Diarrhea may be mild to severe and it may be acute or chronic. It may result in mild to severe dehydration.

- Acute diarrhea may follow secondary to an upper respiratory or urinary tract infection or antibiotic use.
- Acute infectious diarrhea (infectious gastroenteritis) is a result of various bacterial, viral, and/or parasitic infections. The onset of gastroenteritis is often abrupt with rapid loss of fluids and electrolytes from persistent vomiting and diarrhea.
- Chronic diarrhea is related to chronic conditions (malabsorption syndrome, lactose intolerance, food allergies, inflammatory bowel disease).

**Assessment**

- **Risk Factors**
  - Exposure to causative agent, recent travel
  - Risk factors for *Enterobius vermicularis* (pinworm) include crowded places (school, day care) or crowded living spaces (such as more than one family living together).

- **Subjective and Objective Data**
  - Reports of fatigue, malaise, change in behavior, change in stool pattern, poor appetite, weight loss, and pain
  - Assess for signs and symptoms of dehydration.
    - Dry, pale skin
    - Cool lips
    - Dry mucous membranes
    - Decreased skin turgor
    - Diminished urinary output
    - Concentrated urine
    - Thirst
    - Rapid pulse
- Sunken fontanels
- Decreased blood pressure

### SIGNS AND SYMPTOMS OF SPECIFIC PATHOGENS

<table>
<thead>
<tr>
<th>PATHOGEN</th>
<th>MANIFESTATIONS</th>
<th>TRANSMISSION/INCUBATION</th>
</tr>
</thead>
</table>
| Rotavirus | - Commonly causes diarrhea in young children  
- Induces fever and vomiting for 2 days  
- Produces watery diarrhea for 5 to 7 days | - Transmission is fecal-oral.  
- The incubation period is 48 hr. |
| *Escherichia coli* (E. coli) | - Causes watery diarrhea for 1 to 2 days, followed by abdominal cramping and bloody diarrhea  
-Could lead to hemolytic uremic syndrome (HUS) | - Transmission depends on the strain of *E. coli*.  
- The incubation period is 3 to 4 days. |
| *Salmonella* nontyphoidal groups | - Causes nausea, vomiting, abdominal cramping, bloody diarrhea, and fever (may be afebrile in infants)  
- Causes headache, confusion, drowsiness, and seizures  
-May lead to meningitis or septicemia | - Transmission occurs from person to person, but also from undercooked meats and poultry.  
- The incubation period is 6 to 72 hr. |
| *Clostridium difficile* (C. difficile) | - Causes mild, watery diarrhea for a few days  
- May cause less severe symptoms in children than adults  
- May cause leukocytosis, hypoalbuminemia, and high fever in certain children  
-May lead to pseudomembranous colitis | - Transmission occurs through contact with colonized spores, and it is commonly transmitted in health care settings.  
- There is a nonspecified incubation period. |
| *Clostridium botulinum* (C. botulinum) | - Causes abdominal pain, cramping, and diarrhea  
- May cause respiratory compromise or CNS symptoms | - Transmission occurs through contaminated food products.  
- The incubation period is 12 to 26 hr. |
<table>
<thead>
<tr>
<th>PATHOGEN</th>
<th>MANIFESTATIONS</th>
<th>TRANSMISSION/INCUBATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staphylococcus</td>
<td>• Causes food poisoning resulting in severe diarrhea, nausea, and vomiting</td>
<td>• Transmission occurs through food that is inadequately cooked or refrigerated.</td>
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<td></td>
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<td>• The incubation period is 1 to 8 hr.</td>
</tr>
<tr>
<td>Enterobius vermicularis (pinworm)</td>
<td>• Causes perianal itching, enuresis, sleeplessness, restlessness, and irritability due to itching</td>
<td>• Transmission is fecal-oral with infestation beginning when eggs are inhaled or swallowed.</td>
</tr>
<tr>
<td>(pinworm) is a parasitic worm that</td>
<td></td>
<td></td>
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<tr>
<td>is white, threadlike, and</td>
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<tr>
<td>approximately 1/3 to 1/2 inch long.</td>
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<tr>
<td>Giardia lamblia</td>
<td>• Causes the following in children 5 years of age or younger:</td>
<td></td>
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<tr>
<td></td>
<td>o Diarrhea o Vomiting o Anorexia</td>
<td></td>
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<td></td>
<td>• Causes the following in older children:</td>
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<td></td>
<td>o Abdominal cramps o Intermittent loose, malodorous, pale, greasy stools</td>
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<td></td>
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<td>• Transmission occurs from person to person.</td>
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<td></td>
<td></td>
<td>• The nonmotile stage of protozoa may survive in the environment for months.</td>
</tr>
</tbody>
</table>

- Laboratory Tests
  - Perform a CBC with differential to determine anemia and/or infection.
  - Hct, Hgb, BUN, creatinine, and urine-specific gravity levels are usually elevated with dehydration.
  - Stool test for occult blood.
  - Perform a urinalysis.

- Diagnostic Procedures
  - Tape test
    - A tape test should be performed to check for *Enterobius vermicularis*.
    - Nursing Actions
      - Provide instructions to the parents.
Client Education

- Tell the parents to place transparent tape over the child’s anus at night. The tape should be removed the following morning prior to the child toileting or bathing. If possible, have the parent apply the tape after the child has gone to sleep and remove it before the child awakens.
- Inform the parents that the specimen should be brought to the laboratory for microscopic evaluation.
- Teach the parents to use good hand hygiene during this procedure.

Infectious gastroenteritis

- Rotavirus – Enzyme immunoassay (stool sample)
- *E. coli* – Sorbitol-MacConkey agar (stool sample)
- Salmonella – Gram-stained stool culture
- *C. difficile* – Stool culture
- *C. botulinum* – Blood and stool culture
- Staphylococcus – Identification of organism in stool, blood, food, or aspirate
- *G. lamblia* – Enzyme immunoassay (stool sample)

Collaborative Care

- Nursing Care
  - Obtain baseline height and weight.
  - Obtain daily weights at the same time each day.
  - Avoid taking a rectal temperature.
  - Assess and monitor I&O (urine and stool).
  - Initiate IV fluids as ordered.
  - Administer antibiotic as prescribed.
  - Administer oral rehydration therapy (ORT).

- Start replacement with an oral replacement solution (ORS) of 75 to 90 mEq of Na+\(^+/L\) at 40 to 50 mL/kg over 4 hr.

- Determine the need for further rehydration after initial replacement.
  - Initiate maintenance therapy with ORS of 40 to 60 mEq of Na+\(^+/L\) and limit to 150 mL/kg/day.
    - Give ORS alternately with appropriate intake.
      - Give infants water, breast milk, or lactose-free formula if supplementary fluid is needed.
      - Older children may resume their regular diets for additional intake.
    - Replace each diarrheal stool with 10 mL/kg of ORS for ongoing diarrhea.
• Medications
  o Metronidazole (Flagyl) and tinidazole (Tindamax)
    ▪ Indicated for *C. difficile* and *G. lamblia*
    ▪ Nursing Considerations
      □ Monitor for allergies.
      □ Monitor for GI upset.
    ▪ Client Education
      □ Instruct the client to take the medication as prescribed and to report any GI disturbances.
  o Mebendazole (Vermox), albendazole (Albenza), and pyrantel pamoate (Pin-Rid, Antiminth) – Indicated for *Enterobius vermicularis*
    ▪ Nursing Considerations
      □ Administer in a single dose that may need to be repeated in 2 weeks.
      □ Administer mebendazole for children older than 2 years of age.
    ▪ Client Education
      □ Instruct the family that the medication may need to be repeated within 3 weeks.
• Care After Discharge
  o Client Education
    ▪ Have the parents inform the child’s school or day care center of the infection/infestation. The child should stay home during the incubation period.
    ▪ Teach the family to use commercially prepared ORS when the child experiences diarrhea. Foods and fluids to avoid include:
      □ Fruit juices, carbonated sodas, and gelatin, which all have high carbohydrate content, low electrolyte content, and a high osmolality
      □ Caffeine, due to its mild diuretic effect
      □ Chicken or beef broth, which has too much sodium and not enough carbohydrates
      □ Bananas, rice, applesauce, and toast (BRAT diet)
        ▪ This diet has low nutritional value, high carbohydrate content, and low electrolytes.
    ▪ Provide frequent skin care to prevent skin breakdown.
    ▪ Teach the family how to avoid the spread of infectious diseases.
      □ Change bed linens and underwear daily for several days.
      □ Cleanse toys and child care areas thoroughly to prevent further spread or reinfestation.
Keep toys separate and avoid shaking linens to prevent the spread of disease.

- Shower frequently.
- Avoid undercooked or under-refrigerated food.
- Perform proper hand hygiene after toileting and after changing diapers.
- Do not share dishes and utensils. Wash them in hot, soapy water or in the dishwasher.
- Clip nails and discourage nail biting and thumb sucking.
- Clean toilet areas.

- Client Outcomes
  - The child will remain free of infection.
  - The child will maintain adequate hydration

Complications

- Dehydration

<table>
<thead>
<tr>
<th>TYPE OF DEHYDRATION</th>
<th>MANIFESTATIONS</th>
</tr>
</thead>
</table>
| Isotonic            | • Water and sodium are lost in nearly equal amounts.  
                     | • Major loss of fluid from extracellular fluid leads to a reduced volume of circulating fluid. 
                     | • Hypovolemic shock may result. 
                     | • Serum sodium is within normal limits (130 to 150 mEq/L). |
| Hypotonic           | • Electrolyte loss is greater than water loss. 
                     | • Water changes from extracellular fluid to intracellular fluid. 
                     | • Physical manifestations are more severe with smaller fluid loss. 
                     | • Serum sodium is less than 130 mEq/L. |
| Hypertonic          | • Water loss is greater than electrolyte loss. 
                     | • Fluid shifts from intracellular to extracellular. 
                     | • Shock is less likely. 
                     | • Neurologic changes (change in level of consciousness, irritability, hyperreflexia) may occur. 
                     | • Serum sodium concentration is greater than 150 mEq/L. |
### Level of Dehydration

<table>
<thead>
<tr>
<th>Level</th>
<th>Weight Loss</th>
<th>Manifestations</th>
</tr>
</thead>
</table>
| Mild   | 5% in infants 3% to 4% in children               | • Behavior, mucous membranes, anterior fontanel, pulse, and blood pressure are all within normal limits.  
• Capillary refill is greater than 2 seconds.  
• Slight thirst may be experienced.  
• Urine-specific gravity is greater than 1.020. |
| Moderate| 10% in infants 6 to 8% in children                | • Capillary refill is between 2 and 4 seconds.  
• Thirst and irritability may be experienced.  
• Pulse is slightly increased with normal to orthostatic blood pressure.  
• Mucous membranes are dry and tears and skin turgor are decreased.  
• Urine-specific gravity is greater than 1.020 (oliguria). |
| Severe | 15% in infants 10% in children                    | • Capillary refill is greater than 4 seconds.  
• Tachycardia is present and orthostatic blood pressure may progress to shock.  
• Extreme thirst is present.  
• Mucous membranes are very dry and skin is tented.  
• The anterior fontanel is sunken.  
• Oliguria or anuria is present. |

**Nursing Actions**
- Administer IV fluids as prescribed (usually dextrose 5% in a saline solution).
- Provide fluid replacement rapidly for isotonic and hypotonic dehydration, but provide fluid replacement for 24 to 48 hr for hypertonic dehydration to prevent cerebral edema.
- Avoid antiemetics because vomiting usually resolves with treatment of dehydration.
- Determine the cause of diarrhea. Antibiotics are usually reserved for children who are immunocompromised.

**Client Education**
- Teach the client to monitor weight daily.
- Teach the client to consume small amounts of liquids several times a day to prevent vomiting.
Scenario: A 5-month-old infant who is lethargic is brought to the emergency department by his parents. The parents tell the nurse that the infant has experienced fever, vomiting, and diarrhea for the past 2 days. They also state that the child is unable to tolerate clear liquids. The nurse suspects gastroenteritis.

1. Indicate the findings the nurse should anticipate when completing the infant’s head-to-toe admission assessment?

<table>
<thead>
<tr>
<th>ASSESSMENT</th>
<th>FINDINGS</th>
</tr>
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<tbody>
<tr>
<td>Level of consciousness</td>
<td></td>
</tr>
<tr>
<td>Head</td>
<td></td>
</tr>
<tr>
<td>Lung fields</td>
<td></td>
</tr>
<tr>
<td>Cardiovascular system</td>
<td></td>
</tr>
<tr>
<td>Abdomen</td>
<td></td>
</tr>
<tr>
<td>Urinary status</td>
<td></td>
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<tr>
<td>Bowel status</td>
<td></td>
</tr>
<tr>
<td>Activity level</td>
<td></td>
</tr>
<tr>
<td>Nutrition/fluid intake</td>
<td></td>
</tr>
<tr>
<td>Skin turgor</td>
<td></td>
</tr>
</tbody>
</table>

2. The infant weighed 9.1 kg (20 lb) before the onset of symptoms. During the assessment, his weight is recorded as 8.2 kg (18 lb). His capillary refill takes about 3 seconds, and his skin turgor is decreased. Based on this information, the nurse should assess his level of dehydration as

A. none.
B. mild.
C. moderate.
D. severe.
3. The infant’s stool cultures are returned with a diagnosis of rotavirus. The parents state that they also have a 2-year-old child at home and are afraid of spreading the disease. What suggestions should the nurse give to the parents that will be most beneficial to them?

4. A child has lost electrolytes and some water through vomiting. The child’s serum sodium is 115 mEq/L. The nurse determines that the child is ________________.

5. Which of the following fluids is an appropriate choice for rehydrating a child who has experienced diarrhea due to *E. coli* for the past 3 days?
   A. Oral rehydration therapy
   B. IV isotonic saline with glucose
   C. Gelatin
   D. Chicken broth

6. Which of the following findings demonstrated by a child should cause the nurse to suspect the presence of *Enterobius vermicularis* (pinworm)?
   A. Bloody diarrhea
   B. Perianal itching
   C. Moderate dehydration
   D. Abdominal pain
Scenario: A 5-month-old infant who is lethargic is brought to the emergency department by his parents. The parents tell the nurse that the infant has experienced fever, vomiting, and diarrhea for the past 2 days. They also state that the child is unable to tolerate clear liquids. The nurse suspects gastroenteritis.

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<tr>
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<tr>
<td>Level of consciousness</td>
<td>Irritable and lethargic</td>
</tr>
<tr>
<td>Head</td>
<td>Sunken fontanel and pale, sunken eyes</td>
</tr>
<tr>
<td>Lung fields</td>
<td>Clear with no retractions or nasal flaring; good air exchange</td>
</tr>
<tr>
<td>Cardiovascular system</td>
<td>Low blood pressure; increased pulse that is thready in nature</td>
</tr>
<tr>
<td>Abdomen</td>
<td>Distended; hyperactive bowel sounds; infant cries upon palpation; infant verbalizes cramping or displays discomfort by crying and hunching over</td>
</tr>
<tr>
<td>Urinary status</td>
<td>Diminished urine output; concentrated urine when wet; elevated specific gravity</td>
</tr>
<tr>
<td>Bowel status</td>
<td>Frequent stools; watery stool consistency with a greenish appearance; possible blood-tinged stool that is foul smelling</td>
</tr>
<tr>
<td>Activity level</td>
<td>Lethargic; infant wants to be held by parents and is not interested in surroundings</td>
</tr>
<tr>
<td>Nutrition/fluid intake</td>
<td>Disinterested and unable to tolerate formula/breast milk and/or clear liquids</td>
</tr>
<tr>
<td>Skin turgor</td>
<td>Tented; poor turgor; excoriated in diaper area</td>
</tr>
</tbody>
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NCLEX® Connection: Physiological Adaptation, Infectious Disease
2. The infant weighed 9.1 kg (20 lb) before the onset of symptoms. During the assessment, his weight is recorded as 8.2 kg (18 lb). His capillary refill takes about 3 seconds, and his skin turgor is decreased. Based on this information, the nurse should assess his level of dehydration as

A. none.
B. mild.
C. moderate.
D. severe.

The infant has moderate dehydration because he has lost about 10% of his body weight, his capillary refill takes 3 seconds or slightly longer, and decreased skin turgor is present. With mild dehydration, weight loss is around 5%, and other parameters may be slightly higher than what is expected for the infant, but they will still be within normal limits. In severe dehydration, 15% of body weight is lost, capillary refill takes more than 4 seconds, and tenting of the skin is seen when turgor is assessed.

NCLEX® Connection: Physiological Adaptation, Fluid and Electrolyte Imbalances

3. The infant’s stool cultures are returned with a diagnosis of rotavirus. The parents state that they also have a 2-year-old child at home and are afraid of spreading the disease. What suggestions should the nurse give to the parents that will be most beneficial to them?

- Perform frequent hand hygiene. Wash hands after each diaper change and when coming into close contact with other children.
- Disinfect the area around the child and/or keep the sick child in one area when sleeping and/or playing.
- Place dirty diapers in a closed receptacle.
- Wash any soiled sheets immediately.
- Do not share cups or utensils among family members. Wash utensils in hot, soapy water or place in dishwasher.

NCLEX® Connection: Physiological Adaptation, Infectious Disease

4. A child has lost electrolytes and some water through vomiting. The child’s serum sodium is 115 mEq/L. The nurse determines that the child is _____________.

Hypotonic

The child has hypotonic dehydration with net loss of more electrolytes than water (hyponatremia). In hypertonic dehydration, water loss is much more than electrolyte loss, and hypernatremia results. In isotonic dehydration, electrolytes and sodium are lost in equal amounts and serum sodium levels are normal.

NCLEX® Connection: Physiological Adaptation, Fluid and Electrolyte Imbalances
5. Which of the following fluids is an appropriate choice for rehydrating a child who has experienced diarrhea due to *E. coli* for the past 3 days?

   **A. Oral rehydration therapy**
   B. IV isotonic saline with glucose
   C. Gelatin
   D. Chicken broth

   Oral rehydration solution is made specifically for replacing water and electrolytes lost during diarrhea. It is less expensive and will be less painful than IV therapy. Gelatin is high in carbohydrates, is low in electrolytes, and has a high osmolality; therefore, it is ineffective for rehydration. Broth is high in sodium and has no carbohydrates.

   **NCLEX® Connection: Physiological Adaptation, Illness Management**

6. Which of the following findings demonstrated by a child should cause the nurse to suspect the presence of *Enterobius vermicularis* (pinworm)?

   A. Bloody diarrhea
   **B. Perianal itching**
   C. Moderate dehydration
   D. Abdominal pain

   Severe perianal itching is a common symptom of pinworm infestation. Other symptoms include enuresis, irritability, restlessness, and difficulty sleeping. None of the other findings indicate pinworm infestation.

   **NCLEX® Connection: Physiological Adaptation, Infectious Disease**