

# MODULE VI

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## Diarrhea and Dehydration

# ACUTE DIARRRHEA

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- Increased number of bowel movements !
- Loose and watery stools
- ↑ Fluid and electrolyte loss

# ACUTE DIARRHEA

## TYPES

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- **Watery**
- **Bloody diarrhea (dysentery)**

# DIARRRHEA

## ETIOLOGY

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- **Watery**

Rotavirus, Norwalk like viruses, enterotoxigenic *E coli* (ETEC), *Vibrio cholerae*, *Staphylococcus aureus*, *Clostridium difficile*, *Giardia*, and cryptosporidia

- **Bloody**

*Shigella* and *Entamoeba histolytica*. *Campylobacter* organisms, invasive *E coli*, *Salmonella*, *Aeromonas* organisms, *C difficile*, and *Yersinia*

# DIARRHEA MANAGEMENT

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- Maintain appropriate hydration
- Continued feeding
- Drug therapy: limited cases (IMCI)
  - Dysentery /cholera
  - Antiparasitic (amebiasis/giardiasis)

# BLOODY DIARRHEA

## ANTIMICROBIAL THERAPY

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- **Bacterial dysentery.**
  - Ceftriaxone
  - Azithromycin
  - Quinolones (older children)
  - Ampicillin, TMP-SMX (depending on local resistance pattern)
- **Amebiasis /Giardiasis**
  - Metronidazole
- **Cholera**
  - TMP/SMX
  - Doxycycline
  - Tetracycline

# PERSISTENT DIARRHEA

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- > 14 days (IMCI > 7 days)
- Causes
  - Inadequate diet
  - Malabsorption
  - Parasitosis
- Management
  - Adjust diet
  - Consider antiparasitic agents

# DIARRHEA

## OUTBREAKS (e.g., cholera)

- Epidemiologic surveillance
- SUSPECT! (adults with dehydration )
- Early identification of suspected cases
- Culture confirmation
- Report
- Active investigation and treatment of secondary cases
- Strengthen preventive measures

# DIARRRHEA

## 0-2 months-old infants

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### Severe disease if:

- Newborn (diferenciate from transition stools)
- Persistent ( > 7 days)
- Bloody
  - Infection
  - Necrotizing enterocolitis
  - DIC (sepsis)
  - Hemorrhagic disease of the newborn
  - Cow's milk allergy

# DEHYDRATION

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**NEGATIVE WATER BALANCE  
(WITH OR WITHOUT  
ELECTROLYTIC AND ACID-BASE  
DISTURBANCES)**

# DEHYDRATION EVALUATION

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**ASSESS DEGREE**

**IDENTIFY TYPE**

# DEGREE

## WEIGHT LOSS (%)

	0-5 years	> 5 years
MILD	Up to 5%	3%
MODERATE	>5 - 10%	6%
SEVERE	> 10%	9%

# CLINICAL SIGNS



# CLINICAL SIGNS

<b>SIGN</b>	<b>MILD</b>	<b>MODERATE</b>	<b>SEVERE</b>
Enophthalmos	+/-	++/+++	+++++
Mucose membranes	Part. moist	Dry	Very dry
Tears	+	-	-
Fontanelle	Normal	Sunken	Sunken
Thirst	Increased	Intense	Very intense
Skin	Pink	Pale and cold	Mottled
Skin turgor (Skin pinch)	Slightly delayed	> 2 sec.	> 4 sec.

# CLINICAL SIGNS (cont.)

<b>SIGN</b>	<b>MILD</b>	<b>MODERATE</b>	<b>SEVERE</b>
Pulse	Normal	Increased/ mildly weak	Increased/ Thready
BP*	Normal	Mild hypotensivee	Shock
Level of conscious state	Normal	Drowsy	Lethargic/coma
Capillary refill	< 2 sec.	3 to 5 sec.	> 5 sec.
Urine output	Reduced	Oliguria	Oligoanuria

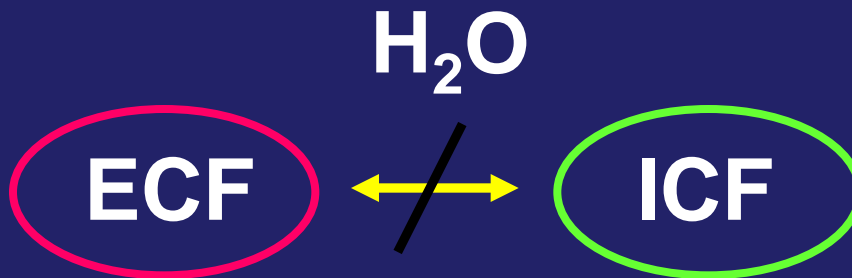
# TYPE

## ISOTONIC DEHYDRATION

Net isotonic loss

↓↓ ECF

OSM normal

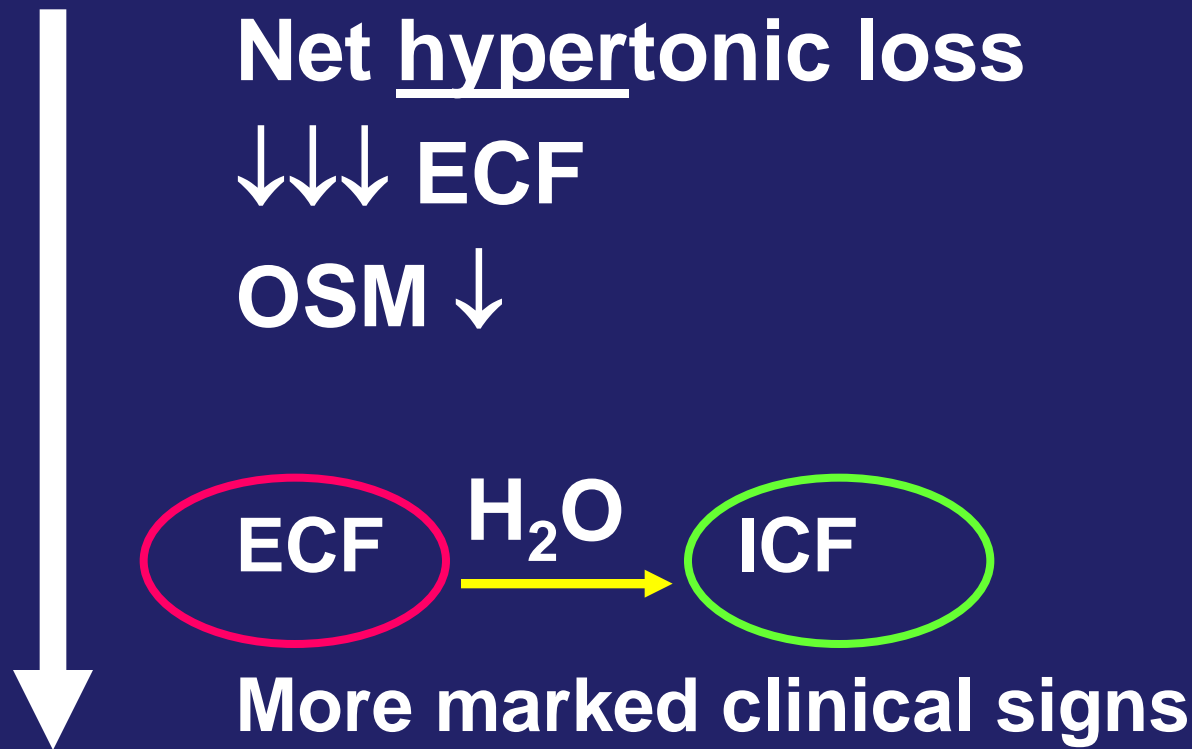


Marked clinical signs

# TYPE

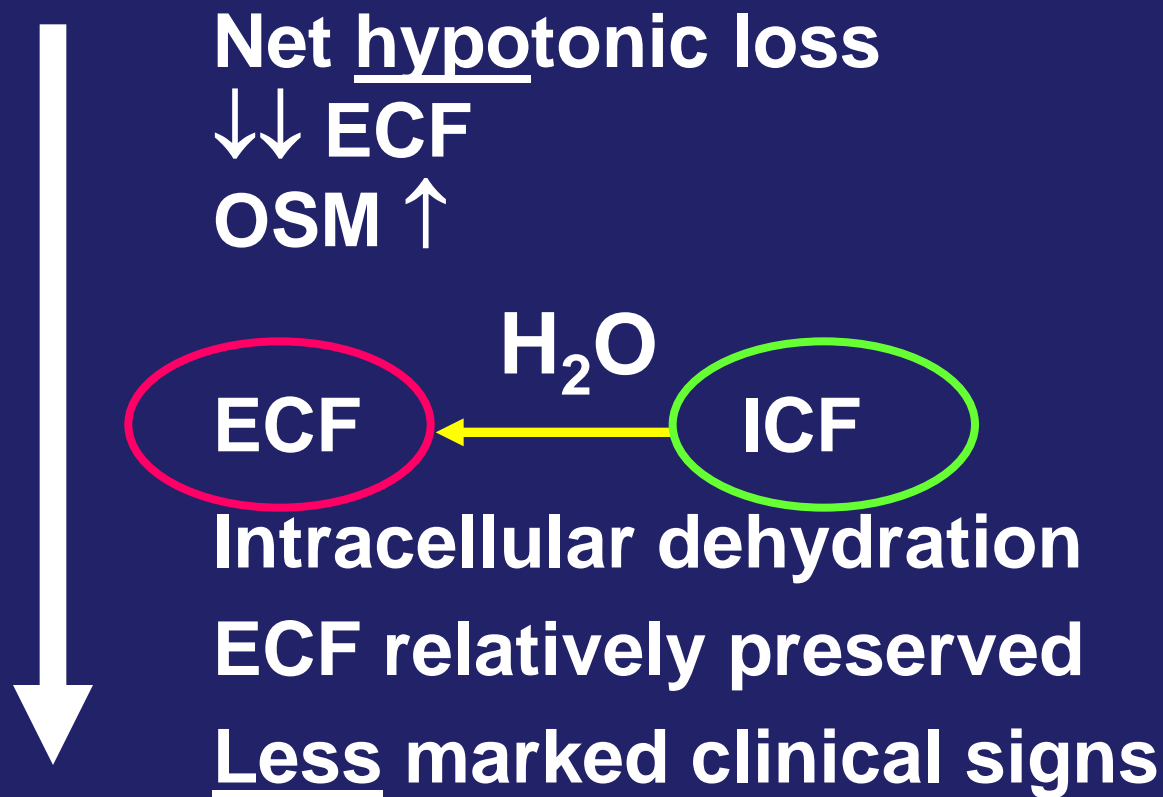
## HYPOTONIC DEHYDRATION

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# TYPE

## HYPERTONIC DEHYDRATION



# HYPERTONIC DEHYDRATION

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- **History**
- **Less marked physical signs**
- **Skinfold sign**
- **Fever**
- **Skin: pink and warm**
- **Late shock**
- **Very intense thirst**
- **Irritability**
- **Seizures**

# DEHYDRATION LABORATORY TESTS

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~~SERUM ELECTROLYTES~~

~~ACID-BASE STATUS~~

~~Blood urea nitrogen (BUN)~~

~~UREA IN URINE (U/P<sub>CR</sub>)~~

# DEHYDRATION MANAGEMENT

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- PLAN A -no dehydration- / B / C -severe dehydration-
- Oral rehydration therapy (ORT)
- Intravenous hydration
  - Expansion (fluid resuscitation)
  - IV hydration

# ORAL REHYDRATION ADVANTAGES

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- **Physiological**
- **Early refeeding**
- **Effective in 90-95% of cases; same for all DH types**
- **REDUCES MORBIDITY AND MORTALITY!**
- **Low cost , simple implementation**
- **Accessibility**
- **No infective, metabolic or electrolytic complications**

# ORT

## RESOURCES

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- Room
- Envelopes containing solutions
- Safe drinking water
- Refrigerator
- Clock / Watch
- Paper and pencil
- Scale
- Containers (jar, cups; metered containers); spoons
- NGT
- Trained staff

# ORS - COMPOSITION

	g/L		mmol/L
• NaCl	3.5	• Na	90
• KCl	1.5	• K	20
• Na <sub>2</sub> HCO <sub>3</sub>	2.5*	• -HCO <sub>3</sub>	30
• Glucose	20	• Cl	80
WFI 1 L		• Dextrose	111

\* tri-Na citrate, dihydrate 2.9 g/L  
10 mmol/L

Total osm. 331 mOsm/L

\* Total osm 311 mOsm/L

# LOW OSMOLALITY ORS

	g/L		mmol/L
• NaCl	2.6	• Na	75
• Gluc. (anhydre)	13.5	• Cl	65
• KCl	1.5	• Gluc, anhydre	75
• tri-Na citrate, dihydrate	2.9	• K	20
		• tri-Na citrate, dihydrate	10
<b>Total weight</b>	<b>20.5</b>	<b>Total OSM</b>	<b>245 mOsm/L</b>

# NORMOHYDRATION

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# ORS ADMINISTRATION

## PLAN A (AT HOME)

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- Give more fluids than usual
- ORS with each diarrheal stool passed / vomit
  - < 2 years: 50 – 100 mL
  - > 2 years: 100 – 200 mL
- Continued feeding/ breast-feeding
- Follow-up / Alarm signs

**ADEQUATE FEEDING/  
BREASTFEEDING !**



# ORS ADMINISTRATION



# ORAL REHYDRATION CONTRAINDICATIONS

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- Shock
- Age < 1 month
- Functional obstruction/ Ileum
- Bilious emesis
- Severely impaired consciousness
- Severe respiratory distress
- Tense and/or tender abdomen

# ORS ADMINISTRATION

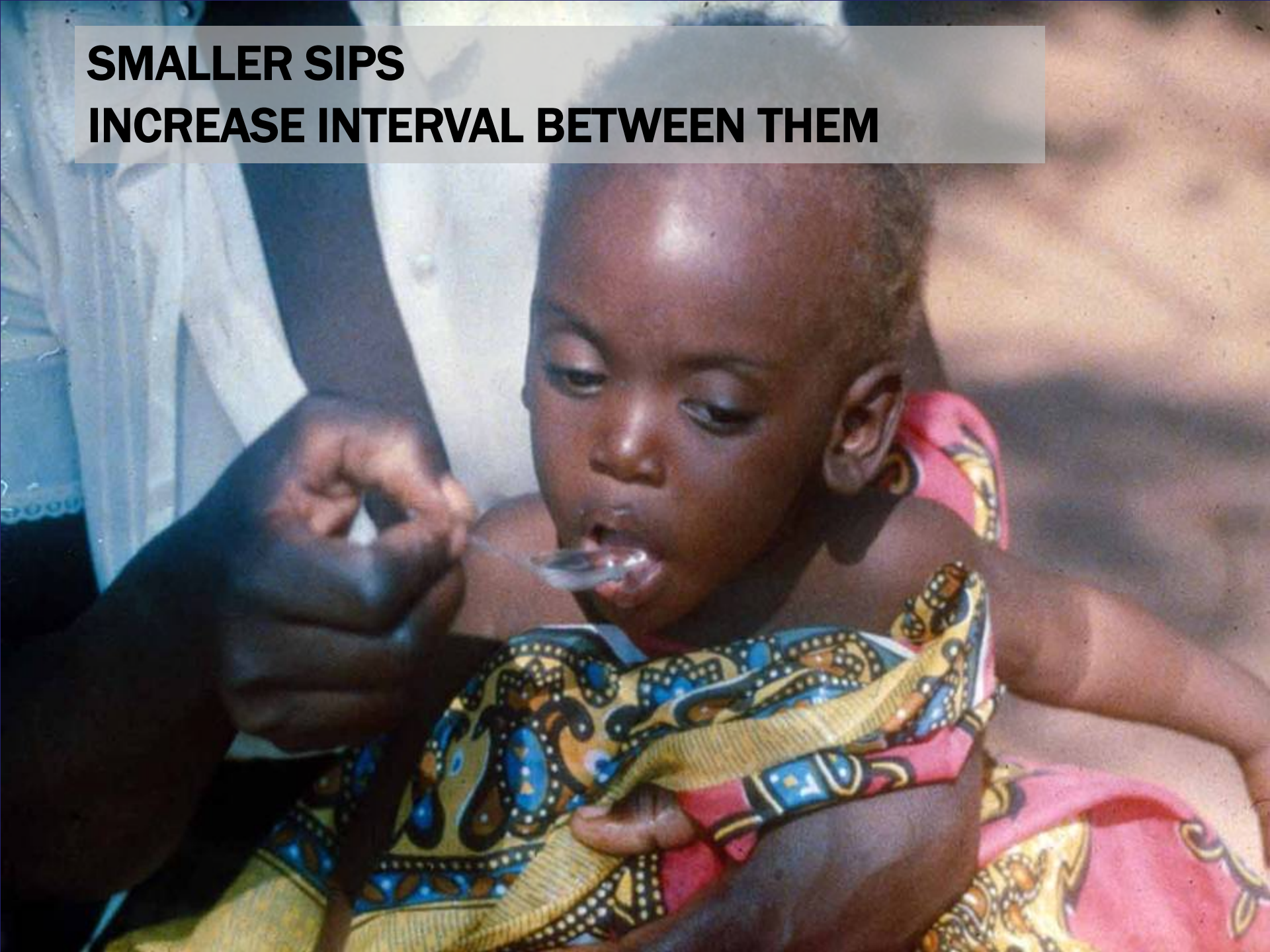
## PLAN B

- According to weight:
  - 50 - 100 mL/kg in 4 hs
- According to age (in 4 hs):
  - > 4 mos: 200-400 mL      4 - 12 mos: 400-700 mL
  - 1- 2 yr: 700-900 mL      2- 5 yr: 900-1400 mL
- Every 30 minutes (if well tolerated)
- Continued monitoring; re-assess at 4 h
- Switch to Plan A when patient has normal hydration

# VOMITING DURING ORT



**SMALLER SIPS  
INCREASE INTERVAL BETWEEN THEM**



# NGT

**Gavage (gravity): 20-25 mL/kg/h every 20 min**

**Drip: 5 macrodrops/kg/min, in 30 min**



# ORAL REHYDRATION FAILURE

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- Worsening of clinical signs
- Loss of fluids greater than intake
- Persistent vomiting
- Significant abdominal distension
- Persistence of dehydration after 6 h

# HYDRATION PLAN C

- Shock:

Intravascular volume expansion

Isotonic crystalloid solution: 20 mL/kg, as rapidly as possible\*

OR

	30 mL/kg	70 mL/kg
< 12 mos.	1 h *	5 h
1 - 5 years	30 min *	2½ hs

\*Repeat if shock signs persist

Alternative: ORS via NGT 20-25 mL /kg / h; in 6 h

# ENHANCING ORT IN A HUMANITARIAN EMERGENCY SETTING

- Prepare a specific ORT area in each health facility
- Teach the population the adequate technique for ORT
- Consider cultural features and issues of the affected population
- Epidemiologic surveillance registry



# DIARRRHEA AND DEHYDRATION

## TREATMENT SUMMARY

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- Anticipate needs in the rehydration posts according to the population affected by the disaster
- Determine degree of dehydration and proceed
- Initiate ORT, except in cases of severe dehydration
- Reinitiate feeding immediately after rehydration
- Antibiotic treatment only for dysentery or if cholera is suspected
- NO antiemetics/ antidiarrheics



THANK  
YOU!