

20 Questions: Fever

1. In the midst of Super Bowl LII, You are called for a baby with a fever. Arriving, you find a heavily bundled infant that mom states 'felt hot'. The baby was born three weeks ago. Is this really an emergency?
2. What temperature defines a fever?
3. How much higher are rectal temperatures compared to oral temps?
4. How good are ear thermometers in this age range?
5. How about pacifier thermometers?
6. Could bundling this infant have been the cause of the fever?
7. Mom states that they tried a cool bath to get the fever down, but it did not seem to help. Why?
8. Why is fever helpful for the body?
9. What is the most common bacterial cause for a fever in girls under age 3?
10. You are called to a nursing home for a confused patient with a temp of 103F. What would have a worse prognosis, a temp this high, or the same patient with a temp of 95F?
11. What are the two most common causes of fever in this type of patient?
12. You listen to the lungs and don't hear any crackles. The O2 saturation is normal. How good are these at determining whether a pneumonia is present?
13. The patient has a shaking chill while you are loading him up. Why do we chill when a fever is present?
14. What is a 'dangerous' fever?
15. Your partner began the shift feeling ill, but her temperature was 100F this morning. It is now 102F. Does this mean she is getting sicker?
16. The Health Connection nurse recommended that a two-year old with a runny nose be seen in the ER for a temp of 102.8. Why?
17. If a child has a fever and is vomiting, is rectal Tylenol effective?
18. How much Tylenol should a child be getting to control fever?
19. Why don't we use aspirin much anymore for fever control?
20. What are some different causes of fever?

20 Answers: Fever

1. Yes. Any child age 28 days or less with a temp of 100.4F (38C) or higher needs blood tests, a spinal tap, urine test, IV antibiotics, and admission to the hospital. This is required because the neonate is not able to prevent bacteremia (bacteria in the bloodstream) which can lead to meningitis at this age and possibly death or permanent disability. Often times, in children this young the only symptom they can produce is fever. Between 28-60 days they generally need immediate evaluation, lab tests, spinal tap, but may not need to be admitted or get antibiotics if they look well and the initial tests are negative.

2. Any temp 100.4F or higher is considered a true 'fever'. This definition applies to **core body** temps (most commonly rectal temps). While the elderly may have lower normal temperatures and therefore a less strict definition of what constitutes a fever, it is generally not true when young otherwise healthy people tell you that they typically run low and 98.6F means they have a fever.
3. Rectal temps are about 1 degree F or 0.6C higher than oral temps. Axillary temps are about a degree less than oral, but axillary temps are **so inaccurate, they should not be relied upon**.
4. **Terrible**. If the ear thermometer says they have a fever, than they probably do, but the ability to detect and measure a fever in infants is poor.
5. The majority of kids won't suck this thing for the requisite two minutes, if it says you have a fever, than you probably do, but if it registers normal, you can't be sure.
6. Depends on how high: good studies of bundling show that it can only increase your temp by about a degree. Bundling fever is never a safe diagnosis to make (same thing with 'teething fevers'). (This does not apply to infants bundled with hot water bottles).
7. Radiation from the skin accounts for 60% (roughly) of heat loss, this is facilitated by vasodilation. Cool baths, etc. cause vasoconstriction and redirection of blood to the core, which will reduce this form of heat loss and thus, are not helpful in getting the temperature down.
8. Most bacteria have evolved to operate best at 98.6F, higher temps tend to interfere with their production of protein, and cause the body to bind up free iron, which is essential for bacterial replication. Thus, if the fever doesn't bother the patient, don't bother treating the fever...
9. Urinary tract infection. Any young girl with a fever and no clear source of infection should have her urine checked. This especially applies to white females. Up to 16% of females under age 3 with no clear source of illness that are febrile will have a UTI. It's less common in boys because they have longer urethras.
10. Hypothermia in the setting of a bacterial infection carries a much worse prognosis, as it implies that the body is unable to appropriately respond to an infection (by becoming febrile), or maintain normal temperature. It often means sepsis syndrome has developed, which carries a high mortality in the elderly.
11. Pneumonia and urinary tract infection are by far the most common causes of fever (and subsequently sepsis) in the elderly.
12. Poor. A study at the VA hospital in Seattle had an ICU doc, a pulmonologist, and an internal medicine doc (all very experienced) listen to 50 patients and document their physical findings. They were no better than a coin flip at hearing changes that represented pneumonias diagnosed on CXR. Don't throw those stethoscopes away yet though, they're still useful in identifying pulmonary edema, asthma, bronchitis, anaphylaxis, etc.
13. The hypothalamus, our internal thermostat is currently cranked up higher than normal (e.g. body wants to be at 102). So if that patient is only at 101 degrees, the brain thinks he is cold, and will shiver in an attempt to increase the temperature to the set degree. This is exactly like when we shiver in the cold Minnesota winter, trying to get our temp to 98.6. Severe and long-lasting shivers are called rigors, which are very uncomfortable.

14. The fever by itself isn't dangerous, even up to 107F no direct damage has been documented from fever. The higher the fever, though, the more the chance of bacteremia, thus, the more concerning it is. This is in **contrast** to hyperthermia, which is overheating due to environmental (e.g. heat stroke) or toxicological factors.
15. Maybe, but don't hang your hat on this. Females and children especially have diurnal (daytime) temperature variation which can be as much as 2 degrees F. Temps are usually lowest in the morning and highest in the evening.
16. Between 3-36 months of age, a temperature of >39C (102.2F) should prompt a search for a source of fever. If none is found on exam, usually a blood culture and sometimes other tests will be done, as under three years children have a tendency to become bacteremic without looking sick (occult bacteremia). This tendency peaks at about 18 months. Luckily, with the hemophilus influenza vaccine, the rate of severe disease from these events has fallen drastically.
17. Not very. Even 25mg/kg of rectal Tylenol (over the usual dose used) only resulted in about ½ the usual blood levels of a standard oral dose in one study. It won't hurt, but don't expect huge benefits.
18. About 10-15mg/kg (usual elixir is 160mg/5ml). Many pediatricians recommend that if parents are giving Tylenol every 4h that they stay with 10mg/kg as a few children have died from liver failure at the higher doses when given for days at a time. (Alternating with ibuprofen is a good idea if you need continuous fever suppression to keep the kid drinking, etc.)
19. There is an association between Reye's syndrome (a rapidly progressive encephalopathy that can cause confusion, seizures, brain damage and death) and aspirin use, especially in cases of influenza and chicken pox. This association led to a recommendation that aspirin not be used to control fever in children. It is still indicated in certain diseases with fever, like juvenile rheumatoid arthritis, Kawasaki's disease, etc.
20. Bacterial infections (everywhere in the body you can imagine), line infections (central line, etc. think cancer patients) or graft infections, fungal, viral, rickettsial, chlamydial infections, parasites, spirochetes (eg: Lyme), cancers of many kinds, connective tissue diseases (lupus, rheumatoid disease), sarcoid, Crohn's disease (and other colitis), drug fever, deep venous thrombus/pulmonary embolus, pericarditis, reabsorbing hematomas, aortic dissection, metabolic and inherited diseases, sub-arachnoid hemorrhage and other CNS events, thyroid disease, drug use, and finally pancreatitis (and others too rare to mention).