Our readers say ...

**How High Is It?**
Temperatures over 105°F warrant immediate intervention as I am concerned about vital enzyme and cell function at such high temperatures. My initial goal would be to get the patient down to a temperature of around 103°F and then continue the work-up.

In other cases, I would be more inclined to act quickly to address the fever if I were able to retrieve laboratory data and institute immediate care for the underlying cause.

*John Ross, DVM*  
*Perry, New York*

**Benefits of Fever**
Fever is one of the body’s defense mechanisms, creating an environment hostile to a pathogen. Thus, within limits, fever is beneficial and should be allowed to run its course during the duration of treatment.

An abscess in a cat is an example in which a very high fever does not require intervention other than the usual drainage and antibiotics. There are basically only two categories of body temperature increase in which I specifically intervene: when the temperature is so high that vital damage can occur or when, on occasion, temporary reduction of body temperature may be beneficial to the well-being of the patient—by enhancing its appetite, for example.

Although I have seen several febrile patients (not those with heat stroke) present with body temperatures above 107°F, I have not seen subsequent evidence of physical damage. However, I usually intervene quickly to reduce temperatures exceeding 106.5°F. I rely on two methods of specific fever reduction—flunixin meglumine (Banamine) injectable (once) or an oral NSAID for two or three days. I reserve mechanical cooling baths for hyperthermia (not fever) as in the case of heat stroke or seizure.

*Wilhelm P. Aanestad, DVM*  
*Garden Grove, California*

**NSAIDs & Cats**
I generally try to find the origin of fever before I treat it. However, if the cause is obvious, I would probably use an appropriate antibiotic and see if in 24 hours that does the trick. In cats I have found that a nonsteroidal antiinflammatory drug is worth using as it will make them feel so much better and prompt them to start eating again. Seeing their cats moving around and not so lethargic also makes the owners feel better. Of course, I prescribe an antibiotic at the same time. The intervention depends on how high the fever is, how clinically affected the animal is, and the cause of the fever.

*Mary Kizer, DVM*  
*Berthoud, Colorado*
The expert says . . .

The Febrile Patient: Should You Cool It?
Garret Pachtinger, VMD, and Lesley King, MVB, Diplomate ACVECC, ACVIM, & ECVIM (Companion Animal)

What’s normal?
Species that regulate their body temperature are called homeotherms. The anterior preoptic area of the hypothalamus contains specialized neurons that control thermoregulation, maintaining body temperature at a “normal” set-point. Warm-sensitive neurons are activated when the body temperature is elevated, triggering heat loss mechanisms, such as panting. Cold-sensitive neurons respond to cooling by initiating heat-production mechanisms, such as shivering.

Why does the temperature go up?
Hyperthermia results from the inability to compensate for increased heat production. In hyperthermia, the hypothalamic set-point remains normal, therefore the animal is “aware” that it is hot and pants or vasodilates in an effort to cool down. Mild hyperthermia is common in stressed animals; severe hyperthermia can occur in animals exposed to excessive ambient temperatures or those with upper airway obstruction.

In contrast, fever is caused by an increased thermoregulatory set-point. Causes of fever include infection, tissue ischemia, inflammation, neoplasia, and drug reactions. In these processes, inflammation initiates a cascade of endogenous pyrogens, which increase the hypothalamic set-point. The endogenous pyrogens include IL-1α/β, IL-6, TNF-α, and the COX-2-dependent prostaglandin 

What happens when the temperature is elevated?
An increased temperature may improve the body’s ability to fight infection by increasing neutrophil and lymphocyte activation and migration, enhancing release of proteolytic enzymes from lysosomes, enhancing interferon production, directly inhibiting some viruses and bacteria, and decreasing the availability of iron used by some bacteria to proliferate.

However, increased temperature can also have adverse consequences. Febrile animals may display nonspecific anorexia or depression. Increased temperatures are associated with an increased metabolic rate and increased oxygen demands. Extremely high temperatures (greater than 106°F) may lead to shock, organ failure, and disseminated intravascular coagulation due to protein denaturation, endothelial cell damage, and activation of platelets.

Options for cooling the “hot” patient
Treatment of severe hyperthermia involves rapid external cooling. Because the hypothalamic set-point is normal, the body temperature can easily be reduced. Convective heat loss may be most effective. The patient is sprayed with water and then placed in an air current generated by a fan. Heat loss by conduction (direct transfer of thermal energy) is achieved by placing the patient on a cool surface, administering chilled intravenous fluids, which may also aid in correcting hypovolemia, and placing ice packs in the hairless axillary and inguinal regions. Finally, evaporative heat loss can be achieved by wetting the pads with isopropyl alcohol; heat energy is lost when the alcohol changes from liquid to gas.

In contrast to hyperthermia, a true fever must be treated with agents that reset the hypothalamic thermoregulatory set-point. Antipyretic agents include salicylates, acetaminophen, dipyrene, and flunixin meglumine, all of which inhibit prostaglandin synthesis. Phenothiazines, such as acepromazine, peripherally block dopamine and adrenergic receptors, resulting in vasodilatation. Aside from true antipyretic agents, a febrile patient may also benefit from intravenous fluids, which can help decrease the temperature and improve hydration status.

Should we cool the febrile patient?
External cooling is effective for hyperthermic patients. In the febrile patient, however, external cooling can be relatively ineffective because the body attempts to maintain the elevated temperature established by the reset hypothalamic set-point. Thus, external cooling induces cutaneous vasoconstriction and shivering, further increasing the body’s metabolic demands. Shivering increases oxygen consumption, the respiratory quotient, and sympathetic nervous system activity. Vasoconstriction diminishes cutaneous heat loss, thus conserving core body heat.

In febrile patients, drugs are the most effective way to normalize the hypothalamic set-point, but they may not be benign. Common adverse effects of nonsteroidal antiinflammatory drugs include gastric ulceration and hemorrhage, renal injury.
and acid–base disturbances. Moreover, the ultimate goal is to determine the underlying cause of the fever. Antipyretic drugs may mask illness and hinder the ability to determine the cause. Despite these concerns, normalizing the temperature may be a priority in febrile patients with severe neurotrauma or hypoxemia because they cannot afford the additional oxygen consumption that accompanies increased metabolic demands. Similarly, temperature reduction may improve the quality of life and nutritional status of some patients, especially cats.

**It’s just a matter of degree…**

Consequently, when deciding whether to cool a patient, the degree of temperature elevation must be taken into consideration. With no other clinical signs, temperatures of 103°F or less are usually associated with stress and are typically not treated. Temperatures between 104°F and 106°F are usually significant. A decision about treatment can be made once the cause has been identified and the pros and cons of therapy are considered. Temperatures greater than 107°F are usually due to true hyperthermia and require immediate external cooling. While treatment principles are similar, proper medical management depends on the underlying cause of the increased temperature. 

See Aids & Resources, below.

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**AIDS & RESOURCES**

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THE FEBRILE PATIENT: SHOULD YOU COOL IT? • Garret Pachtinger and Lesley King

**References**


**Suggested Reading**
