



The Doctor Is In

By Dr. David Hill

Fever Boogie

There is little more alarming than the moment you touch your child and realize she's running a fever. In fact, fever accounts for 30% of visits to pediatricians and up to half of after-hours calls. Fever is usually a normal response to a minor infection. But for newborns, fever can be a sign of life-threatening illness. So let's learn a little more about this hot topic.

What is a normal temperature?

We all learned in elementary school that normal body temperature is 98.6° Fahrenheit (37° Celsius). That number comes from a scientist (Wunderlich) who stuck a thermometer in 25,000 adults' armpits in 1868. More recent studies in adults show there's a range of normal oral temperatures, from 35.6° C (96° F) to 38.2° C (100.8° F). Only 8% of the subjects actually had a temperature of 98.6°! Furthermore, a person's temperature changes over the course of the day by as much as 1° C (1.8° F), lowest around 6:00 AM and highest at 6:00 PM.

So then what's a fever?

Doctors define the following temperatures as fevers:

- Rectal temperature greater than 38° C (100.4° F)
- Tympanic (ear) temperature greater than 38° C (100.4° F)
- Oral temperature greater than 37.8° C (100° F)
- Axillary (armpit) temperature greater than 37.2° C (99° F)

What's the best way to take a temperature?

Rectal temperature remains the gold standard for infants and children too young to hold a thermometer under their tongues. For older children and adults an oral thermometer is fine. Newer digital thermometers work well, and according to *Consumer Reports*, the best ones are often also the least expensive. Tympanic (ear) thermometers are tricky to use and may not always be accurate; the same goes for pacifier thermometers. Temperatures taken under the arm (axillary) are notoriously inaccurate, detecting only 50% to 70% of fevers. Forehead strips are even less accurate. What about mom's hand? Parents who feel their child has a fever are right about 22% of the time.

What's up with the chills and sweats?

A part of the brain called the hypothalamus serves as our body's thermostat. If the hypothalamus senses we're too cold it drives voluntary responses (putting on more clothes, going inside, running in

place) and involuntary responses (shivering, contracting the blood vessels in the skin and extremities). If the hypothalamus senses we're too hot, it triggers voluntary behaviors like jumping in a pool, and involuntary measures like dilating blood vessels in the skin and sweating. A child developing a fever will feel cold, look pale, shiver, and bundle for warmth. When his temperature exceeds the set point, he'll sweat, his skin will flush, and he'll try to cool off.

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What sorts of things cause fever?

Infections by viruses, bacteria, parasites, or fungi cause the immune system to release chemicals (cytokines) that tell the hypothalamus to turn up the temperature. Some bacteria, viruses, and fungi make their own cytokines, contributing to fever. Not all fevers are due to infections. Trauma, cancers, and autoimmune diseases like juvenile rheumatoid arthritis also cause fever. There are also rare hereditary conditions like Familial Mediterranean Fever that may cause periodic unexplained fevers.

Isn't fever dangerous?

Surveys show that many parents, and even some doctors, believe fever can get high enough to be harmful. In fact, without an external insult the body is incapable of generating a temperature high enough (>108° F) to cause injury. The one exception involves patients with severe heart or lung disease who may not tolerate the increased demands fever places on oxygen intake. This doesn't mean there's no such thing as hyperthermia (heat injury). Heat injury comes from external sources, such as exposure to extreme heat or certain drugs. Children left in hot cars or forced to exercise in the heat can die from overheating.

What about febrile seizures?

Fever causes seizures in 2-4% of children

aged six months to six years. While these seizures are often quite frightening to parents, they don't cause any lasting injury or problems. You would think that treating a child's fever might prevent febrile seizures, but studies to date have shown no fewer seizures in children given Tylenol or Ibuprofen.

When should I be worried about a fever?

Any baby under three months of age with a fever needs to see a doctor immediately. Babies this young can become severely ill with little warning, and fever is sometimes the only clue. Low temperatures (<97° F) are equally worrisome in these babies. Infants aged 3 to 12 months are allowed a few days of fever with a cold, but they should see a doctor if the temperature is over 105° F or if the fever occurs without other symptoms (they may have a kidney infection). We allow children over a year of age an unexplained fever up to three days before we get concerned. They often have a viral infection (fifth disease, roseola) that ends with the fever going away around the time a rash appears. Any child with more than three days of fever should see a doctor, as should one whose fever goes away, then returns.

How should I treat fever?

There is some debate over whether to treat fever at all. Fever boosts immune defenses and may help defeat infections. But fever is uncomfortable to children, and studies are unclear on whether treated children get well any slower. No child should take aspirin for a fever (even “Baby Aspirin”); it causes Reye syndrome. In the past, doctors recommended alternating acetaminophen (Tylenol) and ibuprofen (Motrin, Advil), but more recent studies suggest little improvement in fever reduction and some increased risk of overdose. Neither medicine has proven superior to the other, so pick whichever you like and know that you can use the other one if needed. Both medicines can be lethal in overdose, so you should be careful not to give too much. Remember that many combination cold medicines include one of these ingredients. Sponging with tepid water may help bring a fever down, but if the goal is making a child more comfortable it may prove counterproductive.

Remember, fever is a symptom, not a disease. It's nothing to get all burned up about.

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