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## Preventing Heat Illness in Pet Dogs and Cats



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**ABSTRACT**

In present investigation, heat illness in pet dogs and cats was studied. Dogs and cats have the same weaknesses as human children and are characterized by low body height, different amounts and colors of hair and fewer sweat glands. In addition, it is thought that they are more likely to suffer from heat illness because they cannot communicate through words like children or the elderly. In order to prevent heat illness, it is important for the owner to understand such characteristics and to take care of their pet cats and dogs responsibly via proper air conditioning management and hydration.



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## INTRODUCTION

In Japan, climate data such as temperature and humidity has been observed in a ventilated case (for meteorological instruments) installed in the ground of elementary and junior high schools in the past, and in recent years AMeDAS(Automated Meteorological Data Acquisition System) in familiar places. In addition to recording the differences between observation points, the information can also be compared with major cities in other countries with similar measurement items. As a result, it is possible to estimate comfort for human life and to prevent disease. The ventilated case for meteorological instruments was equipped with a thermometer and a hygrometer in the box. The surface is painted white to reflect sunlight and not trap heat. In addition, it is made of wood so that it is difficult to convey heat inside. The sides have louvers designed to improve ventilation and prevent invasion of sunlight and rain. In order to prevent the reflection of heat from the ground, it is installed on grassy soil instead of asphalt, usually at a height of 1.2-1.5 m above the ground. These were techniques for measuring the atmosphere within the area as accurately as possible without being affected by various environmental stimuli from the surroundings at the average height of the head of the supposed person (children and students who belong to elementary and junior high schools). However, it is not a measurement that takes into account differences in individual physique, clothing, and living environment. For example, the influence from the environment is considered to be different for children and adults due to the variation in height or type of clothing. In addition, the impact of reflection from asphalt is easy to receive if people spend time outdoors during the day, and is very important in considering the risk of suffering from heat illness.

In recent years, the heat island phenomenon has become prominent in Japan. Due to the deterioration of the hot environment that accompanies climate change; there are concerns that the occurrence of health problems on a global scale will increase<sup>1</sup>. Under such circumstances, it is feared that not only humans but also pets (mainly dogs and cats) suffer from heat illness. Infants are likely to experience an increase in body temperature while taking a stroll in a baby carriage or while the family is left in the car or at home while shopping. Those with weak physical bodies, such as the elderly and children are more likely to become seriously affected by this and may perish in the worst case. Leaving pets in the house or car when going out or during a walk tends to cause poor health<sup>2</sup>. It is important to note that pets have differences compared to infants and the elderly and are not interchangeable. This paper describes the

differences in symptoms of heat illness (heatstroke, sunstroke and thermal fever), and explains why pets are more likely to suffer from heat illness. In addition, we state what was said in previous studies and the author's opinion on how to prevent pets from suffering from heat illness.

**Definition of heat illnesses (heatstroke, sunstroke and thermal fever):**

Heat illness (heatstroke in a broad sense) is a general term for the state of poor health caused by a hot and humid environment<sup>1</sup>. This is caused by the body's inability to adapt to hot environments such as summer, but it can also be caused by winter heating devices. The types of heat illness include sunstroke, heat convulsions, thermal fatigue, and thermal fever (thermal fever and sunstroke are included in heat illness), which can also occur indoors. It was said that patients would occur even when the temperature is 25°C and increases rapidly when it exceeds 31°C. It should be noted that the disease can be caused not only by high temperature but also by an abrupt temperature change (for example, moving from a room with air conditioning to a room without in winter). What has been mentioned so far is broadly described as heat stroke; more specifically, it may be considered as poor physical condition due to an increase in body temperature rather than simply sunstroke (in this paper, defined as heat illness and heat stroke, respectively).

There is a wide range of sunstroke diseases, ranging from mild to severe. Sunstroke is caused by sunburn and heat from direct sunlight, resulting in insufficient body cooling due to lack of sweating and overheating of the body. The symptoms of overheating are reddish face, rough breathing, heating of the skin from sunburn, dryness, and lack of sweat. Other symptoms such as dizziness, nausea, headache, etc. also occur. If this becomes severe, it may result in unconsciousness, and in the worst case, death.

Thermal fever indicates a severe heat illness. Unlike sunstroke, the presence or absence of direct sunlight is irrelevant. In this state, body temperature regulation does not work well due to a significant lack of moisture and salt in the body caused by a large amount of sweating. Then, body temperature will rise abnormally to 40°C or more, and severe consciousness disturbance will occur. Since body temperature regulation does not work, sweating does not occur and the skin dries. If this state continues for a long time, cell functions will be hindered, and death may occur due to multiple organ failure.

### **Why dogs and cats are susceptible to the disease?**

In Japan, it is said that heat illness is likely to occur especially from May to October when the temperature rises. In humans, infants are likely to suffer from heat illness because of their weak bodies. Animals such as dogs and cats are also likely to be affected because they have fewer sweat glands. Humans can sweat from the entire surface of their body allowing body temperature to be easily adjusted, but dogs can sweat only from the paws and around the nose. For this reason, panting occurs by releasing the tongue and speeding up breathing promoting the evaporation of moisture thereby releasing heat. The same applies to cats, with sweat glands only on the soles of their feet.

Secondly, the distance from the ground to the body of dogs is shorter when taking a walk, and the reflected heat from the paved road has a great influence on the dog. According to the manual issued by the Ministry of the Environment<sup>3</sup>, if the general reported normal temperature (in a way that is measured in the ventilated case for meteorological instruments) is 32.3°C when taking a walk during a hot day, the temperature changes depending on the height from the ground due to reflection from asphalt. It is about 32°C at a height of 150 cm from the ground, but it is about 35°C at 50 cm; which is the height of an infant, and more than 36°C near the ground (5cm above), which is the height of a pet. Namely, the pet is exposed to a hot environment more than the owner feels hot. It may be said that symptoms are less likely to appear in dogs that do not usually take a walk with their owner.

The third problem is the hair color. Hair color that easily absorbs sunlight causes a tendency for the body temperature to rise. For dogs and other animals, the hair grows and changes in amount depending on the season (the temperature is high or low), but the problem that the color may be darker than human skin will continue (Except for some birds). Fourthly, there is a problem that the owner has difficulty in noticing any abnormalities of the pet.

Infants and the elderly can explain their issues by communicating vocally in different ways. Pets, however, are difficult to interpret solely based on their crying. Occasionally, there may be differences in the cry, but it is more difficult to understand exactly what it is (for example, if they are hungry or angry). It may be less likely to notice physical changes in cats than dogs since they are more likely to be quiet at home.

## How to prevent pet heat illness

Table No. 1 shows the questionnaire results for pet owners<sup>4</sup>. In order to prevent the heat illness of pets, it is necessary for the owner to look closely at the state of the pet and take care of it properly. Thinking about how your pet suffers from heat illness and preventing it leads to the prevention of heat illness. As described in the 'Introduction', it is necessary to 1) Improve ventilation 2) prevent reflection (from asphalt, etc.) and 3) be careful to account for the lowered body height. It is also necessary to consider individual conditions (such as the presence or absence of illness)<sup>5</sup>. Unfortunately, the color of the hair is hard to change, so the breeder has to take other actions such as: using air conditioning and open spaces and walking in non-reflective and shady areas, but if one put a pet on a baby carriage and took a walk, it can increase the body height of the pet and deal with heat received from the ground. In addition, if there are signs of heat response such as sticking out the tongue and breathing quickly, it may be necessary to cool or hydrate the pet. Aside from fashion, people wear long-sleeved shirts to prevent sunburn. Similarly, wearing clothes may have a certain effect to prevent reflections and hair from becoming hot.

## CONCLUSION

Since pets such as dogs and cats are kept by people, they cannot move freely to their favorite places. This also gives rise to a situation where pets must stay in hot places, and it is thought that they are more susceptible to heat illness. Infants are prone to injury if they are not cared for by their parents and relatives<sup>6</sup> and pets should be treated in the same way. According to the Ministry of the Environment manual<sup>3</sup>, people can prevent heat illness by doing the following: Avoid heat, take water frequently, pay attention to sudden hot days, make body preparations for heat, consider personal conditions (obesity, already suffering from other diseases, etc.), and consider each other in group activities (follow the words of the person who oversees the place, take a break, etc.). These are actions that people do to take care of their state of being, but in the case of pets, the owner must take responsibility for taking care of these matters.

The points that need to be taken care of in this way are constant, and it is thought that whether or not it can be done properly will lead to prevention of heat illness and ingenuity.

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**Table No.1: Questionnaire survey on heat illness of pets**

Question	(Option)	Yes (%)	No (%)
1) Do you know that pets also have heat illness?		84.0(overall)* <sup>1</sup> / 88.5(dog breeder) / 77.1(cat breeder)	16.0(overall) / 11.5(dog breeder) / 22.9(cat breeder)
2) Have you ever suspected heat illness for your pet? <sup>*2</sup>		43.4 / 45.5 / 39.7	56.6 / 54.5 / 60.3
3) When is “Yes” in Question 2)? <sup>*3</sup>	<ul style="list-style-type: none"> <li>-When you are away from home</li> <li>-During a walk</li> <li>-When you are together at home</li> <li>-When you are away from home</li> <li>-Moving by car</li> <li>-When you are outside (such as a pet-friendly shop)</li> <li>-When playing outside</li> <li>-When you are answering in the car</li> <li>-Moving by train or bus</li> <li>-Others</li> </ul>	<ul style="list-style-type: none"> <li>43.0(dog breeder) / 41.3(cat breeder)</li> <li>38.0 / -</li> <li>34.9 / 46.0</li> <li>22.5 / 14.3</li> <li>20.5 / 9.5</li> <li>19.8 / 12.7</li> <li>14.0 / -</li> <li>14.0 / 8.7</li> <li>8.5 / 4.0</li> <li>1.9 / 2.4</li> <li></li> </ul>	
4) What measures are being taken to prevent pets from becoming heat illness? <sup>*4</sup>	<ul style="list-style-type: none"> <li>-Turn on air conditioner</li> <li>-Pull the cooling mat</li> <li>-Ensure an airy environment</li> <li>-Consciously hydrated</li> <li>-Do not leave in the sun for a long time</li> <li>-Reduce walk time</li> <li>-Refrain from walking</li> <li>-Cool wear</li> <li>-Others</li> </ul>	<ul style="list-style-type: none"> <li>68.3(dog breeder) / 74.0(cat breeder)</li> <li>53.9 / 45.0</li> <li>51.8 / 46.7</li> <li>44.1 / 36.0</li> <li>41.5 / 20.2</li> <li>32.6 / -</li> <li>26.7 / -</li> <li>19.6 / 9.6</li> <li>5.4 / 2.5</li> <li></li> </ul>	

5) When the house has only pets, is the air conditioner turned on? <sup>*5</sup>	-Leave it on -Set with a timer and turn it on for a short time. -Leave off	77.3(overall) / 78.9(dog breeder) / 74.3 (cat breeder) 18.0 / 18.3 / 17.3 4.7 / 2.8 / 8.4
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Based on Reference 4). A pet insurance company conducted a survey of 1052 Japanese people who have dogs or cats as pets.

\*1: People who keep dogs or cats.

\*2: Single answer for those who answered Yes in question 1.

\*3: Multiple answers are possible.

\*4: Multiple answers from people taking measures against heat illness.

\*5: Single answer of the person who answered “Turn on air conditioner” in Question 4.

Questions 1-2 were answered with Yes / No, and 3-5 were answered by selecting from the choices (the meaning on the right side of the table was also different).

