

## Sickness Behavior in Chickens

As a prey species, chickens are stoic and typically suppress signs of weakness, including when they are sick. It is difficult to detect sick chickens because they rarely show signs of illness before it becomes severe. Chickens also instinctually hide sickness behavior in the presence of a perceived threat, such as humans, because such behavior tells predators that the ill chicken may be an easy meal (Figure 1; Tizard, 2008). While sickness is mainly associated with pathogenic disease, sickness behavior can also result from injury, nutrient deficiency, and environmental stressors, such as thermal stress.

This Extension bulletin describes normal chicken behavior, behavioral and physiological indicators of sickness, and how to identify sickness behaviors to better manage chickens and improve their health.

### What Does Normal Chicken Behavior Look Like?

To understand sickness behavior in chickens, you must first understand normal chicken behavior. Normal or natural chicken behaviors are those behaviors which animals display under natural conditions specific to their species, occur in nature, and happen out of their own interest (Bracke and Hopster, 2006). Natural behaviors can further indicate an animal is healthy, has good welfare, and its needs are being met. Natural behavior is influenced by a combination of age, sex, genetics, experience, and environment, and varies between individuals.

Some natural chicken behaviors which are positive indicators of welfare include preening, dust bathing, foraging, and perching, as well as play, aggression, and reproductive behaviors. Additionally, chickens are a flock species and need to be raised in groups promoting social behaviors. Social hierarchy is important and helps maintain social balance. Time spent engaging in natural behaviors will vary between breeds and individual chickens. Therefore, it is important to know what is normal for your specific birds.



*Figure 1. Chickens are a prey species and are watchful of their environment. Source: Pixabay.com*

- ▶ **Preening** is a form of grooming. A chicken will run its beak through its feathers to distribute oils and realign the feathers (Nicol, 2015).
  - **Allopreening** is an affiliative behavior consisting of preening directed at conspecifics (other chickens) and helps maintain positive social bonds (Nicol, 2015).
- ▶ **Dust bathing** refers to a series of behaviors including pecking and scratching at a substrate such as dirt, followed by sitting and wing flapping to gather and distribute dust particles, then laying and rubbing or rolling and shaking off the particles (Costa et al., 2012). Dust bathing is thought to help clean the feathers and remove external parasites (Costa et al., 2012; Nicol, 2015) and may be a social activity (Olsson et al., 2002).
- ▶ **Foraging** is an exploratory behavior occurring when a chicken scratches or pecks at a potential food source, such as dirt or grass, even in the presence of freely accessible food (Jacob, eXtension). Chickens are highly motivated to forage and it takes up the majority of their daily time (Nicol, 2015). Foraging



**Figure 2.** Chickens perch above the ground to avoid predators. Source: Pixabay.com

may provide chickens with information about the environment, but it is also self-rewarding in that they may come across higher quality food items (Nicol, 2015). Chickens are socially motivated to forage and do so more often in the presence of others (Nicol, 2015).

- ▶ **Perching** refers to a chicken sitting on surfaces off the ground (Nicol, 2015). Chickens often perch close to the ground and roost on surfaces at greater heights (Figure 2). Chickens typically perch in order to rest, but perching also allows them to escape ground-dwelling predators and aggressive peers (Nicol, 2015). Roosting refers specifically to sleeping while perching.
- ▶ **Play** can be either a social or individual activity and includes several behaviors such as sparring, food-running, and frolicking. Sparring consists of fighting without intent to injure and may involve jumping with light kicking or pecking and stand-offs (Baxter et al., 2019). Physical contact during sparring isn't forceful nor does it cause the recipient bird to avoid the other (Baxter et al., 2019). Food-running involves chasing another bird with a piece of feed or large object, and frolicking refers to spontaneous activity such as running, jumping, or wing flapping (Baxter et al., 2019). Sparring and chasing may become more aggressive after 2-3 weeks of age (Nicol, 2015).
- ▶ **Aggression** is an agonistic behavior occurring when birds make physical contact with one another with the intent to injure. Aggression can include brief or forceful pecking and scratching or jumping at the

other bird, and the recipient bird may attempt to avoid the aggressor or respond in kind (Baxter et al., 2019). Aggression can also occur as a dominance behavior in the form of a threat, where the birds look at and circle one another, puff out their chests, spread their wings, and elongate their spines (Jacob, eXtension). These behaviors typically occur to establish hierarchy (pecking order) among birds (Baxter et al., 2019).

- ▶ **Reproductive** behaviors begin when chickens become sexually mature around 4-5 months of age (Johnson, 2015; Vizcarra et al., 2015), but individuals may vary by breed, environment, age, and sex. Cockerels and roosters may wing flap, tail-wag, crow, and waltz to attract females or engage in courtship, and receptive hens will crouch (Nicol, 2015). Hens will also display nesting, egg laying, and mothering behaviors. Hens will seek out nesting locations and create nests prior to laying eggs, then sit on or incubate the eggs until they hatch (Chaiseha and El Halawani, 2015). After hatching, the hen will brood (mother) her young.

## What is Sickness Behavior?

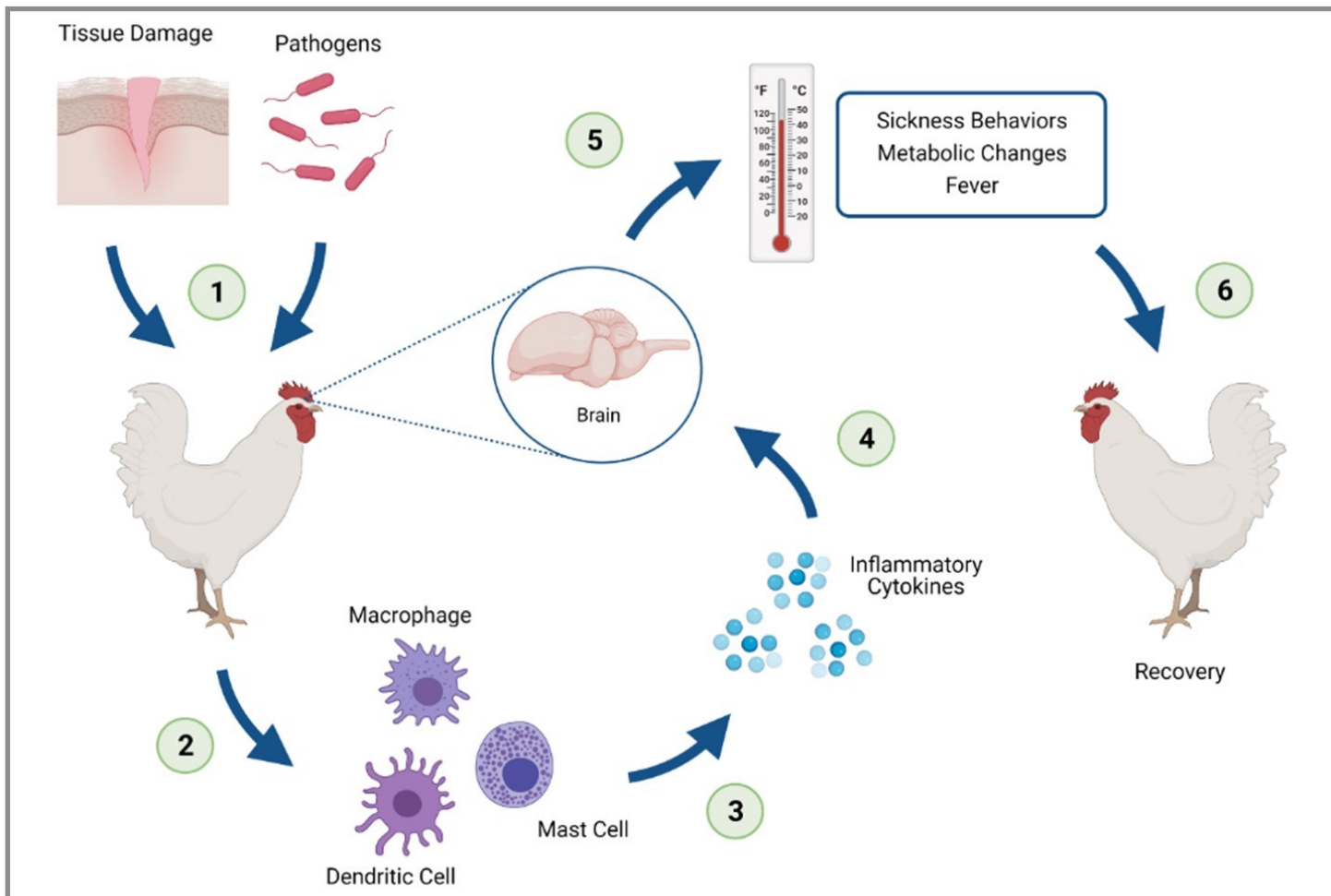
Sickness behavior is an animal's adaptive response to disease, injury, or stress, which aids in their recovery (Tizard, 2008; Dantzer, 2004; Johnson, 2002). The presence and performance of sickness behavior may indicate poor welfare, nutritional deficiency, or other environmental distress in a variety of species, in addition to illness and injury (Hart and Hart, 2019). Sickness behavior occurs as a symptom of an immune response through immune cell and immune molecule activity (Tizard, 2008; Millman, 2006). Infection by pathogens stimulates an immune response, thus inducing sickness behavior.

The following section focuses on the physiological processes responsible for infectious sickness behavior.

## How Do Infection or Injury Stimulate Sickness Behavior?

Figure 3 outlines the pathway from infection or tissue damage (injury) to sickness and subsequent recovery.

1. A pathogen infects the animal and/or tissue damage occurs.



**Figure 3.** The path from infection or tissue damage to sickness and recovery. Source: Adapted from Hart and Hart, 2019; Tizard, 2008; and Johnson, 2002; Created in BioRender.com

2. This stimulates innate immune cells, including macrophages, dendritic cells, and mast cells, at the site of infection or injury (Tizard, 2008).
3. The macrophages, dendritic cells, and mast cells release cytokines (Tizard, 2008).
4. These cytokines serve multiple roles:
  - a. Cytokines act as messengers between the immune system and the brain (Johnson, 2002). The cytokines travel to the brain either via the bloodstream or through the nervous system and bind to receptors on brain cells (Tizard, 2008).
  - b. Cytokines can also play a role in inflammation (pro-inflammatory cytokines) and contribute to pain, affecting sickness behavior through the presence of pain (Zhang and Anan, 2007).
  - c. Specific cytokines can directly influence certain sickness behaviors. For example, interleukin-1B can reduce eating behavior (anorexia; Weary et al., 2014).

5. The brain responds by inducing physiologic and metabolic changes, such as fever, as well as distinct behaviors that aid recovery, such as fatigue. Fatigue can also occur as a symptom of the body allocating energy and resources to fighting the disease or injury (Adelman and Martin, 2009; Dantzer, 2004).
6. The combination of fever, metabolic, and behavioral changes then inhibit pathogenic growth and promote recovery (Hart and Hart, 2019).

## Behaviors Indicating Sickness

Sickness behaviors in chickens vary widely, from subtle to clear clinical signs of illness. Table 1 outlines some sickness behaviors. Sickness behavior can also appear as a reduction in frequency, duration, or intensity of normal behavior.

## Physiological Signs of Sickness

Sickness behavior and physiological sickness go hand in hand. It is important to understand the physiological

**Table 1.** Behaviors in chickens which can indicate sickness

Behavior	What It Looks Like
Dullness or Depression	Chicken shows reduced interest in the environment and interactions with conspecifics, including but not limited to play, dominance, and reproductive behaviors. Behaviors such as preening, dust bathing, and foraging may be reduced in frequency or duration.
Fatigue (Lethargy)	Chicken does not stand or move around as much as it normally does. More time is spent sitting or resting, and it may often keep its eyes closed.
Inattentiveness	Chicken does not respond to changes or stressors, such as human presence and sudden sounds or motions.
Anorexia	Chicken is eating or drinking less than normal.
Isolating	Chicken does not interact with other chickens as much as previously and may self-isolate, spending more time away from the rest of the flock.
Hunching (Figure 4)	Chicken typically stands with ruffled feathers, neck pressed into its chest, and head down. It may droop its wings with its eyes closed.
Huddling	Chickens group together to conserve body heat during cold stress.
Panting	Chicken is open-beaked and takes frequent shallow breaths. Often observed with birds trying to dissipate heat during heat stress but can be associated with illness.
Spreading Wings	Chicken spreads wings out to either side, often to dissipate heat during heat stress.

Source: Adapted from Mauldin, 1992; Cheng et al., 2004; Weary et al., 2014; Li et al., 2015; Matthijs et al., 2017; Dar et al., 2019

signs of illness in chickens, as they can be much clearer indicators of disease, injury, distress, or impaired welfare. Table 2 outlines some physical indicators of sickness in healthy versus sick chickens.

## How Does Sickness Behavior Contribute to Recovery?

Ill or injured animals behave in a way that promotes healing and recovery. Often this involves prioritizing a different selection of behaviors over an animal’s normal behavioral repertoire.

These trade-offs help reallocate resources and energy to healing and fighting infection, particularly through the febrile response (fever) which both suppresses and destroys pathogens during infection (Hart and Hart, 2019). Fever is associated with high metabolic costs, and the febrile response is aided by behaviors and metabolic changes that reduce heat loss, increase heat production, and conserve energy (Hart and Hart, 2019).



**Figure 4.** This chicken exhibits hunching behavior, standing with its feathers ruffled and its neck pressed to its chest. The bird’s head is down, eyes closed, and wings drooped, indicating that this chicken is ill. Source: Accetta-Scott, 2015.

**Table 2.** Physical signs of healthy versus sick chickens

	Healthy Chickens	Sick, Injured, or Stressed Chickens
Temperature (Cloacal)	105.0°F-109.4°F (40.6°C-43.0°C)	Not within range. Often elevated due to fever.
Heart Rate	250-300 beats/minute	Not within range.
Respiratory Rate	23-36 breaths/minute	Not within range. Panting is about 150 breaths/minute
Appearance	Clean and well-groomed. No signs of injury. Eyes are clear and comb is bright.	Dirty with ruffled feathers. May be injured or have cloudy eyes. Comb is pale, indicating anemia.
Gait	No signs of difficulty walking. Can easily walk over 5 feet of distance.	Difficulty walking. Limping or lameness evident.
Performance	Normal growth rate and egg laying for its age and strain.	Weight loss and reduced growth rate and egg laying.
Droppings	Relatively solid and varied shades of brown or green (if consuming grass or vegetation). Cecal droppings are gooey, and urinary waste appears as a white cap on droppings.	Variation from normal droppings. Diarrhea, which is runny or watery. Droppings that are black or red (bloody), orange, yellow, dark green, milky white, foamy, greasy, or have worms present can indicate disease or presence of parasites.

**Note:** Parameters mentioned can vary by breed, age, and sex. Source: Adapted from Roberts, 2020; Hart and Hart, 2019; Li et al., 2015; Fielder, 2015a and 2015b; Moyle et al., 2014; Jacob and Pescatore, 2013

Other behavioral trade-offs include fatigue, inactivity, and reduced natural behaviors, such as eating (Figure 5). Fatigue reduces the energy and resources needed for metabolism so they can be used to aid recovery from infections and physical injury (Adelman and Martin, 2009). Reduced activity additionally preserves resources by limiting energy expenditure (Hart and Hart, 2019). Anorexia directly suppresses infection by reducing the nutrients available for pathogens to use toward replication (Adelman and Martin, 2009). On the other hand, behaviors supporting long-term health may be reduced to further promote recovery, such as play and reproductive behaviors (Weary et al., 2014).

## Chicken Welfare: What Can We Do?

Managing sickness is important to the welfare of your chickens.

**Identify** chickens with behavioral or physiological signs of illness and evaluate the need for treatment. Chickens

that may become sick or are sick should be isolated to provide specialized care and to prevent the spread of disease to healthy chickens (Figure 6).

**Establish** a relationship with a reliable local veterinarian, call your vet for a diagnosis, and treat your chickens as directed. Chickens with severely impaired welfare and who are unlikely to survive because of infection or injury may need to be euthanized.

**Prevent** sickness in your chickens by knowing what distresses them and how they behave during stressful events. Manage and reduce stressors, as they are linked to immunosuppression (Gomes et al., 2014). Practice biosecurity and maintain high hygienic standards when working with or handling your chickens. Consider vaccinations to prevent disease. Furthermore, when introducing new birds to your flock, quarantine them to ensure they are healthy and prevent disease transmission into your flock.



**Figure 5.** Chicken eating feed from a feed trough. Source: Pixabay.com

In summary, sickness, injury, and distress are challenging to detect in chickens due to their stoic nature, but it is possible through observing sickness behaviors and changes in normal or natural behaviors. Natural chicken behaviors include walking, eating, foraging, dust bathing, play, and reproductive behaviors. Sickness behaviors, on the other hand, can include lethargy (fatigue), anorexia, self-isolating, and hunching. These behavioral changes are often a symptom of the immune system responding to infection, tissue damage, and stressors due to cytokine action and cytokine signaling. Sickness behaviors can occur in tandem with physiological signs of illness. Sickness behaviors aid in recovery by suppressing pathogen growth or multiplication or by reallocating bodily resources and energy within the body from less essential functions to fighting disease or healing. Despite this, it is important to intervene and manage illness, injury, and distress in chickens to improve individual and flock health and welfare.



**Figure 6.** A healthy chicken. Source: Pixabay.com

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