Introduction:

This document summarizes evidence from available Indian and International guidelines/ published reviews in clinical journals and medical books. It aids physicians and other caregivers in making appropriate diagnostic and therapeutic decisions in an outpatient setting. It provides a framework for managing patients with particular symptom or condition. It covers diagnosis, clinical assessment, alarm features, clinical management, and investigations at outpatient level and referral management to inpatient facility/ hospital.

Scope and objective:

- To provide evidence backed recommendations for the identification and care of children with diarrhea at outpatient clinic.
- To give physicians a practical approach and guide to the care of patients with diarrhea
- To develop a tool that can be used with medical documentation and therefore promote compliance with best practice to standardize clinical care for patients with diarrhea in an outpatient setting.

Target population:

Pediatric population with new onset of symptoms of diarrhea

Target Users:

- General Physicians
- Nurses
- Other health care professional
- Outpatient Clinics

The clinical protocol cover critical elements of patient care from patient's first visit to a physician, outpatient management, through to follow up and referral to inpatient facility/ hospital. The Clinical team can refer to these protocols and bibliography for detailed information.

Exclusions:

Children suffering from known underlying pathology have been excluded from the scope of this tool.

Disclaimer:

The clinical protocol are designed to be used by medical professionals licensed to practice in India as a guide and are not intended to substitute for informed medical decisions or judgment by a licensed medical professional.

Milliman

Pediatric Diarrhea: Outpatient Care Protocol

1. Introduction / definition *J1,J2,J3, J4, J5,J6, B1,B2,B3*

Diarrhea is defined as a recent change in consistency and character of stools with an increase in stool frequency to twice the usual number in infants or three or more loose stools per day in older children. In a breast fed infant it is defined as an increased frequency of stool as observed by the mother.

Note: *Normally, a young infant has about 5g / kg of stool output per day but stool output may increase to greater than 10g /kg / 24 hr in case of diarrhea in infants and children. Diarrhea is responsible for 19 percent of the deaths of children aged less than five years in developing countries.*

2. General presentation *J1,J2,J3, J4, J5, B3*

Child may present at the outpatient clinic with the following:

- Frequent watery or loose stool
- Associated conditions such as nausea, vomiting, fever and /or abdominal pain
- Poor feeding or excessive thirst
- Decreased urination
- Drowsiness or listlessness or irritability

3. Alarm features

In the presence of any of the alarm features the child should be assessed by the physician carefully and referral management along with supportive treatment should be initiated. The alarm features are:

- Not accepting any oral feed or refusing to feed for more than 6 hours
- Persistent vomiting
- Signs of severe dehydration. (*Refer to Table.1)*
- Signs of severe malnutrition. (*Refer to Table.2)*
- Significant weight loss of more than 9%
- Abdominal distension
- Convulsions or loss of consciousness

4. Clinical types of diarrhea *J1, J2, J5 ,J6, B2,B3*

Generally the management is based on the type of diarrhea. Clinical type of diarrhea can be determined by assessing the child so that an appropriate treatment plan can be developed and implemented without delay

- **Acute watery diarrhea:** Diarrhea without blood, with or without vomiting and fever. This can be managed at outpatient clinic by providing symptomatic treatment.
- **Dysentery:** Diarrhea with visible blood and mucus, tenesmus, fever and abdominal pain. This generally requires certain investigations for further treatment.
- **Persistent diarrhea:** Diarrhea of more than 14 days, with marked weight loss, with or without blood in stool. This condition is usually not managed at outpatient setting and is referred to hospital.

5. Risk factors:

- Malnutrition increases the risk for diarrhea
- Children < 2 years of age are susceptible to diarrhea due to Rota virus
- Poor hygiene
- Infants who are not exclusively breast fed
- Coexisting sepsis or infection

6. Clinical diagnosis:

The evaluation of diarrhea in children requires a careful review of medical history, a physical examination, and occasionally diagnostic testing.

6.1. History *J2, J5, B3*

Physician should include history of the following parameters to determine underlying pathology and rule out other causes.

Ask for:

- **Stool details**
  - Duration of symptoms and number of stools in the past 24hrs
  - Color and consistency of stools
  - Blood or mucus in stools
- **Associated symptoms**
  - Any changes in urine output
  - Presence and duration of fever
  - Association with vomiting, abdominal pain or tenesmus
- **Feeding history**
  - Feeding details on whether child is breastfeeding or taking other foods
  - Degree of reduction in appetite since onset of symptoms and whether feeding has been with-held.
  - Recent ingestion of contaminated food
- **Other**
  - Recent antibiotic treatment within past 2 months
  - Outbreak of diarrhea in the neighborhood
  - Weight of the child at birth and the latest weight being measured
  - Any existing disease condition celiac disease, cystic fibrosis, lactose intolerance, hirschsprung's disease, immunodeficient and immune compromised condition

Note: *Premorbid conditions should be considered in assessing the status of child*

6.2. Physical examination *J2,J3,J4,J5, B2,B3*

Clinician should carefully perform the physical examination and continuously observe the child for any warning signs. It is a critical step in establishing diagnosis and management thereon.

- **Check for:**
  - Vital Signs such as temperature, pulse, respiratory rate and blood pressure
  - Restlessness or irritability
  - Lethargy / reduced level of consciousness
  - Skin color
  - Temperature of the extremities
  - Depression of fontanel in infants to assess level of dehydration.
  - Abdominal mass, distension, tenderness, guarding etc

- **Assessment of Hydration status**
  - Assessment of hydration is a critical step in determining the well being of all children with diarrhea to provide appropriate treatment.

Table 1. Assessment of Hydration status

Physical Examination	**No Dehydration**	**Some Dehydration 2 or more signs)**	**Severe Dehydration 2 or more signs)**
General condition	Well, alert	Restless, irritable	Lethargic or unconscious
Eyes	Normal	Sunken	Sunken
Thirst	Drinks normally, not thirsty	Drinks eagerly, thirsty	Drinks poorly, not able to drink
Skin pinch (abdomen)	Goes back quickly (< 1sec)	Goes back slowly (1 to 2 sec)	Goes back very slowly (>2 sec)

Note:

- *Degree of dehydration can be determined by the presence of two or more signs at each level of hydration assessment.*
- *In some infants and children the eyes normally appear somewhat sunken. It is helpful to ask the mother if the child's eyes are normal or more sunken than usual.*
- *The mouth may always be dry in a child who habitually breathes through the mouth.*
- *The mouth may be wet in a dehydrated patient owing to recent vomiting or drinking.*
- *The skin pinch is less useful in infants or in children with marasmus or kwashiorkor or in obese children.*

- **Assessment of Weight loss** Normal weight minus weight after diarrhea)
  - Weight loss < 3% indicates no dehydration.
  - 3 to 8% weight loss indicates some dehydration
  - ≥ 9% weight loss indicates severe dehydration

Note: *Weight loss is useful in estimating the degree of dehydration if prior weight is known.*

- **Assessment of Nutritional status**

Nutritional status can be assessed by using any of the methods.

- **Height and Age method**
  Stunting percentage = Height of child / Height of a normal child of same age x 100

- **Height and Weight method**
  Wasting percentage = Weight of child / Weight of a normal child of same height x 100

Table 2. Nutritional status according to stunting and wasting percentage *B3*		
Nutritional Status	**Stunting %**	**Wasting %**
Normal	> 95	> 90
Mildly Impaired	87.5 to 95	80 to 90
Moderately impaired	80 to 87.5	70 to 80
Severely impaired	< 80	< 70

- **Arm / Head Circumference method**

Table 3. Nutritional status according to Arm/Head circumference ratio *B3*	
Ratio Arm/ Head Circumference	**Malnutrition**
0.280 to 0.314	Mild
0.250 to 0.279	Moderate
< 0.249	Severe

7. Investigations *J2,J3, J5,B2, B3*

Investigations are usually not required but may be required in some conditions to help determine the causative organism / pathology of illness and to determine the severity of condition.

7.1. Routine investigations

- CBC
- BUN and creatinine
- Serum electrolytes
- Blood gases
- X-ray chest and abdomen
- Microscopic examination of stool (Stool M / E)
- Stool culture
- Ova / Parasite Test

Note: Children with watery diarrhea, no fever and no dehydration, usually need no investigations.

7.1.1. Indications for routine investigations

- CBC, BUN and creatinine, serum electrolytes, blood gases and X-ray chest are indicated in severe dehydration, shock, suspected systemic infection, dysentery, persistent diarrhea
- Microscopic examination of stool (Stool M/E) is indicated in acute watery diarrhea with fever (to rule out bacterial / protozoal infection), diarrhea with tenderness on abdominal palpation (to rule out surgical causes) and dysentery (for blood in stool)
- Stool culture is indicated in frank bloody diarrhea, fever before onset of diarrhea or lasting more than 48hrs, tenesmus, severe or persistent symptoms, known exposure to a bacterial agent and presence of fecal leukocytes

- Ova / Parasite test is indicated in negative stool culture with persistent symptoms and persistent diarrhea

7.2. Additional investigations

- In persisting cases additional investigations as follows may be indicated.
  - Stool exam for phenolphthalein and magnesium sulphate
  - Clinitest or Benedict's test to detect lactose intolerance
  - Stool for clostridium difficile toxin
  - Endoscopic studies to rule out surgical or neoplastic causes
  - Small bowel biopsy to rule out surgical or neoplastic causes
  - Sigmoidoscopy or colonoscopy with biopsies to rule out surgical or neoplastic causes
  - Barium studies to rule out surgical or neoplastic causes

8. Differential Diagnosis*, J2, J5, J4, B3*

Physician should rule out other causes / conditions which are responsible for diarrhea:

- Infections such as urinary tract infections, pneumonia(fever predominates)
- Malabsorption (history of known cystic fibrosis, celiac disease)
- Food allergy or intolerance / lactose intolerance (vomiting, abdominal cramps, rashes, eczema, respiratory congestion or flu-like symptoms)
- Food poisoning (vomiting, abdominal cramps, nausea, recent history of contaminated food ingestion)
- Hemolytic-uremic syndrome (pallor, jaundice, oliguria / anuria, blood in stool),
- Antibiotic associated diarrhea: Diarrhea after a recent course up to 2 months of antibiotics, pseudomembranous colitis etc. (history of previous treatment, absence of infection)
- Immune deficiency disease, protein losing enteropathy, laxative abuse, motility disorders etc. (history, previous treatment and specific signs and symptoms)

9. Management of Diarrhea *J1,J2, J4,J5, J6,B1,B2,B3*

9.1. Principles of management

- Rehydration therapy
- Zinc supplements
- Drug therapy for underlying pathology and other symptomatic treatment
- Nutritional management
- Referral management if condition worsens or in presence of alarm features.

9.1.1. Rehydration Therapy

Rehydration therapy is necessary to replace fluid and electrolyte loss in children with diarrhea and is based on the assessment of severity of dehydration. Assessment of severity and correction of dehydration is the most important step in the management of diarrhea. Choice of fluid therapy depends on the severity and type of dehydration.

- **No Dehydration: WHO Plan A** *J2, J5, B3*
  - For exclusively breast-fed child, ORS /clean water in addition to breast milk can be given whereas for child not exclusively breast-fed, a combination of ORS solution and food-based

fluids like soup, rice water, yoghurt drinks and / or clean water in the form of frequent small sips can be given.

Table 4. Requirement of additional fluid according to age	
Age - up to 2 years	50 to 100 ml after each loose stool
Age - 2 years or more	100 to 200 ml after each loose stool

- **Some Dehydration: WHO Plan B**
  - In the first four hours, it is recommended to give the following amount of ORS, according to the child's weight or age (if the weight is not known). However, if the child is thirsty, more ORS should be given.
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Table 5. ORS recommended in the first four hours				
Weight	<6kg	6kg to 10kg	10kg to 12kg	12kg to 19kg
Age	Up to 4 months	4 to 12 months	12months-2 yrs	2yrs-5yrs
ORS in ml	200-400	400-700	700-900	900-1400

Note: *The approximate amount of ORS required in ml) can also be calculated by multiplying the child's weight in kg) by 75.*

  - If the child is < 2 years, a teaspoonful ORS should be given every 1-2 minutes. An older child may have frequent sips from a cup. .
  - If the child's eyelids become puffy, it is advisable to stop ORS and give plain water in older children or breast milk in breast-fed infants.
  - Hydration status of the child should be assessed every 4 hours or before and if hydration status worsens, treatment for severe dehydration should be started and should be referred immediately to the hospital.

- Severe **Dehydration: WHO Plan C**
  - The patient should be immediately started with intravenous (IV) rehydration therapy and referred to a hospital.

Table 6. IV fluid recommended according to age		
Age	Initially, **30 ml/kg** in:	Subsequently, **70 ml/kg** in:
<12 months	1 hr	5 hrs
≥12 months	30 minutes	2.5 hrs

Note: *The best IV fluid solution is Ringer's lactate solution also called Hartmann's solution for injection). If Ringer's lactate is not available, normal saline solution (0.9% NaCl) can be used. 5% glucose dextrose solution on its own is* ***not*** *effective and should not be used.*

  - Hydration status should be assessed at least every hour or more often. If it does not improve, IV fluids should be given more rapidly.

Note: *Sunken eyes recover more slowly than other signs and are less useful for monitoring.*

9.1.2. Zinc supplements: *J2, B3*

Zinc supplementation is recommended by WHO, UNICEF, and countries around the world for the treatment of all diarrhea episodes among children. It is believed to decrease the duration and

severity of diarrhea and the likelihood of future diarrhea episodes in the 2-3 months following supplementation.

Table 7. Dosage of zinc supplementation according to age	
Age - up to 6 months	1/2 tablet (10 mg) per day for 10–14 days
Age - 6 months or more	1 tablet (20 mg) per day for 10–14 days

9.1.3. Drug therapy in diarrhea *J2,J6,B1,B2, B3*

9.1.3.1. Antibiotics

Most cases of diarrhea are self-limiting and generally no medication is necessary except in a few cases. Physicians should emphasize on given elements when practicing:

- Majority of childhood diarrhea has viral origin and does not require treatment with antibiotics
- Physicians should encourage rational use of antibiotics to prevent emergence of multi resistant pathogens
- Antibiotic therapy depends on the results of stool culture specifying the causative organism responsible for the disease

Indications, contraindications and dosage of antibiotic therapy

Table 8. Antibiotic Therapy			
Causative Organism	**Drug of choice**	**Dosage**	**Contraindications**
Shigella	Cotrimoxazole (Trimethoprim and Sulfamethoxazole) OR* Ciprofloxacin (*Depending upon the sensitivity pattern of the region)	10 mg TMP and 50 mg SMX/ kg /day in 2 divided doses for 5 days 20mg /kg /day in 2 divided doses for 5 days	Cotrimoxazole is contraindicated in children below 2 months of age. Ciprofloxacin is contraindicated in children below 12 years of age.
V. cholerae	Doxycycline OR Furazolidone OR Cotrimoxazole	Single dose of 5mg/kg (maximum 200mg) 5-8mg /kg / day in 4 divided doses for 3 days 10 mg TMP and 50 mg SMX/ kg / day in 2 divided doses for 5 days	Doxycycline is contraindicated in children below 12 years of age. Furazolidone is contraindicated in children below 1 month of age. Cotrimoxazole is contraindicated in children below 2 months of age.
Entamoeba histolytica	Metronidazole (for invasive Amoebiasis) OR Diloxanide furoate (for luminal Amoebiasis)	15-20 mg / kg / day in 3 divided doses for 7-10days 20 mg /kg / day for 10 days	Metronidazole is contraindicated in the presence of any neurological disorders, blood dyscrasias and seizures. Diloxanide furoate is not given to children below 2 years of

			age.
Acute giardiasis	Metronidazole OR Tinidazole	15mg /kg / day in 3 divided doses for 5 days 10-15mg /kg / day in 3 divided doses for 5 days	Both metronidazole and tinidazole have the same contraindications as mentioned above.
Enteroinvasive E.coli	Cotrimoxazole, Trimethoprim and Sulfamethoxazole OR Ciprofloxacin	10 mg TMP and 50 mg SMX/ kg / day in 2 divided doses for 5 days 20mg /kg /day in 2 divided doses for 5 days	Cotrimoxazole is contraindicated in children below 2 months of age. Ciprofloxacin is contraindicated in children below 12 years of age.
Campylobacter jejuni	Antibiotics are not necessary		
Non-typhoid salmonella	Ampicillin	50-100 mg /kg / day 6hourly	None

Other Drugs

- Drugs such as anti motility agents, anti secretary agents, binding agents do not offer any significant benefits in diarrhea and should not be recommended
- Anti spasmodic drugs should never be indicated for the treatment of acute diarrhea in children. However in those with diarrhea accompanied with abdominal cramps or spasms it may be given
- Antiemetics are not recommended in the treatment of acute pediatric diarrhea. However in the presence of nausea and vomiting antiemetics such as ondansetron used in a single dose was found to be effective in reducing need for IV therapy and enhancing oral rehydration therapy.
- Intra venous antibiotics should be reserved for children who cannot tolerate oral drugs and for those who are suspected to have sepsis
- If the child continues to vomit, non-sedative anti emetics could be used such as domperidone in the dose of 10-20 mg 3-4 times daily.

9.1.4. Nutritional management: *J 5,J6,B3*

Early nutritional supplementation should be recommended as nutritional status is an important determinant of diarrheal duration and severity of condition.

- Breast-fed infants: Continue breast-feeding as recommended.
- Nutritional advice during rehydration phase:
  - Non-breastfed infants: Only ORS for the first 4 hours followed by ORS and freshly prepared cooked, mashed or ground food every 3 to 4 hours. Recommended foods are cereal or other starchy food mixed with pulses, vegetables and meat or fish with 1 to 2 teaspoons of vegetable oil added to each serving.
- Nutritional advice after rehydration phase:
  - Infants 6-12 months: Easily digestible energy rich complementary foods in addition to breast/animal milk. Additional meals are recommended at least 3 times a day in breast-fed, and 5 times a day in non breastfed infants.

- Older children: Thick preparation of staple food with extra vegetable oil or animal fats, rich in potassium legumes, banana) and carotene dark green leafy vegetables, red palm oil, carrot, pumpkin). The child should be encouraged to eat at least 6 times a day.

10. Follow up:

- Educate the caregiver to immediately return to the physician if warning signs appear (*Refer to patient advisory).*
- Inform about the next timely follow up visit *(Refer to patient advisory).*

11. Quality indicators

The quality indicators that are important in documenting the adherence to policy in the management of pediatric diarrhea are:

- ORS given as the first line of treatment in mild to moderate diarrhea
- Referral management for alarm features
- Zinc supplement added to the treatment
- Nutrition management advice given

12. Patient advice:

Patient education must be reinforced about the disease, its causes, alarm features, prevention, treatment, zinc supplementation and when to seek help.

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