

# Pediatric IV Fluid Guidelines

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An Intravenous (IV) fluid is a liquid substance that is delivered directly into a patient's bloodstream through a vein using a needle or catheter. These fluids are used to provide necessary hydration, medications, and nutrients to patients who are unable to take these substances orally.

These general guidelines for pediatric IV fluid administration and management are based on the works of Kight and Waseem (2023).

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## Pediatric IV fluid management

### Emergent intravenous fluid administration

Emergent intravenous fluid administration is necessary if there are signs of inadequate or poor perfusion, indicated by delayed capillary refill, tachycardia, poor color, oliguria, or hypotension.

### Treatment recommendations

Treatment recommendations are based on assessing dehydration severity. Frequent monitoring of vital signs and physical exams helps guide this assessment. Normal mucous membranes and absence of sunken eyes reduce the likelihood of significant dehydration.

Labs generally play a limited role, except for measuring electrolytes for sodium imbalance. Monitoring electrolytes in patients unable to eat, especially young children, can determine the need for dextrose in fluids. BUN partially correlates with dehydration but is non-specific. The most useful lab test is bicarb less than 17 mEq/L.

### Oral rehydration

Oral rehydration is the preferred method for managing mild to moderate dehydration, assuming no contraindications exist. It is unsuitable for children experiencing severe dehydration or shock and should be avoided in cases of circulatory instability, altered mental status, persistent vomiting, bloody diarrhea, acute abdomen, intestinal obstruction, paralytic ileus, hyponatremia, significant underlying illness, or severe respiratory distress.

### Enteral hydration

In dehydrated children, there are various methods for enteral hydration and different solutions for intravenous fluid replacement when needed. Alternative methods of enteral hydration:

- Nasogastric tube
- Nasoduodenal tube
- Orogastric tube
- Gastric tube
- Gastrojejunal tube
- Normal plasma sodium levels range from 135 to 144 mEq/L.
- Normal saline has a plasma sodium concentration of 154 mEq/L, with 1/2 and 1/4 normal saline containing fractions of 154 mEq/L.
- Lactated Ringer's has a sodium concentration of 131 mEq/L.

## Treating dehydration

Treating dehydration involves three key steps: correcting fluid deficit, which includes fluid loss; maintenance therapy, addressing the physiological needs for fluids and electrolytes; and sustained replacement of ongoing fluid losses.

The recommended dosage for oral fluids is 50 to 100 mL/kg over a span of 2 to 4 hours. It is advised to use an oral rehydration solution instead of plain water or commercial sports drinks.

## Using IV fluids

Intravenous fluid administration is typically used when oral rehydration fails. This method is often more effective for infants and young children, especially with vomiting and diarrhea. Severe dehydration, indicated by oliguria, also requires IV fluids. Children in shock or with respiratory distress should receive IV fluids for rapid restoration of intravascular volume and adequate tissue perfusion.

## Nasogastric administration

Nasogastric administration provides an effective alternative for rehydration, offering similar rates and fluids as oral administration. Utilizing an evidence-based algorithm guided by the clinical dehydration score can significantly reduce the need for intravenous fluids and shorten emergency room stays.

## Isotonic solutions

An isotonic solution should be administered to correct volume depletion, irrespective of plasma sodium concentration. Regular and frequent re-evaluations are necessary to ensure the proper fluid volume is being provided.

## Fluid bolus

A fluid bolus should be rapidly infused at 10 to 20 mL/kg of isotonic saline (0.9%). This should be given over 20 minutes in children with moderate dehydration and as fast as possible for severe dehydration. Avoid using hypotonic or dextrose-containing fluids for bolus unless correcting hypoglycemia.

A single 20-mL/kg bolus improves circulation but may not normalize hemodynamic status, so it can be repeated as needed until adequate perfusion is restored, with careful monitoring of clinical condition and vital signs.

Improvement in clinical status and resolution of dehydration signs like tachycardia and dry mucous membranes can be easily monitored. A fluid requirement of over 60 mL/kg without clinical improvement suggests other causes, such as septic shock or hemorrhage.

## Dextrose

In children not consuming sufficient calories orally, 5% dextrose (D5) should be included in their maintenance fluids. If hypoglycemia occurs, it should be promptly and properly corrected.

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## Reference

Kight, B. P., & Waseem, M. (2023, February 28). *Pediatric fluid management*. PubMed; StatPearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK560540/>