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Understanding Alerting Tasks

Some trainers categorize alerting tasks to differentiate whether a dog is predicting a future medical event, responding to a symptom before her handler is aware of it or notifying her handler of an environmental change. Terminology to differentiate these categories tends to cause unnecessary debate in the service dog community. This text uses the word *alert* to describe all of these tasks. Alerts are task behaviors a service dog offers without her handler needing to consciously provide a cue.

Training alert behaviors in response to cues that a handler or trainer can cause or detect, such as time of day, an alarm, a sound (that the trainer can perceive or that a hearing-impaired handler can generate) or a symptom that a handler can perceive is relatively straightforward. However, training alerts to symptoms a handler cannot detect (e.g., the odor associated with a symptom) presents difficulties.

The ability to perceive an odor does not necessarily translate to a dog's ability to communicate the presence of the odor promptly or accurately.

Research exploring the odor detection ability of dogs has demonstrated that dogs can detect the presence of bacteria or bacterial infection (e.g., *Clostridium difficile*, cholera) and viral disease (e.g., COVID-19). Dogs are trained to detect cervical cancer; lung cancer; heart, liver, and kidney disease; and other human health conditions. Researchers and trainers continue to explore novel applications, such as using a dog to detect pregnancy in polar bears, ketosis in dairy cows or contamination in whiskey barrels. However, the ability to perceive an odor does not necessarily translate to a dog's ability to communicate the presence of the odor promptly or accurately.

Types of Alert Behaviors

You can train dogs to perform many behaviors to alert a handler, such as licking, nudging, pawing, blocking or retrieving an object. You can shape these interactions into passive, intrusive, one-time or persistent alerts to fit a handler's needs and environments.



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Chin Rest is an example of an unobtrusive passive alert.

- ▶ **Passive alert:** A dog performs a passive or inconspicuous alert behavior, such as Chin Rest on their seated handler's thigh. Passive alerts are appropriate in workplaces, schools and vehicles when a handler is alert and responsive.
- ▶ **Intrusive alert:** A dog performs a disruptive, annoying or demanding behavior. Reserve intrusive alerts for situations in which a handler is unlikely to respond to a passive alert, such as when a handler experiences hyperfocus, a mood disorder, dissociation, brain fog or fatigue.
- ▶ **One-Time alert:** A dog performs the alert behavior once and discontinues the behavior.
- ▶ **Persistent alert:** A dog performs the alert behavior repeatedly until her handler's response ends the alert. The handler's response is predetermined in their Task List; it is an action that mitigates symptoms rather than simply a release cue or cessation of the symptom.

You can train any safe and appropriate behavior as an alert behavior. They are typically chained from foundational task behaviors. Avoid behaviors that a dog does frequently or to solicit attention to reduce the frequency of false positive alerts.

False Positive and False Negative Alerts

False positive and false negative are two ways that a dog can fail to alert correctly. When a dog performs an alert behavior at the wrong time, we call it a false positive. When a dog fails to perform an alert behavior at the right time, we call it a false negative. Both are common in medical alert service dogs.

Researchers have determined that there is an odor associated with the ictal stage of epileptic seizures and that dogs are able to detect it. However, the dogs gave a high rate of false positives during trials. Ultimately, they were able to indicate the presence of seizure odor with only 53 percent accuracy. They were better able to indicate the absence of the odor.

Clients must expect a high rate of false positive alerts, in addition to periods of increased false positive alerts, such as when a dog offers behaviors to earn a reinforcer or to exert control over the environment. Clients must also expect periods of increased false negative alerts, such as when a dog is less motivated (e.g., experiencing physical discomfort or environmental stressors) or is sleeping. Handlers must not rely on a service dog to indicate the presence or absence of symptoms when their safety would be compromised in the case of either a false negative or a false positive alert. When false positive alerts can cause or exacerbate symptoms, it's unlikely that medical alert tasks are appropriate.

When possible, use wearable technology (e.g., seizure detection devices; continuous glucose monitors; fall detection devices; blood pressure, heart rate and oxygen saturation monitoring devices) to detect a handler's symptom instead of a service dog. Wearable technology is more reliable than a service dog, particularly for detecting hypoglycemia. In one study comparing diabetic alert service dogs to continuous glucose monitoring, dogs alerted to hypoglycemia correctly and in a timely manner only 36 percent of the time. Wearable technologies detect symptoms sooner than a service dog, which allows a handler better opportunity to control symptoms. Most wearable technologies cost less than maintaining a service dog.



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A diabetic service dog can alert their handler before a situation becomes dangerous. When the dog alerts their handler, they have time to check and correct their blood sugar (glucose) levels.

Novice handlers may inadvertently create problematic false positive alerts that exacerbate their symptoms and reduce their functioning. This occurs when a handler does not understand that service dog alert tasks are inherently unreliable and/or a handler believes that alert tasking is a product of bonding rather than training. The following anecdote is the true story of a handler attempting to train a psychiatric service dog without professional assistance. This situation was a particularly extreme example of a common experience of a novice handler attempting to train a dog to alert to amorphous antecedents (Stage 7) and not understanding dogs' propensity toward false positive alerts.

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A handler with multiple complex conditions, including PTSD, was walking their puppy on a sidewalk alongside light traffic. The puppy was undertrained compared to a typical service dog prospect of the same age and had not been trained to alert to environmental changes. The puppy became startled and pulled on the leash, a typical behavior of an undertrained, reactive puppy. However, the handler believed that their puppy was alerting them to a [nonexistent] stalker, allowed their puppy to drag them and then reinforced the puppy for the behavior. Similar encounters were repeated. The handler claimed that their puppy could predict danger and lead them to a safe place.

By the time the handler consulted a professional service dog trainer, their dog had developed severe reactivity to environmental concerns—which were also her handler’s symptom triggers—and as a result, her handler felt unable to leave their home for several months. This handler was unable to understand that their undertrained dog was causing the majority of their symptoms. They believed that their dog was alerting to credible threats. Near a year of age, the puppy’s reactivity became serious, and the handler consulted a professional trainer. As the dog’s reactivity diminished with behavior modification and medications, she stopped performing tasks. The handler was distressed at first because they were unable to recognize that their dog had not been adequately trained and that she had never been performing legitimate tasks. Unsurprisingly, the dog was dismissed from service training after behavior modification and medication failed to reduce her symptoms sufficiently.

Handler Responses to Alert Behaviors

Alert behaviors do not relieve symptoms; they bring attention to them or to situations that require action to prevent symptoms. The handler, or their caregiver(s), must respond appropriately to the symptom to reduce it. You can train dogs to continue an annoying alert behavior until their handler performs a specific response behavior. Handler responses vary widely, according to symptoms, treatment plans and the situation or environment.

A doctor has advised a handler to exercise to reduce their panic symptoms, so the handler trains their service dog to retrieve a leash and running shoes at the beginning of panic symptoms. This handler’s response to their dog’s task is to get up and take their dog for a walk or run, which reduces their oncoming panic symptoms.

A handler has difficulty waking up in the morning to take their medication. They train their service dog to tug their blanket off the bed and paw at them. This handler’s response to being awakened this way is to stand up. Their service dog continues pawing at their body until they do so.



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Service dogs that alert to odors associated with symptoms may be trained to smell their handler's skin, sweat, saliva or breath.

Training Medical Alert with Scent Cues

Dogs can perceive an astounding array of odors from human bodies and the microbes that live in and on humans. Researchers are beginning to identify some of the chemical compounds that cause these odors, such as the gases allyl mercaptan and dimethyl trisulfide—sulfur compounds found in garlic—that emanate from human skin during psychological distress.

Trainers interested in training medical alerts by odor detection should pursue continuing education in training detection dogs (e.g., drug detection, bed bug detection, search and rescue) or achieve competition titles in American Kennel Club (AKC) Scent Work, United Kennel Club (UKC) Nose Work or National Association of Canine Scent Work (NACSW) before working with service dog clients. Use best practices, such as those established by Johnen and others, during all scent detection training.

Conditions or symptoms that cause detectable odor

- Epileptic seizures
- Hypoglycemia
- Anxiety
- Panic
- PTSD
- Postural orthostatic tachycardia syndrome
- Any condition that causes an increase in catecholamines or cortisol—"stress hormones"

Not all health conditions produce an odor for scent detection training. For example, epileptic seizures produce an odor that dogs can detect, but non-epileptic seizures do not. It is not certain how dogs sense non-epileptic seizures.

Criteria

- ▶ The dog discriminates between scent swabs collected during a symptom and scent swabs collected at other times, such as after exercise.
- ▶ The dog performs a distinct alert behavior when it perceives the odor associated with the symptom.
- ▶ The dog does not perform the alert behavior at other times.

A handler might prefer to train a dog to indicate the presence or absence of odor on cue. In this case, train a positive response and a negative response.

Cue

The cue is the odor associated with a handler's symptom.

Collecting and Storing Scent Samples

Scents must be collected, handled and stored carefully to ensure the swab contains the desired odor and no other odors. The practices below were gathered from studies researching service dog odor detection and chosen for using materials readily accessible to the general public.

1. Use sterile gauze pads to harvest odor. If opening a large pack, store unused gauze pads in a sealed glass container or sealed mylar bag.
2. If possible, the symptomatic person should perform their own scent swabs to reduce the chance of the gauze containing other odors.
3. Rub the gauze against the skin of the armpit for 10 seconds. A less-preferred but valid alternative is rubbing the gauze on both palms for 10 seconds.
4. Immediately place the gauze in a glass container or mylar bag and seal it.
5. Label the container with the date and the symptom or asymptomatic state.
6. Store the scent swab in the refrigerator for up to 4 weeks.
7. Collect unscented and asymptomatic-scented control swabs and store them in the same way as the symptom scent samples.
8. When training, keep the scent sample containers closed as much as possible to preserve the scent.

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Training Sequence

Research investigating the validity of service dog alerts often does not describe how dogs were trained. However, two research studies with some of the most successful alert results—one on seizure alert dogs and the other on diabetic alert dogs—describe the training sequence the dogs were trained with. The successful dogs, coming from different training programs, were trained with nearly identical training sequence.

1. Train the dog to perform the desired alert behavior.
2. Train the dog to respond to the symptomatic scent by performing the desired alert behavior.
3. Train the dog to discriminate between the symptomatic scent sample and unscented samples.
4. Train the dog to discriminate between a symptomatic scent sample and asymptomatic scent samples from the same person.
5. Train the dog to discriminate between symptomatic scent samples and asymptomatic scent samples from other people with the same condition. This appears to be a critical step.

Maintaining an accurate and complete training log is critical. A training log can reveal human training patterns that may contribute to false positive or false negative alerts. Whenever possible, verify symptoms before reinforcing a dog for its alert behavior.



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Training Medical Alert with Symptom Cues

Dogs are exceptionally sensitive to perceiving movement, body language and other's behavior patterns. They can perceive oncoming symptoms by changes in a handler's breathing, posture, gait and behavior—often before the handler is aware of their symptoms. You can train dogs to respond to these symptom cues, which is believed to be more reliable than scent training because of the handler's ability to recognize their oncoming symptoms and identify false positive alerts.

The handler, or their family and caregivers, must initially identify their first observable symptoms, or tells. Handlers may need to video record themselves at onset of symptoms so they can identify how their posture, movements and voice change immediately before they notice their symptoms begin.

A handler reproduces (fakes) their first observable symptom(s) as the cue for their dog to perform the task behavior chain. Remind clients to be sure that faking a symptom is safe



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for them and does not provoke real symptoms. Common symptoms to reproduce (fake) for training are rate of breathing, gait changes, tremor, body postures, falls and becoming unresponsive.

Criteria

- The dog performs an alert behavior when it perceives the oncoming symptom.
- The dog does not perform the alert behavior at other times.
- The dog discriminates between cues during a symptom and when his handler is not symptomatic, such as discriminating between breathlessness due to panic attack versus breathlessness caused by exercise.

Cue

The cue is any change associated with the onset of the handler's symptom, such as a change in breathing, tone of voice, speech, movement, gait, tremor, body posture or responsiveness.

Training Sequence

1. Train the dog to perform the desired alert behavior.
2. Train the dog to respond to the cue by performing the desired alert behavior.
3. Train the dog to discriminate between cues during a symptom and when his handler is not symptomatic.

Natural Medical Alerts

Natural alerts are alert behaviors that a dog offered initially without training and that have been reinforced. Natural alerts occur due to a lack of habituation to a symptom and a dog's desire to communicate about the symptom. The term is used when trainers and handlers do not understand what a dog is perceiving or what drives a dog to attempt to communicate. Many trainers believe that having a dog with a natural alert is luck, while others believe that natural alerting is a result of training without punishment, cultivating a secure attachment style, encouraging communication, avoiding habituation and developing fluency in free shaping. Some research suggests that natural alerts are more strongly associated with human qualities (e.g., noticing and responding to their dog) than with dog qualities.

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Stimulus Control of Multiple Alert Tasks

When a dog performs an alert behavior after it perceives a symptom and does not perform the behavior when the symptom is absent, we say the alert behavior is "under stimulus control." However, when a dog performs the alert behavior for a different symptom, the alert is no longer under stimulus control.

Some service dogs excel at medical alert and begin to communicate a wide variety of symptoms and conditions. Some handlers train a distinct alert behavior for each symptom, but this can lead to confusion and ineffective alerting tasks.

A mobility service dog partnered with a person in a wheelchair began alerting to nightmares and progressed to alerting to headaches, medical implant malfunction, organ infections, bedsores and other symptoms. He soon alerted to more symptoms than he had alert behaviors, and his handler became unable to tell which symptom he was alerting.

The opposite situation is more common. One symptom is likely to cue multiple alert tasks, depending on the situation. The alert task a dog uses at a loud venue is likely to be different from the alert task he uses when his handler is driving a vehicle. Some handlers use alert behaviors that are specific to the situation or location rather than to the symptom.

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These handlers must be self-aware enough to identify which symptom their dog is alerting them to or use wearable technology.

Some handlers have a need for one distinct alert behavior under stimulus control and use a generalized alert behavior for lower priority symptoms or daily routines.

Task Drift

Task drift is a normal phenomenon of a behavior drifting, or shaping, away from its original criteria. Task drift occurs for a variety of reasons, including inconsistent reinforcement of the desired behavior or a dog's mild frustration causing her to offer a different behavior.

A dog might offer a more effective behavior than what is described on a client's Task List. When this occurs, the client can decide whether to accept and reinforce their dog's modified task or to retrain the original desired behavior.

Tasks that drift must be reinforced at a higher rate, be maintained more frequently and/or be retrained as a behavior chain.