

## **Fever in children**

**FEVER OVERVIEW** — Fever is a normal response to a variety of conditions, the most common of which is infection. Fever occurs when the body's temperature is elevated as a result of the body's thermostat being reset to a higher-than-usual temperature.

Nearly every child will develop a fever at some point. The challenge for parents is to know when to be concerned. This topic review will discuss the definition of a fever, how to accurately measure a child's temperature, how and when to treat fever, and signs and symptoms that require further evaluation.

**FEVER DEFINITION** — Because of the normal variation in body temperature, there is no single value that is defined as fever. However, the following are generally accepted values:

- Rectal temperature above 100.4°F (38°C)
- Oral temperature above 100°F (37.8°C)
- Axillary (armpit) temperature above 99°F (37.2°C)
- Ear (tympanic membrane) temperature above 100.4°F (38°C) in rectal mode or 99.5°F (37.5°C) in oral mode
- Forehead (temporal artery) temperature above 100.4°F (38°C)

Axillary, ear, and forehead temperature measurements are easier to obtain than rectal or oral temperatures, but they are less accurate and may need to be confirmed rectally or orally in certain children.

**FEVER CAUSES** — Infection is the most common cause of fever in children. Common viral and bacterial illnesses like colds, gastroenteritis, ear infections, croup, bronchiolitis, and urinary tract infections are the most likely illnesses to cause fever. (See ["Patient information: The common cold in children"](#) and ["Patient information: Nausea and vomiting in infants and children"](#) and ["Patient information: Ear infections \(otitis media\) in children"](#) and ["Patient information: Croup in infants and children"](#) and ["Patient information: Bronchiolitis \(and RSV\) in infants and children"](#) and ["Patient information: Urinary tract infections in children"](#).)

Although teething may be associated with fever, temperatures higher than 102°F (38.9°C) are unlikely to be related to teething.

Bundling a child who is less than three months old in too many clothes or blankets can increase the child's temperature slightly. However, a rectal temperature of 101°F (38.5°C) or greater is not likely to be related to bundling and should be evaluated (see ["Evaluation recommended"](#) below).

Some childhood immunizations can cause fever. The timing of the fever varies, depending upon which vaccination was given. (See ["Patient information: Vaccines for infants and children age 0 to 6 years"](#).)

**HOW DO I MEASURE MY CHILD'S TEMPERATURE?** — The best way to measure a child's temperature depends upon several factors. In all children, a rectal temperature is the most accurate. However, it is possible to accurately measure the temperature in the mouth (for children older than four or five years) when the proper technique is used.

Temperatures measured in the armpit are less accurate but may be useful as a first test in an infant who is younger than three months or an older child who cannot hold the thermometer under his or her tongue. If the armpit temperature is over 99°F (37.2°C), the rectal temperature should be measured.

Temperatures measured in the ear or on the forehead also are less accurate than temperatures measured rectally or orally and may need to be confirmed by one of these methods.

It is not accurate to measure a child's temperature by feeling the child's skin. This is called a tactile temperature, and it is highly dependent upon the temperature of the person who is feeling the child's skin.

**Glass versus digital thermometers** — Digital thermometers are inexpensive, widely available, and the most accurate way to measure temperature. A variety of styles are available.

Glass thermometers that contain mercury are not recommended due to the potential risks of exposure to mercury (which is toxic) if the thermometer is broken. If a digital thermometer is not available, be sure to carefully "shake down" the glass thermometer before use. Instructions for disposing of thermometers that contain mercury are available online ([www.epa.gov/mercury/spills/index.htm](http://www.epa.gov/mercury/spills/index.htm)).

Other types of thermometers are available, including plastic strip and pacifier thermometers. However, these are not as accurate as digital thermometers and are not recommended.

### **Rectal temperature**

- The child or infant should lie down on his or her stomach across an adult's lap.
- Apply a small amount of petroleum jelly (eg, Vaseline®) to the end of the thermometer.
- Gently insert the thermometer into the child's anus until the silver tip of the thermometer is not visible (1/4 to 1/2 inch inside the anus) ([figure 1](#)).
- Hold the thermometer in place. A glass thermometer requires two minutes, while most digital thermometers need less than one minute.

**Oral temperature** — Do not measure the temperature in a child's mouth if he or she has consumed a hot or cold food or drink in the last 30 minutes.

- Clean the thermometer with cool water and soap. Rinse with water.
- Place the tip of the thermometer under the child's tongue toward the back. Ask the child to hold the thermometer with his or her lips.
- Keep the lips sealed around the thermometer. A glass thermometer requires about three minutes, while most digital thermometers need less than one minute.

### **Armpit temperature**

- Place the tip of the thermometer in the child's dry armpit.
- Hold the thermometer in place by holding the child's elbow against the chest for four to five minutes.

**Ear temperature** — Ear thermometers are not as accurate as rectal or oral thermometers. If the child has been outside on a cold day, wait 15 minutes before measuring the ear temperature. Ear tubes and ear infections do not affect the accuracy of an ear temperature.

- To measure temperature accurately in the ear, the parent must pull the child's outer ear backward before inserting the thermometer ([figure 2](#)).
- Hold the ear probe in the child's ear for about two seconds.

**SHOULD I TREAT MY CHILD'S FEVER?** — There are pros and cons of treating fever. Fever may play a role in fighting infection, but it can also make a child uncomfortable.

The height of a child's fever is not always the best indicator of whether the child needs to be treated and/or evaluated. Instead, it is important to note how a child behaves and appears. Fever is usually accompanied by other symptoms. Some of these symptoms require evaluation by a healthcare provider, even if there is no fever. The table provides a list of some of these symptoms ([table 1](#)).

In most cases, a child with a fever can be observed and/or treated at home. However, it is important for parents to know when a child with a fever needs to be evaluated by a healthcare provider, when fever should be treated, and when it is reasonable to observe the child without treating the fever.

The guidelines provided below are general guidelines that do not apply to every situation; parents who have questions or are concerned about their child should contact their child's healthcare provider for advice.

**Evaluation recommended** — A healthcare provider should be consulted in the following situations:

- Infants who are less than three months of age who have a rectal temperature of 100.4°F (38°C) or greater, regardless of how the infant appears (eg, even well-appearing young infants should be evaluated).
- Children who are three months to three years who have a rectal temperature of 100.4°F (38°C) or greater for more than three days or who appear ill (eg, fussy, clingy, refusing to drink fluids).
- Children who are 3 to 36 months who have a rectal temperature of 102°F (38.9°C) or greater.
- Children of any age whose oral, rectal, tympanic membrane, or forehead temperature is 104°F (40°C) or greater or whose axillary temperature is 103°F (39.4°C) or greater.
- Children of any age who have a febrile seizure. Febrile seizures are convulsions that occur when a child (between six months and six years of age) has a temperature greater than 100.4°F (38°C). (See "[Patient information: Febrile seizures](#)".)
- Children of any age who have recurrent fevers, even if the fevers last only a few hours.
- Children of any age who have a fever and have a chronic medical problem such as heart disease, cancer, lupus, or sickle cell anemia.
- Children who have a fever as well as a new skin rash.

**Treatment recommended** — Treatment of fever is recommended if a child has an underlying medical problem, including diseases of the heart, lung, brain, or nervous system. In children who have had febrile

seizures in the past, treatment of fever has not been shown to prevent seizures, but is still a reasonable precaution.

Treatment of fever may be helpful if the child is uncomfortable, although it is not necessary.

**Treatment not required** — In most cases, it is not necessary to treat a child's fever. A child older than three months who has a rectal temperature less than 102°F (38.9°C) and who is otherwise healthy and acting normally does not require treatment for fever.

Parents who are unsure if their child's fever needs treatment should contact the child's healthcare provider. (See '[Evaluation recommended](#)' above.)

## **FEVER TREATMENT OPTIONS**

**Medications** — The most effective way to treat fever is to use a medication such as [acetaminophen](#) (sample brand name: Tylenol®) or [ibuprofen](#) (sample brand names: Advil®, Motrin®). These treatments can reduce the child's discomfort and lower the child's temperature by 2 to 3°F (1 to 1.5°C). Aspirin is not recommended for children under age 18 years due to concerns that it can cause a rare but serious illness known as Reye syndrome.

[Acetaminophen](#) may be given every four to six hours as needed, but should not be given more than five times in a 24-hour period. Acetaminophen should not be used in children younger than three months of age. The dose of acetaminophen should be calculated based upon the child's weight (not age).

[Ibuprofen](#) may be given every six hours. Ibuprofen should not be used in children younger than six months of age. The dose of ibuprofen should be calculated based upon the child's weight (not age).

Giving combinations of [acetaminophen](#) and [ibuprofen](#) or alternating acetaminophen and ibuprofen increases the chance of giving the wrong dose of one or the other of the medications.

Fever-reducing medications should only be given as needed, and discontinued once bothersome symptoms have resolved.

**Increase fluids** — Having fever can increase a child's risk of becoming dehydrated. To reduce this risk, parents should encourage their child to drink an adequate amount of fluids. Children with fever may not feel hungry, and it is not necessary to force them to eat. However, fluids such as milk (cow's or breast), formula, and water should be offered frequently. Older children may eat flavored gelatin, soup, or frozen popsicles. If the child is unwilling or unable to drink fluids for more than a few hours, the parent should consult the child's healthcare provider.

**Rest** — Having a fever causes most children to feel tired and achy. During this time, parents should encourage their child to rest as much as the child wants. It is not necessary to force the child to sleep or rest if he or she begins to feel better. Children may return to school or other activities when the temperature has been normal for 24 hours.

**Sponging and baths** — Sponging is not as effective as antifever medications and generally is not recommended.