully rehydrated.

- Start intravenous fluids (IV) immediately using either Ringer's lactate solution or, if not available, normal saline:

- <1 year old: 30 ml/kg in the first hour then 70 ml/kg in next 5 hours
- >1 year old: 30 ml/kg in the first 30 mins then 70 ml/kg in the next 2 ½ hours

Note: during first hour, assess the patient every 15-30 mins. If radial pulse remains weak after first 30ml/kg, repeat this once. Thereafter, assess every 1-2 hours and if hydration is not improving, give the IV drip more rapidly.

- As soon as patient can drink, give standard ORS (about 5 ml/kg/h) alongside IV fluid. Adjust to compensate for ongoing fluid losses in high output stooling.
- Initiate oral antibiotics [§] as soon as vomiting stops.
- After 3 hours (or 6 hours for infants <1 year old), re-assess the patient. If signs of severe dehydration persist, repeat IV therapy. If the patient shows signs of some dehydration, follow treatment plan [B]. If successfully rehydrated, observe the child for at least six hours before discharge while the mother administers WHO ORS (by mouth) to replace ongoing losses, as per treatment plan [A].

Source: WHO. Updates on the management of severe acute malnutrition in infants and children. 2013. http://www.who.int/nutrition/publications/guidelines/updates_management_SAM_infantandchildren/en/

Source: WHO. The treatment of diarrhoea - A manual for physicians and other senior health workers. 2005. <http://apps.who.int/iris/bitstream/10665/43209/1/9241593180.pdf>

These treatment protocols are based on current knowledge, further study and documentation is necessary to improve knowledge and treatment.

Supplementary information

[†] Classifying dehydration

Note: Careful judgement is needed in SAM children as the usual signs of dehydration may not be present.

Two of the following signs: • Lethargic or unconscious • Sunken eyes • Not able to drink or drinking poorly • Skin pinch goes back very slowly.	Pink: SEVERE DEHYDRATION	<ul style="list-style-type: none"> ■ If child has no other severe classification: <ul style="list-style-type: none"> ◊ Give fluid for severe dehydration (Plan C) OR ■ If child also has another severe classification: <ul style="list-style-type: none"> ◊ Refer URGENTLY to hospital with mother giving frequent sips of ORS on the way ◊ Advise the mother to continue breastfeeding ■ If child is 2 years or older and there is cholera in your area, give antibiotic for cholera
Two of the following signs: • Restless, irritable • Sunken eyes • Drinks eagerly, thirsty • Skin pinch goes back slowly.	Yellow: SOME DEHYDRATION	<ul style="list-style-type: none"> ■ Give fluid, zinc supplements, and food for some dehydration (Plan B) ■ If child also has a severe classification: <ul style="list-style-type: none"> ◊ Refer URGENTLY to hospital with mother giving frequent sips of ORS on the way ◊ Advise the mother to continue breastfeeding ■ Advise mother when to return immediately ■ Follow-up in 5 days if not improving
Not enough signs to classify as some or severe dehydration.	Green: NO DEHYDRATION	<ul style="list-style-type: none"> ■ Give fluid, zinc supplements, and food to treat diarrhoea at home (Plan A) ■ Advise mother when to return immediately ■ Follow-up in 5 days if not improving

Source: WHO. Integrated Management of Childhood Illness. Module 4: Diarrhoea. 2014.
http://apps.who.int/iris/bitstream/10665/104772/6/9789241506823_Module4_eng.pdf

[‡] Signs of over-hydration

- Child's weight exceeds the target weight
- Increased respiratory rate and pulse (both must increase to consider it a problem)
- Jugular veins engorged (pulse wave can be seen in the neck)
- Increasing oedema (e.g. puffy eyelids)

Source: WHO. Training course on the management of severe malnutrition: Initial Management. 2002.
http://apps.who.int/iris/bitstream/10665/70449/6/WHO_NHD_02.4_Module3_eng.pdf – updated 2013 – available on request

Further guidance

Malnourished children are particularly susceptible to certain conditions including hypoglycaemia and hypothermia. This should be monitored and therapy adapted appropriately as per WHO guidelines on management of children with SAM.

Source: WHO. Updates on the management of severe acute malnutrition in infants and children. 2013.
http://www.who.int/nutrition/publications/guidelines/updates_management_SAM_infantandchildren/en/

Indication:

- Suspected cholera patients hospitalized with severe dehydration or
- High purging or failure of first 4 hour course of therapy or coexisting conditions (e.g. pregnancy) or co-morbidities (e.g., SAM) that pose elevated risk in cholera illness, regardless of degree of dehydration

	First-line drug choice and dose (if local strain sensitive)	Alternative drug choices
Adults, including pregnant women	Doxycycline Single dose: 300 mg	Azithromycin: 1 g orally as single dose or Ciprofloxacin: 1 g orally as single dose
Children <12 years old	Doxycycline: Single dose: 2-4 mg/kg	Azithromycin: 20 mg/kg (max 1g) orally as single dose or Ciprofloxacin: 20 mg/kg (max 1g) orally as single dose

Zinc supplement:

- Zinc should be given to all children as soon as the duration and severity of the episodes of diarrhoea start to reduce, as follows:
 - ≤ 6 months: half tablet (10 mg) per day for 10–14 days
 - ≥ 6 months one tablet (20 mg) per day for 10–14 days
- However, WHO-recommended therapeutic foods already contain adequate zinc, and children with severe acute malnutrition receiving F-75, F-100 or ready-to-use therapeutic food should not therefore receive additional zinc

Sources:

WHO. Pocket book of Hospital care for children. Guidelines for the Management of Common Childhood Illnesses Second edition. 2012.

http://apps.who.int/iris/bitstream/10665/81170/1/9789241548373_eng.pdf?ua=1

WHO. Guideline: Updates on the management of severe acute malnutrition in infants and children. Geneva, World Health Organization; 2013.

http://www.who.int/nutrition/publications/guidelines/updates_management_SAM_infantandchildren/en/



GUIDELINE

**UPDATES ON THE MANAGEMENT
OF SEVERE ACUTE MALNUTRITION
IN INFANTS AND CHILDREN**



World Health
Organization

WHO/NHD/11.1(MO)
ORIGINAL: ENGLISH
DISTR: GENERAL

Modules for participants

DEPARTMENT OF NUTRITION FOR HEALTH AND DEVELOPMENT



**World Health
Organization**

TRAINING COURSE ON THE INPATIENT MANAGEMENT OF SEVERE ACUTE MALNUTRITION

Fluid management in children with confirmed or suspected Cholera

Diagnosis of Cholera: profuse watery diarrhea with severe DH during a cholera outbreak or positive stool culture for *Vibrio Cholerae* O1 or O139

1. Determine whether child is suffering from SAM

SAM: Mid-upper arm circumference <11.5 cm (only for 6-59 months) OR weight-for-height Z score < -3 OR Bilateral edema

2. Classify dehydration

3. Follow treatment plan based on child's nutrition and hydration status

Non-SAM children

**Treatment
Plan [A]:**
Shows no
signs of
dehydration

- Replace fluid losses with standard WHO (low-osmolarity) ORS (NOT ReSoMal)
 - <2 years old: 50-100 ml per loose stool up to approximately ½ liter per day
 - 2-10 years old: 100-200 ml per loose stool up to approximately 1 liter per day
 - >10 years: as much fluid as they want up to approximately 2 liters per day

- The child's usual diet should continue during diarrhea

Non-SAM children

- Administer standard ORS in the first 4 hours. If the patient wants more ORS, give more. Adjust to compensate for ongoing fluid losses in high output stooling.

Age ¹	Less than 4 months	4-11 months	12-23 months	2-4 years	5-14 years	15 years or older
Weight	Less than 5 kg	5-7.9 kg	8-10.9 kg	11-15.9 kg	16-29.9 kg	30 kg or more
ORS solution in ml	200-400	400-600	600-800	800-1200	1200-2200	2200-4000

Note: monitor the patient frequently to ensure that ORS is taken satisfactorily and that signs of dehydration are not worsening. Breastfeeding and therapeutic milk should continue throughout rehydration. Provide food as soon as the patient is able to take it.

- After 4 hours, re-assess the patient. If there is still 'some dehydration', repeat ORS and offer food and other fluids. Or follow treatment plan [C] if shows severe dehydration signs or [A] if successfully rehydrated.

Treatment

Plan [B]:

Shows signs of some dehydration

Non-SAM children

- Start IV fluids immediately using Ringer's lactate solution or, if not available, normal saline:
 - <1 year old: 30 ml/kg in the 1st h, then 70 ml/kg in next 5st h
 - >1 year old: 30 ml/kg in the 1st ½ h, then 70 ml/kg in the next 2 ½ h

Note: during first hour, assess the patient every 15-30 mins. If radial pulse remains weak after first 30ml/kg, repeat this once. Thereafter, assess every 1-2 hours and if hydration is not improving, give the IV drip more rapidly.

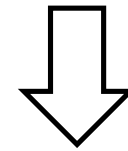
- As soon as patient can drink, give standard ORS (5 ml/kg/h) alongside IV fluid. Adjust to compensate for ongoing fluid losses in high output stooling.
- Initiate oral antibiotics as soon as vomiting stops.
- After 3 hours (or 6 hours for infants <1 year old), re-assess the patient. If signs of severe DH persist, repeat IV. If the patient shows signs of some DH, follow treatment plan [B]. If successfully rehydrated, observe the child for at least 6h before discharge while the mother administers ORS to replace ongoing losses, as per treatment plan [A].

Treatment Plan [C]:

Shows signs of severe DH



- High intracellular sodium
- They retain fluids in the body
- Intracellular potassium is lost to the extracellular space
- Total body potassium is low
- Reduced renal and cardiac function



- Prone to fluid retention
- Cannot tolerate rapid changes in blood volume

Children with SAM

**Treatment
Plan [A]:**
Shows no
signs of
dehydration

- Replace fluid losses with standard WHO (low-osmolarity) ORS (NOT ReSoMal):
 - <2 years old: **30** ml per loose stool
 - >2 years old: 100 ml per loose stool
- As soon as possible, initiate F-75 feeding. Use F-75 reference card to determine amount per feed (for patients who have been successfully rehydrated, use rehydrated weight). When patient shows signs of readiness for transition, **initiate RUTF and F75**, or F100 feeding.

Source: WHO. Updates on the management of severe acute malnutrition in infants and children, 2013

These treatment protocols are based on current knowledge, further study and documentation is necessary to improve knowledge and treatment.

Children with SAM

- Replace fluid losses with standard WHO (low-osmolarity) ORS (NOT ReSoMal):
<2 years old: **30** ml per loose stool

Treatment Plan [A]:
Shows no signs of dehydration

- RUTF during transition – least evidence
- Either you top up amount of RUTF not taken with F75
- Or if the child does not take half of the prescribed amount, stop giving RUTF; give F75 and try after 1-2 d

readiness for transition, **initiate RUTF and F75**, or F100 feeding.

Source: WHO. Updates on the management of severe acute malnutrition in infants and children, 2013

These treatment protocols are based on current knowledge, further study and documentation is necessary to improve knowledge and treatment.

Children with SAM

Treatment Plan [B]:

Shows signs of some DH

- Step 1: Rehydrate slowly with standard WHO ORS (NOT ReSoMal), orally or by nasogastric tube (only if the child is unable to drink): **5 ml/kg every 30 min for the first 2 hours.**
- Step 2: If dehydration persists, administer 5 -10 ml/kg WHO ORS until child is fully rehydrated (up to a maximum of 10 hours); **alternating with F75 is recommended.** Adjust ORS volumes to compensate for ongoing fluid losses **in high output stooling.**

Note: there is serious risk of overhydration among children with SAM. Check for signs of improved hydration status or overhydration every 30 mins for the first 2 hours, then hourly. Stop ORS if overhydration signs appear. Breastfeeding and therapeutic milk should continue throughout rehydration.

- **Once patient is successfully rehydrated, re-screen for SAM and follow treatment plan [A] either for SAM or non-SAM children depending on nutritional status.**

Children with SAM

- Step 1: Rehydrate slowly with standard WHO ORS (NOT ReSoMal), orally or by nasogastric tube (only if the child is unable to drink): **5 ml/kg every 30 min for the first 2 hours.**
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- The 1st 2h of ORS dosage is skipped if the child has received IV therapy for shock
- After 2 h of starting rehydration, ORS MUST be alternated with F75
- When ever the child passes loose stools, the loss should be compensated
 - <2 y, 30-50 ml after each loose/watery stool
 - 2 y and above, 100 ml after each loose/watery stool

Treatme
nt Plan
[B]:
Shows
signs of
some DH

Children with SAM

Treatment Plan [C]:

Shows signs of severe DH. For children with SAM, the only indication for IV infusion is circulatory collapse caused by DH or septic shock.

- Administer IV fluids, 15ml/kg over 1 h using either Ringer's lactate with 5% glucose or **half-strength Darrow's solution** with 5% glucose. If neither is available, use 0.45% saline + 5% glucose.

Note: monitor every 5-10 min for signs of over hydration and signs of heart failure. Stop IV therapy immediately if these develop.

- If child improves, repeat same amount of IV fluids for a second hour** and start giving 5 -10 ml/kg standard ORS until child is fully rehydrated (up to a max of 10 hours). Alternating with F75 is **recommended**. Adjust ORS volumes to compensate for ongoing fluid loss **in high output stooling**.
- Initiate oral antibiotics as soon as vomiting stops.
- Once patient is successfully rehydrated, re-screen for SAM and follow treatment plan [A] either for SAM or non-SAM children depending on nutritional status. If the patient is non-SAM after successful rehydration, observe the patient for at least 6h before discharge while the mother administers ORS to replace ongoing losses, as per treatment plan [A] for non-SAM.

Children with SAM

Treatment Plan [C]:

Shows signs of severe DH. For children with SAM, the only indication for IV infusion is circulatory collapse caused by DH or septic shock.

- Administer IV fluids, 15ml/kg over 1 h using either Ringer's lactate with 5% glucose or **half-strength Darrow's solution** with 5% glucose. If neither is available, use 0.45% saline + 5% glucose.

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- If child improves, repeat same amount of IV fluids for a second hour** and start giving 5 -10 ml/kg standard ORS until child is fully rehydrated (up to a max of 10 hours). Alternating with F75 is **recommended**. Adjust ORS volumes to compensate for ongoing fluid loss **in high output stooling**.

- If the child does not improve with IV after 1h, assume septic shock
- Maintenance IV fluids 4ml/kg/h, order blood
- Transfuse whole blood 10 ml/kg over 3 h

discharge while the mother administers ORS to replace ongoing losses, as per treatment plan [A] for non-SAM.

<p>Two of the following signs:</p> <ul style="list-style-type: none"> ● Lethargic or unconscious ● Sunken eyes ● Not able to drink or drinking poorly ● Skin pinch goes back very slowly. 	<p><i>Pink:</i></p> <p>SEVERE DEHYDRATION</p>	<ul style="list-style-type: none"> ■ If child has no other severe classification: <ul style="list-style-type: none"> ◊ Give fluid for severe dehydration (Plan C) <p style="text-align: center;">OR</p> <p>If child also has another severe classification:</p> <ul style="list-style-type: none"> ◊ Refer URGENTLY to hospital with mother giving frequent sips of ORS on the way ◊ Advise the mother to continue breastfeeding ■ If child is 2 years or older and there is cholera in your area, give antibiotic for cholera
<p>Two of the following signs:</p> <ul style="list-style-type: none"> ● Restless, irritable ● Sunken eyes ● Drinks eagerly, thirsty ● Skin pinch goes back slowly. 	<p><i>Yellow:</i></p> <p>SOME DEHYDRATION</p>	<ul style="list-style-type: none"> ■ Give fluid, zinc supplements, and food for some dehydration (Plan B) ■ If child also has a severe classification: <ul style="list-style-type: none"> ◊ Refer URGENTLY to hospital with mother giving frequent sips of ORS on the way ◊ Advise the mother to continue breastfeeding ■ Advise mother when to return immediately ■ Follow-up in 5 days if not improving
<p>Not enough signs to classify as some or severe dehydration.</p>	<p><i>Green:</i></p> <p>NO DEHYDRATION</p>	<ul style="list-style-type: none"> ■ Give fluid, zinc supplements, and food to treat diarrhoea at home (Plan A) ■ Advise mother when to return immediately ■ Follow-up in 5 days if not improving

Signs of over-hydration

- **Child's weight exceeds the target weight**
- Increased respiratory rate and pulse (both must increase to consider it a problem)
- Jugular veins engorged (pulse wave can be seen in the neck)
- Increasing edema (e.g. puffy eyelids)

- Suspected cholera patients hospitalized with severe dehydration or
- High purging or failure of first 4 hour course of therapy or coexisting conditions (e.g. pregnancy) or co-morbidities (e.g., SAM) that pose elevated risk in cholera illness, regardless of degree of dehydration

	First-line drug choice and dose (if local strain sensitive)	Alternative drug choices
Adults, including pregnant women	<p>Doxycycline</p> <p>Single dose: 300 mg</p>	<p>Azithromycin 1 g orally as single dose, or</p> <p>Ciprofloxacin 1 g orally as single dose</p>
Children <12 years old	<p>Doxycycline:</p> <p>Single dose: 2-4 mg/kg</p>	<p>Azithromycin 20 mg/kg (max 1g) orally as single dose, or</p> <p>Ciprofloxacin 20 mg/kg (max 1g) orally as single dose</p>