

Approach to Acute Gastroenteritis

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Objectives



At the end of the session, the participants should be able to:

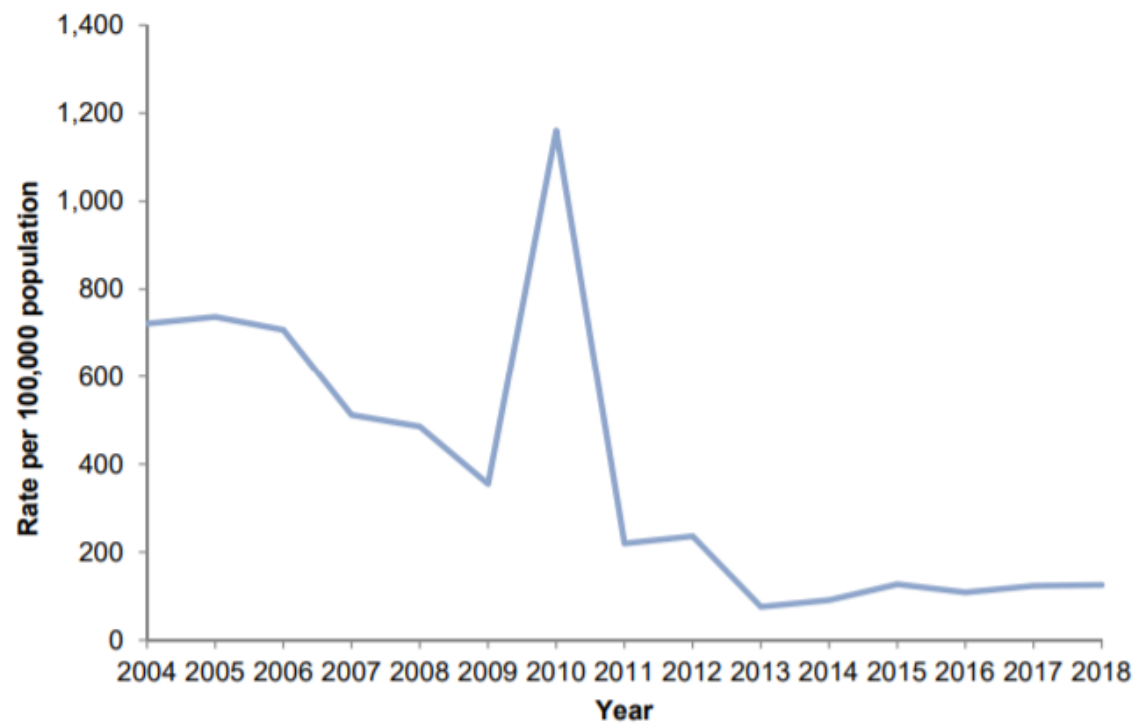
- Identify the type of gastroenteritis based on the clinical features of patients
- Provide appropriate management for patients based on hydration status and etiology of infection
- Advise prevention and control measures for the family and the community
- Recognize updated evidence-based management of acute gastroenteritis

Table 4A.1 - Ten Leading Causes of Morbidity

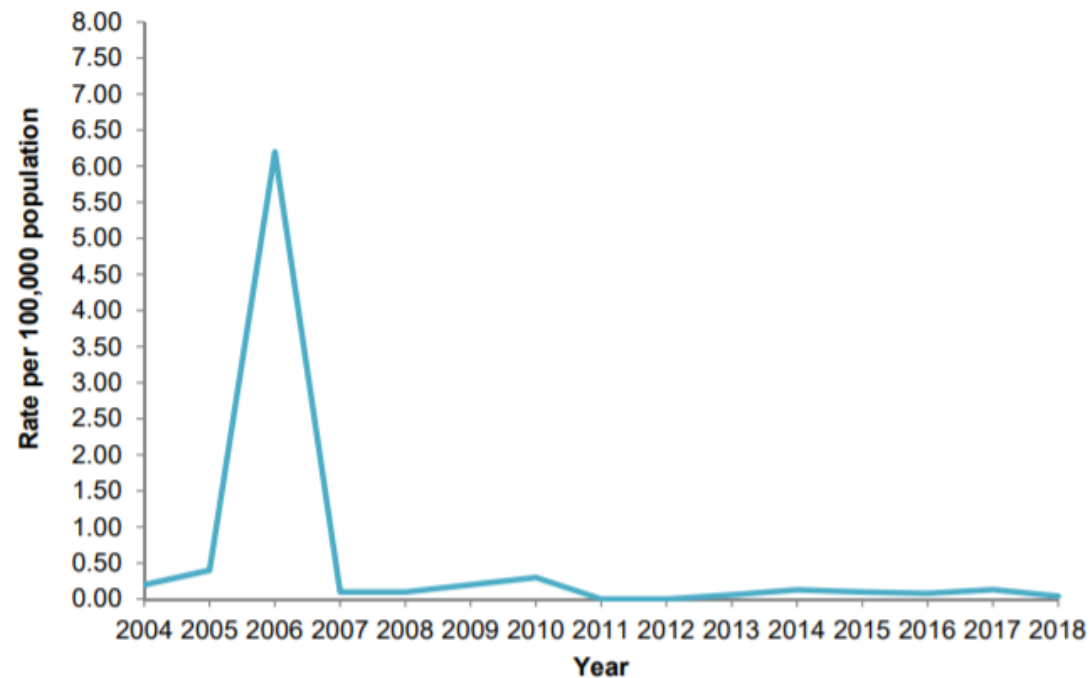
Philippines, 2018

	Disease	Number of case	Rate per 100,000 population
1	Acute Respiratory Tract Infection	1,209,821	1,139.53
2	Hypertension	602,811	567.79
3	ALRTI and Pneumonia	503,884	474.61
4	Urinary Tract Infection	280,687	264.38
5	Bronchitis	130,057	122.50
6	Acute Watery Diarrhea	112,543	106.00
7	Influenza	91,681	86.35
8	Diseases of the Heart	66,688	62.81
9	Dengue Fever	51,361	48.38
10	TB Respiratory	39,923	37.60

**Figure 4B.7 - Acute Watery Diarrhea
Morbidity Rate
Philippines, 2004 - 2018**



**Figure 4B.9 - Cholera
Morbidity Rate
Philippines, 2004 - 2018**



Case vignette



- Junior, a 5-year-old boy, previously healthy, was brought to Ambulatory Care Unit for the following
 - Loose watery stools within the day, occurring 6 times already
 - With low grade fever and vomiting
 - Able to sip fluids
 - With adequate urine output

- Pertinent PE
 - Irritable and drinks eagerly
 - VS: HR: 118 bpm, RR: 28 bpm, T 38.1, BP: 90/60 mmHg, Weight: 15kg
 - Sunken eyeball
 - Skin pinch <1 second

Is Junior having an acute infectious diarrhea?



Yes

No

Cannot tell

Integrated Management of Childhood Illness

Chart Booklet



March 2014

In developing countries

A large proportion of childhood morbidity & mortality is caused by 5 conditions:

- Acute respiratory infections
- Diarrhea
- Measles
- Malaria
- Malnutrition

Encompasses a range of interventions to manage major childhood illnesses in health facilities and at home

Participating Professional Medical Societies and Agencies



Department of Health



San Lazaro Hospital



Philippine Society for
Microbiology and Infectious
Diseases



Philippine Society for
Pediatric Gastroenterology,
Hepatology and Nutrition



Pediatric Nephrology
Society of the
Philippines



Pediatric infectious
Disease Society of the
Philippines



Philippine Society of
Gastroenterology



Philippine Society of
Nephrology



Philippine Academy
of Family Physicians

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Department of Health

San Lazaro Hospital

Philippine Society for Microbiology and Infectious Diseases

<https://www.psmid.org.ph/>



Acute gastroenteritis



- Acute gastroenteritis is a disease characterized by changes in the **character and frequency** of stool
- It can be defined as the **passage of a greater number of stools of decreased form** from the normal lasting **less than 14 days**
- Generally associated with other signs or symptoms including nausea, vomiting, abdominal pain and cramps, increase in intestinal gas-related complaints, fever, passage of bloody stools (dysentery), tenesmus (constant sensation of urge to move bowels), and fecal urgency.

When is the diagnosis of acute infectious diarrhea suspected?



If a patient presents with the passage of **3 or more loose, watery or bloody stools within 24 hours** that may be accompanied by **any** of the following symptoms:

- Nausea
- Vomiting
- Abdominal pain
- Fever

Case vignette

- Junior, a 5-year-old boy, previously healthy, was brought to Ambulatory Care Unit for the following
 - Loose watery stools within the day, occurring 6 times already
 - With low grade fever vomiting
 - Able to sip fluids
 - With adequate urine output

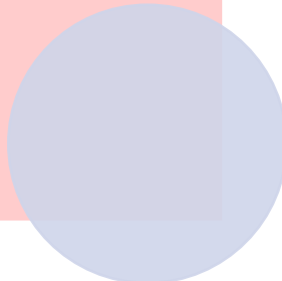
- Pertinent PE
 - Irritable and drinks eagerly
 - VS: HR: 128 bpm, RR: 28 bpm, T 38.1, BP: 90/60 mmHg, Weight: 15kg
 - Sunken eyeballs
 - Skin pinch <1 second

What pre-treatment clinical evaluations are recommended for immunocompetent patients presenting with acute infectious diarrhea?



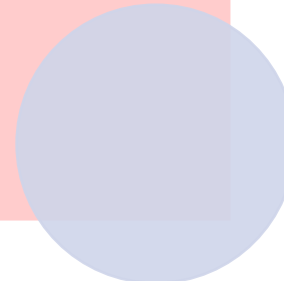
- Consumption of raw, ill-prepared, or rotten food
- Intake of contaminated water
- History of travel

**Extensive
clinical
history**



- Done to assess disease severity, degree of dehydration, presence of complications

**Complete
physical
examination**



Will you order a routine stool examination?



Yes

No

What is the clinical use of diagnostic tests in children and adults with acute infectious diarrhea?



- Diagnostic tests should be requested based on the patient's clinical status
- Routine stool examination is not indicated** in acute watery diarrhea, except in cases where **parasitism is suspected** or in the **presence of bloody diarrhea**
- Stool cultures are indicated only for **severe cases, high risk of transmission of enteric pathogens** (food handlers); high risk of **complications**; and for **epidemiologic purposes** (when there is suspicion of an outbreak that is enteric in origin).

What is the clinical use of diagnostic tests in children and adults with acute infectious diarrhea?



- There is **insufficient evidence to support the use of biomarkers** (CRP, calprotectin, ESR, procalcitonin) in distinguishing the cause of acute infectious diarrhea
- **Rapid diagnostic tests** may be used during outbreaks of cholera and shigella but **confirmation with stool culture is still recommended**
- Clinical correlation is necessary in interpreting tests done using molecular diagnostics

Will you order a routine stool examination?



Yes




No

What are the clinical parameters that would indicate the presence of dehydration in children with acute infectious diarrhea?



- Abnormal vital signs (tachycardia, tachypnea)
- Depressed level of consciousness
- Depressed fontanel
- Sunken eyes
- Decreased or absent tears
- Poor skin turgor
- Prolonged capillary refill time
- Abnormal respiratory pattern
- Decreased urine output



**The most common
complication of diarrhea is:
DEHYDRATION**

An accurate assessment of the degree of dehydration in infants and children is important for proper decision-making and treatment

What is the degree of dehydration of Junior?



None

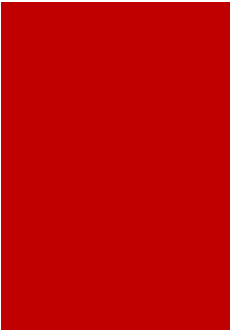
Some

Severe

Parameters		No signs of dehydration	Mild to Moderate dehydration	Severe dehydration
Fluid Deficit (% body weight)	Infant	<5%	5-10%	>10%
	Child	3%	6%	9%
Condition ^a		Well, alert	Restless, irritable	Lethargic, unconscious
Thirst		Drinks normally, not thirsty	Thirsty, drinks eagerly	Drinks poorly, not able to drink
Fontanel/Eyes ^a		Normal	Slightly depressed/ slightly sunken	Sunken
Tears		Present	Present or decreased	No tears
Cutaneous Perfusion/ Capillary Refill Time ^b		<2 seconds	Around 2 seconds	>3 seconds
Respiration		Normal	Deep, may be rapid	Deep and rapid 2mo-12mo: ≥50 breaths/min >12mo-5yrs: ≥40 breaths/min
Skin Pinch ^a		Goes back quickly	Goes back slowly	Goes back very slowly
History of Urine Output		Normal	Decreased (<0.5 ml/kg/hr in 8 hours)	Minimal (<0.3ml/kg/hr in 16 hours) or none (no urine output in 12 hours)
Interpretation			If the patient has two or more of the above signs, there is MILD to MODERATE DEHYDRATION	If the patient has two or more of the above signs, there is SEVERE DEHYDRATION

^aThese parameters are unreliable for patients with severe malnutrition. Use other parameters to distinguish malnutrition from dehydration.

^bCapillary refill time is the time required for return of color after application of blanching pressure to a distal capillary bed.⁵⁹



Does the child have diarrhoea? ✓

If yes, ask:

- For how long?
- Is there blood in the stool?

Look and feel:

- Look at the child's general condition. Is the child:
 - Lethargic or unconscious?
 - Restless and irritable?
- Look for sunken eyes.
- Offer the child fluid. Is the child:
 - Not able to drink or drinking poorly?
 - Drinking eagerly, thirsty?
- Pinch the skin of the abdomen. Does it go back:
 - Very slowly (longer than 2 seconds)?
 - Slowly?

Classify DIARRHOEA

for DEHYDRATION

Two of the following signs: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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

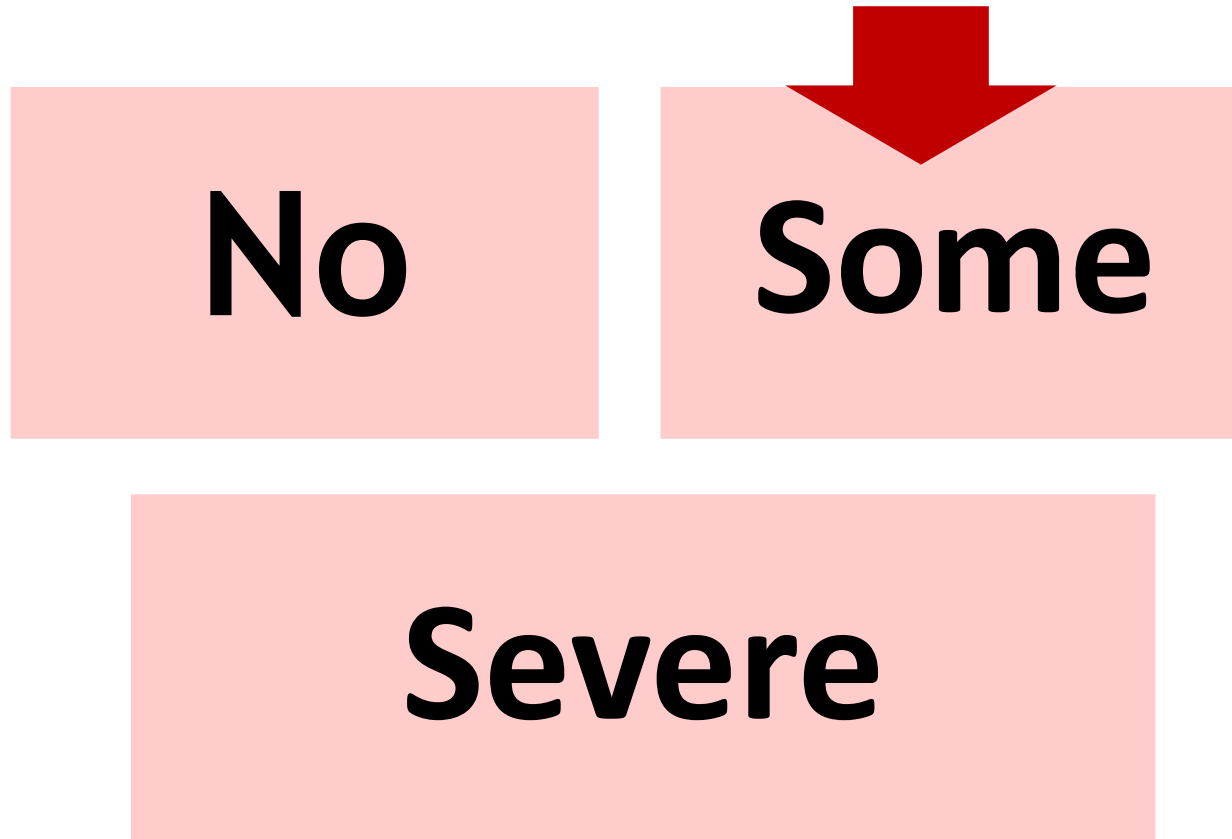
and if diarrhoea 14 days or more

• Dehydration present.	Pink: SEVERE PERSISTENT DIARRHOEA	<ul style="list-style-type: none"> ■ Treat dehydration before referral unless the child has another severe classification ■ Refer to hospital
• No dehydration.	Yellow: PERSISTENT DIARRHOEA	<ul style="list-style-type: none"> ■ Advise the mother on feeding a child who has PERSISTENT DIARRHOEA ■ Give multivitamins and minerals (including zinc) for 14 days ■ Follow-up in 5 days

and if blood in stool

• Blood in the stool.	Yellow: DYSENTERY	<ul style="list-style-type: none"> ■ Give ciprofloxacin for 3 days ■ Follow-up in 3 days
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What is the degree of dehydration of Junior?



Adults

Parameters	Mild dehydration	Moderate dehydration	Severe dehydration
Fatigue	+/-	+	+
Thirst	+/-	+	+
Sunken eyes	-	+	+
Blood pressure	Normal	Orthostatic hypotension	Shock
Respiratory rate (breaths per minute)	Normal	21 - 25	≥25
Pulse rate (beats per minute) ^a	≥80	≥100	Faint or thready pulses
Peripheral circulation	Warm extremities	Cold, clammy skin	
Level of consciousness	Alert	Lethargic	Coma or stupor
Oral mucosa	Moist	Dry	
Muscle weakness	None	Mild to moderate	Severe
Skin turgor ^b	≤2 seconds	>2 seconds	
Capillary refill time ^c	≤2 seconds	>2 seconds	
Urine output (ml/kg/hr)	≥0.5	<0.5	

^aThese values are appropriate for assessing severity of dehydration if the patient has no fever

^bSkin turgor is best assessed at the anterior forearm, anterior thigh, anterior chest, subclavicular area, or sternum

^cCapillary refill time should be assessed with the examiner's middle finger at the same level as the patient's heart

Table 7. Other parameters used in assessing dehydration in adults.^{73,75-77}

Parameters	Mild dehydration	Moderate dehydration	Severe dehydration
Body Weight Change	Reduction of 3-5% of body weight in ≤7 days or Increase of 3-5% of body weight in ≤7 days as an indication that a person was dehydrated before rehydration	Change of >5% of body weight	
Urine Specific Gravity	≥1.010	≥1.020	
Urine Osmolality (mosm/kg)	>800		
Serum Osmolality (mosm/kg)	295-300	>300	
BUN/Creatinine Ratio			>20
Metabolic acidosis (pH <7.35, HCO₃ <22 mmol/L)	-	-	+

What laboratory tests should be done to assess for the presence of complications for acute infectious diarrhea?

- Complete blood count
- Urinalysis
- Serum electrolytes (Na, K, Cl)
- BUN and creatinine
- Serum bicarbonate or total CO₂ (if available)
- ABG (optional)

Complications such as AKI and electrolyte imbalances can occur with acute infectious diarrhea

**Will you advise admission for
Junior?**



Yes

No

Cannot tell

What are the criteria for admission among children presenting with acute infectious diarrhea?



Clinical history

- Unable to tolerate fluids
- Suspected electrolyte abnormalities
- Conditions for safe follow-up and home management are not met

Physical findings

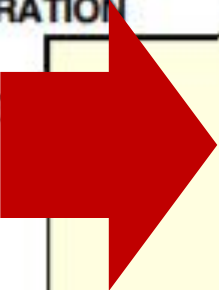
- Altered consciousness
- Abdominal distention
- Respiratory distress
- Hypothermia

Co-existing medical condition

- Pneumonia
- Meningitis
- Sepsis
- Moderate to severe malnutrition
- Suspected medical condition



for DEHYDRATION
Classify DIARRHOE



<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>Pink: 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)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
<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>Yellow: 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.</p>	<p>Green: NO DEHYDRATION</p>	<ul style="list-style-type: none">■ Give fluid, zinc supplements, and food to treat diarrhoea at home (Plan A)

How will you manage dehydration among children?

No signs of dehydration

- **Reduced osmolarity oral rehydration solution (ORS)** is recommended to replace ongoing losses
- If commercial ORS is not available, **homemade ORS** may be given

Mild to moderate dehydration

- **Reduced osmolarity ORS** is recommended to replace ongoing losses
- If oral rehydration is not feasible, administration of ORS via **nasogastric tube** is preferred over IV hydration

Severe dehydration

- **Rapid intravenous rehydration** is recommended with plain Lactated Ringer's (LR) Solution or 0.9% Sodium Chloride

Homemade ORS



- 4-5 teaspoons of sugar
- 1 teaspoon of salt
- 1 liter of clean drinking water

How will you manage dehydration among children?



- Monitoring
 - Check the child from time to time during rehydration to ensure that ORS is being taken satisfactorily and that signs of dehydration are not worsening
 - Evaluate the child's hydration status at least hourly
- Breastfeeding should be continued in addition to hydration therapy for breastfed infants
- Carbonated, sweetened, caffeinated and sports beverages are not recommended for fluid replacement

PLAN C

- 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

- If child has no other severe classification:
 - Give fluid for severe dehydration (Plan C)
OR
- If child also has another severe classification:
 - 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

PLAN B

- Two of the following signs:
- Restless, irritable
 - Sunken eyes
 - Drinks eagerly, thirsty
 - Skin pinch goes back slowly.

Yellow:
SOME DEHYDRATION

- Give fluid, zinc supplements, and food for some dehydration (Plan B)
- If child also has a severe classification:
 - 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

PLAN A

Not enough signs to classify as some or severe dehydration.

Green:
NO DEHYDRATION

- 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

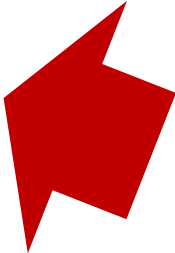
Will you advise admission for Junior?



Yes

No

Cannot tell



When will you reassess the hydration status of Junior after beginning ORS?



- 1 hour
- 2 hours
- 3 hours
- 4 hours

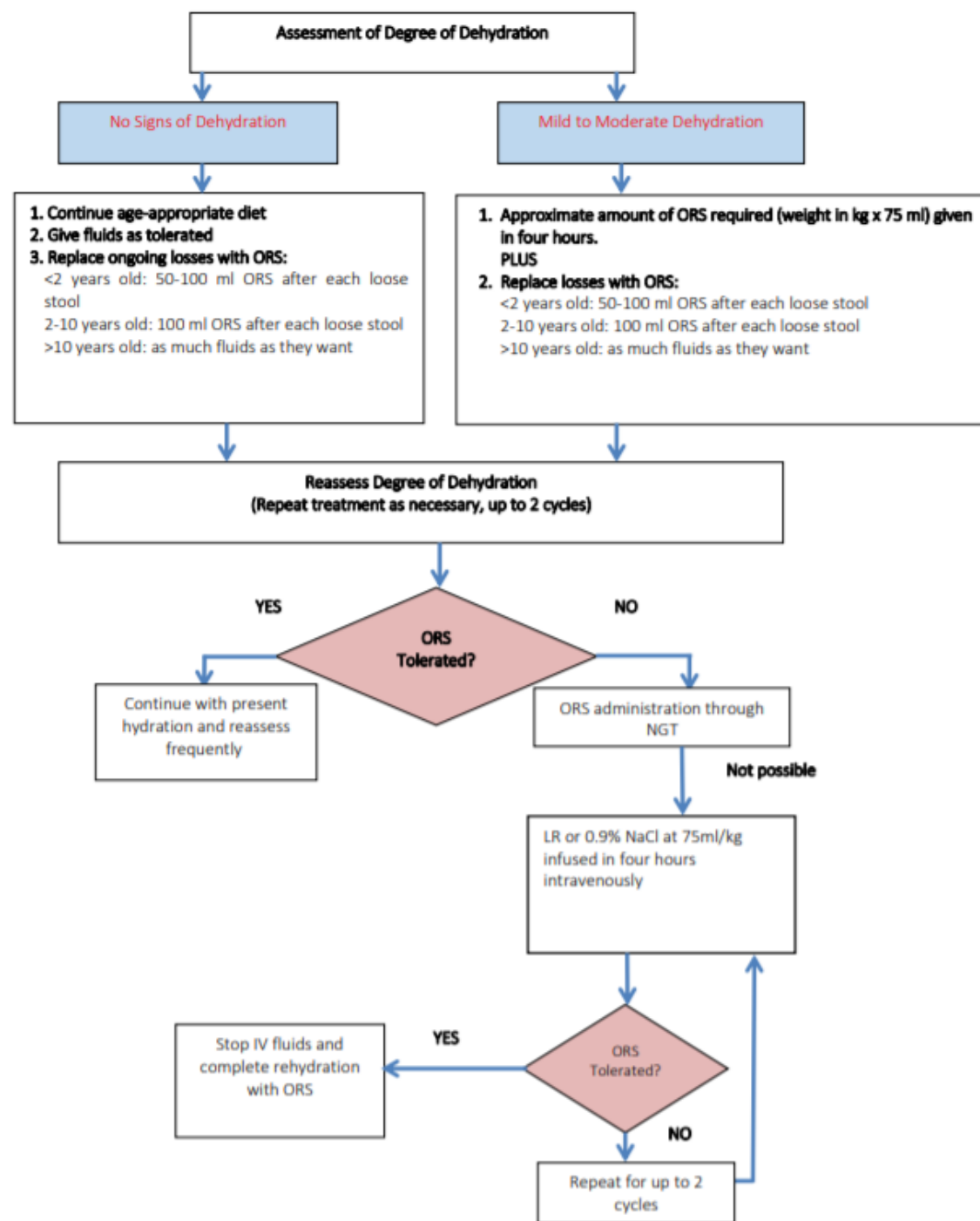


Figure 1. Protocol for no signs of dehydration and mild to moderate dehydration. (Adapted with modifications^{1,2,4})

Assessment of Degree of Dehydration

No Signs of Dehydration

1. Continue age-appropriate diet
2. Give fluids as tolerated
3. Replace ongoing losses with ORS:
 - <2 years old: 50-100 ml ORS after each loose stool
 - 2-10 years old: 100 ml ORS after each loose stool
 - >10 years old: as much fluids as they want

Mild to Moderate Dehydration

1. Approximate amount of ORS required (weight in kg x 75 ml) given in four hours.
PLUS
2. Replace losses with ORS:
 - <2 years old: 50-100 ml ORS after each loose stool
 - 2-10 years old: 100 ml ORS after each loose stool
 - >10 years old: as much fluids as they want

Reassess Degree of Dehydration
(Repeat treatment as necessary, up to 2 cycles)

YES

NO

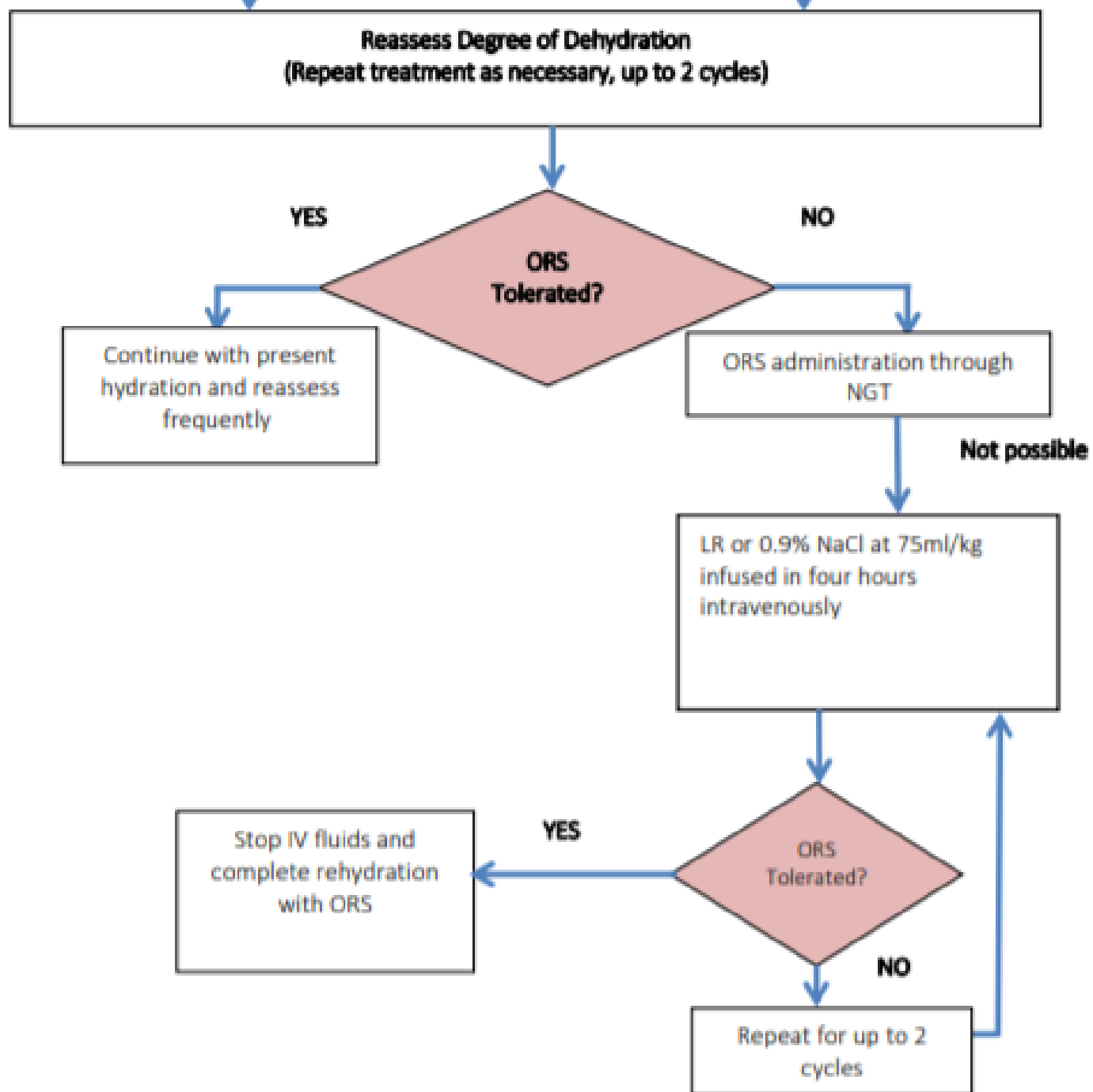


Figure 1. Protocol for no signs of dehydration and mild to moderate dehydration. (Adapted with modifications^{1,24})

PLAN A: TREAT DIARRHOEA AT HOME

Counsel the mother on the 4 Rules of Home Treatment:

1. Give Extra Fluid
2. Give Zinc Supplements (age 2 months up to 5 years)
3. Continue Feeding
4. When to Return.

1. **GIVE EXTRA FLUID** (as much as the child will take)

▪ **TELL THE MOTHER:**

- Breastfeed frequently and for longer at each feed.
- If the child is exclusively breastfed, give ORS or clean water in addition to breast milk.
- If the child is not exclusively breastfed, give one or more of the following:
ORS solution, food-based fluids (such as soup, rice water, and yoghurt drinks), or clean water.

▪ **It is especially important to give ORS at home when:**

- *the child has been treated with Plan B or Plan C during this visit.*
- *the child cannot return to a clinic if the diarrhoea gets worse.*

▪ **TEACH THE MOTHER HOW TO MIX AND GIVE ORS. GIVE THE MOTHER 2 PACKETS OF ORS TO USE AT HOME.**

▪ **SHOW THE MOTHER HOW MUCH FLUID TO GIVE IN ADDITION TO THE USUAL FLUID INTAKE:**

Up to 2 years	50 to 100 ml after each loose stool
2 years or more	100 to 200 ml after each loose stool

Tell the mother to:

- Give frequent small sips from a cup.
- If the child vomits, wait 10 minutes. Then continue, but more slowly.
- Continue giving extra fluid until the diarrhoea stops.

2. **GIVE ZINC** (age 2 months up to 5 years)

▪ **TELL THE MOTHER HOW MUCH ZINC TO GIVE (20 mg tab):**

2 months up to 6 months	1/2 tablet daily for 14 days
6 months or more	1 tablet daily for 14 days

▪ **SHOW THE MOTHER HOW TO GIVE ZINC SUPPLEMENTS**

- Infants - dissolve tablet in a small amount of expressed breast milk, ORS or clean water in a cup.
- Older children - tablets can be chewed or dissolved in a small amount of water.

3. **CONTINUE FEEDING** (exclusive breastfeeding if age less than 6 months)

4. **WHEN TO RETURN**

Give extra fluid

- Breastfeed
- ORS, food-based fluids or clean water
- Teach the parent how to mix and give ORS volume/volume loss:
 - Up to 2 years: 50-100 ml per stool
 - > 2 years: 100-200 ml per stool
- Give frequent small sips from a cup
- If the child vomits, wait 10 minutes, then continue but more slowly

Zinc supplement

- 2 mo - 6 mo: ½ tablet daily for 14d
- 6 mo or more: 1 tab/day

Continue feeding

When to return

PLAN B: TREAT SOME DEHYDRATION WITH ORS

In the clinic, give recommended amount of ORS over 4-hour period

■ DETERMINE AMOUNT OF ORS TO GIVE DURING FIRST 4 HOURS

WEIGHT	< 6 kg	6 - <10 kg	10 - <12 kg	12 - 19 kg
AGE ^a	Up to 4 months	4 months up to 12 months	12 months up to 2 years	2 years up to 5 years
In ml	200 - 450	450 - 800	800 - 960	960 - 1600

^a Use the child's age only when you do not know the weight. The approximate amount of ORS required (in ml) can also be calculated by multiplying the child's weight (in kg) times 75.

- If the child wants more ORS than shown, give more.
- For infants under 6 months who are not breastfed, also give 100 - 200 ml clean water during this period if you use standard ORS. This is not needed if you use new low osmolarity ORS.
- **SHOW THE MOTHER HOW TO GIVE ORS SOLUTION.**
 - Give frequent small sips from a cup.
 - If the child vomits, wait 10 minutes. Then continue, but more slowly.
 - Continue breastfeeding whenever the child wants.
- **AFTER 4 HOURS:**
 - Reassess the child and classify the child for dehydration.
 - Select the appropriate plan to continue treatment.
 - Begin feeding the child in clinic.
- **IF THE MOTHER MUST LEAVE BEFORE COMPLETING TREATMENT:**
 - Show her how to prepare ORS solution at home.
 - Show her how much ORS to give to finish 4-hour treatment at home.
 - Give her enough ORS packets to complete rehydration. Also give her 2 packets as recommended in **Plan A**.
 - Explain the 4 Rules of Home Treatment:
 1. **GIVE EXTRA FLUID**
 2. **GIVE ZINC (age 2 months up to 5 years)**
 3. **CONTINUE FEEDING (exclusive breastfeeding if age less than 6 months)**
 4. **WHEN TO RETURN**

Determine amount of ORS

- $15\text{kg} \times 75\text{ml/kg} = 1,125\text{ mL}$

Show the mother how to give ORS

After 4 hours, REASSESS and classify the child for dehydration

Explain the home treatment to the caregiver

PLAN C: TREAT SEVERE DEHYDRATION QUICKLY

FOLLOW THE ARROWS. IF ANSWER IS "YES", GO ACROSS. IF "NO", GO DOWN.

START HERE

Can you give intravenous (IV) fluid immediately?

YES→

NO



- **Start IV fluid immediately.** If the child can drink, give ORS by mouth while the drip is set up. Give 100 ml/kg Ringer's Lactate Solution (or, if not available, normal saline), divided as follows

AGE	First give 30 ml/kg in:	Then give 70 ml/kg in:
Infants (under 12 months)	1 hour*	5 hours
Children (12 months up to 5 years)	30 minutes*	2 1/2 hours

* Repeat once if radial pulse is still very weak or not detectable.

- **Reassess the child every 1-2 hours.** If hydration status is not improving, give the IV drip more rapidly.
- Also give ORS (about 5 ml/kg/hour) as soon as the child can drink: usually after 3-4 hours (infants) or 1-2 hours (children).
- Reassess an infant after 6 hours and a child after 3 hours. Classify dehydration. Then choose the appropriate plan (A, B, or C) to continue treatment.

Is IV treatment available nearby (within 30 minutes)?

YES→

NO



Are you trained to use a naso-gastric (NG) tube for rehydration?

YES→

NO



Can the child drink?

YES→

NO



Refer URGENTLY to hospital for IV or NG treatment

- **Refer URGENTLY to hospital for IV treatment.**
- If the child can drink, provide the mother with ORS solution and show her how to give frequent sips during the trip or give ORS by naso-gastric tube.

- **Start rehydration by tube (or mouth) with ORS solution:** give 20 ml/kg/hour for 6 hours (total of 120 ml/kg).
- **Reassess the child every 1-2 hours while waiting for transfer:**
 - If there is repeated vomiting or increasing abdominal distension, give the fluid more slowly.
 - If hydration status is not improving after 3 hours, send the child for IV therapy.
- After 6 hours, reassess the child. Classify dehydration. Then choose the appropriate plan (A, B or C) to continue treatment.

NOTE:

- If the child is not referred to hospital, observe the child at least 6 hours after rehydration to be sure the mother can maintain hydration giving the child ORS solution by mouth.



PLAN C

- Start IV fluid immediately
- Refer urgently to hospital for IV treatment
- Start rehydration by tube (or mouth) with ORS solution
- Reassess every 1-2 hours

When will you reassess the hydration status of Junior after beginning ORS?



- 1 hour
- 2 hours
- 3 hours
- 4 hours

Will you prescribe an antibiotic to Junior?



Yes

No

What are the indications for empiric antibiotic treatment in children with acute infectious diarrhea?



- Primary management of acute infectious diarrhea in children is still **rehydration therapy**. **Routine empiric antibiotic therapy is NOT recommended.**

- Antimicrobials may be recommended for the following conditions:
 - Suspected cholera
 - Bloody diarrhea *Entamoeba histolytica, Salmonella and Shigella*
 - Diarrhea associated with other acute infections



Major etiologies of childhood diarrhea in developing countries

Syndrome	Etiologic agents	Features
Acute watery diarrhea Watery stools; may contain mucous. Fever may be present.	Rotavirus	Leading cause of gastroenteritis in children younger than two years.
	Enterotoxigenic <i>Escherichia coli</i> (ETEC)	Leading cause of gastroenteritis in older children and adults.
	<i>Vibrio cholerae</i> O1 and O139	Associated with endemic and epidemic disease. Vomiting and voluminous "rice-water diarrhea" in severe cases.
	Cryptosporidium	Common in infants (younger than one year) even in the absence of HIV; infrequently seen in older children.
	Norovirus	Abrupt onset of vomiting and diarrhea with low grade fever.
Invasive diarrhea Gross blood in stool. Often associated with fever, vomiting, abdominal pain.	Shigella spp.	Leading cause of invasive diarrhea. <i>S. dysenteriae</i> serotype I produces Shiga-toxin and is associated with epidemics of severe disease. Complications include toxic megacolon, rectal prolapse, intestinal perforation, seizures, encephalopathy and sepsis.
	Nontyphoidal <i>Salmonella enterica</i>	Several serotypes cause gastroenteritis. Infants, elderly, and immunocompromised at increased risk for disseminated infection.
	Campylobacter spp.	Predominantly <i>C. jejuni</i> and <i>C. coli</i> . May mimic appendicitis. Complications include Guillain-Barré syndrome.
	Enteroinvasive <i>Escherichia coli</i> (EIEC)	EIEC are closely related to Shigella and cause a syndrome essentially identical to shigellosis.
	Enterohemorrhagic <i>Escherichia coli</i> (EHEC)	EHEC produce Shiga toxin identical to that produced by <i>S. dysenteriae</i> serotype I, associated with increased risk of hemolytic uremic syndrome.
	<i>Entamoeba histolytica</i>	<i>E. histolytica</i> is a protozoal organism which causes intestinal infection which may be indistinguishable from Shigella and other bacteria. Rare complications include extraintestinal infections, most commonly hepatic abscess.
	Adenovirus types 40/41	Also cause watery diarrhea.

What are the recommended antimicrobials for the different etiologies?

- Azithromycin
10mg/kg/dose OD x 3 days
- Doxycycline (if >8yrs old): 2mg/kg single dose

Cholera

- Ciprofloxacin
30mg/kg/day PO into 2 doses
- Azithromycin 10mg
PO OD x 3days
- Ceftriaxone IV 75-100mg/kg/day

Shigella

- Metronidazole
10mg/kg/dose TID for 10-14 days to avoid relapse

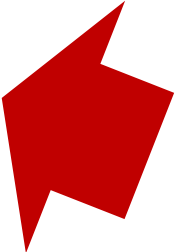
Amoebiasis

Will you prescribe an antibiotic to Junior?



Yes

No



**Can you give loperamide to
Junior?**



Yes

No

Medications



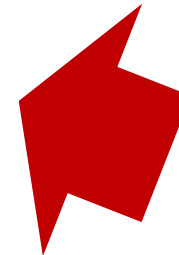
- Zinc medication** as adjunctive therapy for children >6 months to shorten the duration of diarrhea and reduce frequency of stools
- Racecadotril** may be given to infants and children as adjunctive therapy to **shorten the duration of diarrhea**
- Loperamide is NOT recommended** for children with acute infectious gastroenteritis due to serious adverse events
- Anti-emetics are NOT recommended** due to potential adverse events

Can you give loperamide to Junior?



Yes

No



**Will probiotics work? Is Yakult
enough?**



Yes

No

What is the role of probiotics in the management of acute infectious diarrhea in children?



- Probiotics are recommended as an **adjunct therapy** throughout the duration of the diarrhea in children. Probiotics have been shown to reduce symptom severity and duration of diarrhea.

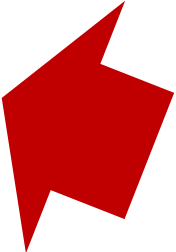
- The following probiotics may be used:
 - Saccharomyces boulardii*
 - Lactobacillus rhamnosus*
 - Lactobacillus reuteri*
 - There is insufficient evidence to recommend *Bacillus clausii*

Will probiotics work? Is Yakult enough?



Yes

No



Do you recommend the BRAT diet?



Yes

No

What is the recommended diet for children with acute infectious diarrhea?



- Breastfeeding should be continued in breastfed infants
- In general, feeding should be continued. However, if feeding is not tolerated, early refeeding may be started as soon as the child is able
- If diarrhea persists for >7 days or if patients are hospitalized due to severe diarrhea, lactose-free diet may be given to children who are predominantly bottle-fed to reduce treatment failure and decrease the duration of diarrhea.

What is the recommended diet for children with acute infectious diarrhea?



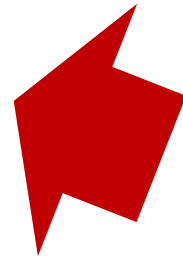
- No change from age-appropriate diet is recommended
- Diluted lactose milk is not recommended
- Restrictive diet such as BRAT (banana, rice, apple, tea) diet is not recommended because of the risk of malnutrition from its inadequate nutritional value

Do you recommend the BRAT diet?



Yes

No





Prevention

Interventions should be aimed at reducing subsequent episodes of diarrhea, malnutrition, and delays in physical and mental development



- Exclusive breastfeeding** until age six months, and continued breastfeeding with complementary foods until two years of age.
- The **consumption of safe food and water**. If available, water brought to a rolling boil for at least five minutes is optimal for preparing food and drinks for young children.
- Handwashing** after defecating, disposing of a child's stool, and before preparing meals.
- The **use of latrines**; these should be located more than 10 meters and downhill from drinking water sources

Food and Water-Borne Disease Prevention and Control Program



AO No. 29-A.s 1997

Interventions:

- institutionalization of Oral Rehydration Therapy (ORT) corners in both the hospitals and outpatient public health facilities for the immediate management and treatment of diarrhea cases
- integration of the identification and management of diarrhea among the children in the IMCI protocol
- design, installation and operationalization of a FWBD surveillance and response system to detect impending outbreaks and provide immediate investigation and response to these cases
- provision of drugs/medicines and supplies augmentation to identified local government units (LGUs) with high incidence of FWBDs
- developing clinic practice guidelines on the diagnosis, management and treatment of several FWBD

Summary



- Manage the child with diarrhea accordingly by identification of dehydration status and possible etiologic agent
- Ordering of laboratories is not routine for all patients
- Antibiotic therapy and other adjunct treatments should be used on a case to case basis
- Prevention and control of acute diarrheal diseases should include other non-health sectors



Thank you!

References



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- PSMID. (2017). The CPG on the Management of Acute Infectious Diarrhea in Children and Adults
- World Health Organization. (2014). Integrated Management of Childhood Illness