

# VET CANDY

2 CE CREDITS  
INSIDE!

Special edition:  
Respiratory Disease

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TRUETT  
ANIMAL HEALTH

IDENTITY THEFT  
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THE CAT

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SUCCESS**

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ADVOCATE  
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**AMANDA STEFFEN**

makes her own rules

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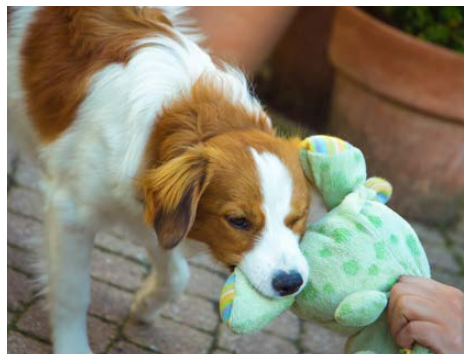
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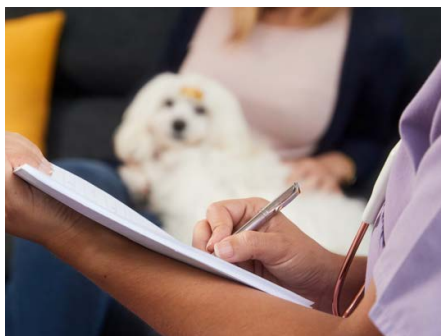
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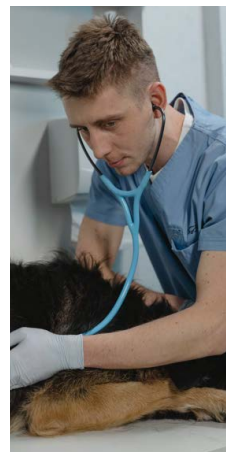


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*Welcome to the world of*  
**VET CANDY**

*Dr. Jill Lopez*



Happy New Year! This time of year when we think about setting New Year's resolutions. We vow to lose weight, or work harder to get a raise at work. Many times, however, we are so busy chasing these smaller goals we fail to look at the big picture. What we should be setting are life goals.

Speaking of setting life goals, this issue's cover model, Amanda Steffen, is taking steps to complete one of her life's goals which is to focus on holistic medicine. She is taking advanced courses to specialize in acupuncture therapy and hopes to one day open her own practice. If you are making life goals and want to share with us, tag @myvetcandy, we would love to hear about it!

In this issue, we have a special treat for you – free RACE approved veterinary and veterinary technician CE! We have the latest clinical updates on respiratory disease and case studies from Dr. Mathieu Paulin, Dr. Anthony Gonzalez, Dr. Carey Hemmelgarn, and Melissa Evans, CVT.

If you would like to receive RACE approved CE credit for reading, then click on the below to take a short test. When you pass this test, you will instantly receive a certification of completion for your records. It is that easy!

As always, I would like to thank our amazing team of writers and my assistant editor, Dr. Shannon Gregoire.

We love you for reading!

*Scan to take  
quiz for CE*



# Special Contributors

**Carey Hemmelgarn**, DVM DACVECC is a board-certified emergency and critical care clinician who currently practices in the New York/New Jersey greater metropolitan area. She received her veterinary degree from Washington State University, but moved to the east coast to complete her internship before graduation. Dr. Hemmelgarn spent three years in a residency focused on small animal emergency and critical care, achieving board certification in Emergency and Critical Care in 2013. Dr. Hemmelgarn's professional interests include trauma cases and blood disorders.

**Anthony Gonzalez**, DVM DACVECC is a graduate of Cornell University and received his Doctor of Veterinary Medicine degree from Tuskegee University. Following an internship, he completed a residency in Emergency & Critical Care at the University of Pennsylvania. Dr. Gonzalez worked in a busy specialty-emergency hospital in Los Angeles before joining Cornell Veterinary Specialists in 2018. He is board-certified by the American College of Veterinary Emergency and Critical Care.

Melissa Evans, CVT, VTS (ECC) completed an AAS in Veterinary Technology from Bergen Community College. In 2013, she became a licensed veterinary technician. After working at a specialty clinic, she completed a specialty in Emergency and Critical Care.

**Dr. Mathieu Paulin** graduated from the Alfort School of Veterinary Medicine in Paris, France in 2019. Following graduation, he completed a small animal rotating internship at the University of Montreal. In July 2020, he began a specialty internship in small animal internal medicine at the Western College of Veterinary Medicine. In 2020, Dr. Paulin was awarded membership as a Laureate of the Veterinary Academy of France. In July 2021, Dr. Paulin began a residency in small animal internal medicine at the WCVM.

**Dr. Jean-Yin Tan** is a board-certified equine internal medicine specialist with international experience in 5 states, 2 provinces, and expertise in both equine specialty practice and ambulatory care. She is a former practice owner who received certification in professional management in 2020 and received her MBA (with Honours) in 2022. In 2015 she joined the University of Calgary as an instructor in Equine Clinical Sciences.

**Melissa Evans, LVT, VTS (ECC)** Melissa is a licensed veterinary technician who earned her Veterinary Technician Specialty (VTS) in Emergency and Critical Care in 2018. Melissa has worked at referral and specialty hospitals in both New Jersey and New York as an Emergency, ICU, and Critical Care technician. Currently, she works per diem for specialty hospitals throughout New York City and is the owner of Melissa Evans, VTS (ECC) – Veterinary Nurse Consulting.



# DR. AMANDA STEFFEN MAKES HER OWN RULES

*By Jenn Boon*



Ever since she was a little girl, **Amanda knew she wanted to be a veterinarian.**

Now, with the title “Dr.” in front of her name, that dream has become a reality!

For this University of Tennessee graduate, being one of some 47,000 veterinarians in the United States is more than just a job – it is a calling. But unlike the thousands of other vet med professionals out there, Dr. Amanda Steffen has a very special (some might even say unique) interest...- senior pets and aging care.

Grey muzzles? Adorable white fur?

Sign her up!

When it comes to older pets, Dr. Steffen loves educating owners about aging changes and how we can help our pets transition into seniors with grace, comfort, and happiness. Building upon her background in emergency medicine, general practice, and non-profit veterinary medicine, tackling older pet issues was the perfect next step.

Vet Candy is delighted to have had the opportunity to interview Dr. Amanda Steffen. Today, she shares her vision for senior animal care, discusses some of the problems facing modern vet med, and also explains why scheduling vacations is an absolute must.

Introducing, the wonderful Dr. Amanda Steffen!

## **Enjoying the Paw-some Golden Years**

“Blessed is the person who has earned the love of an old dog.”

How true this saying is.

While kittens and puppies are cute as buttons, there is a magic about senior pets. Older companion animals give us profound and endless love throughout their relatively short lives, and as a result, it is our duty as their humans to take the very best care of them right up until the end.

Dr. Amanda Steffen agrees.

"My mission in life for my veterinary medicine career is to help pets enjoy their senior golden years," she says. "My hope is to offer a multi-modal approach to senior pet care such as pain control, joint support, nutrition, proper exercise routines, appropriate care of chronic diseases and making the golden years enjoyable for pets and owners."

These are commendable goals.

To get there, Dr. Steffen is taking advanced courses to specialize in acupuncture therapy for pets. She hopes to offer integrative medicine with Chinese Medicine where Western medicine has reached its limits. In 2023, she also plans to open a mobile veterinary acupuncture business in the Cincinnati, Ohio area.

How exciting!

## What to do When Work-Life Balance Hangs by a Thread

Like many fellow veterinarians, Dr. Amanda Steffen is lucky. She enjoys her job.

Nevertheless, it can be stressful. While there are dozens of pros to working in this field, there are also several serious cons. For example, a lack of work-life balance. The American Veterinary Medical Association itself writes, "Achieving work-life balance is one of the most important ways to achieve both career and personal satisfaction."

Is finding balance easy? Heck no.

According to Amanda Steffen, this is one of the worst problems facing the veterinary field today.

"I believe one of the biggest problems is the lack of a work-life balance," she reveals. "It is common to sign a contract with a new job with only 10 days of PTO in a full calendar year. This same job often includes half the weekends in the year and 50+ hour work weeks. Vets are some of the most compassionate humans and it is difficult for us to stand up for ourselves and say no."

From staying late to skipping lunch and providing round-the-clock care, veterinarians are no strangers to work-life imbalance.

That's why taking breaks is crucial.

Vacations are necessary to recharge. Mentally and physically, time off is a way to disconnect from being "on" 24/7 and remember there is more to life than work, work, work! For Amanda, that means traveling to beautiful places like Hawaii, Ireland, the Dominican Republic, and Utah.

"I believe that everyone should take a long vacation once in their life," Dr. Steffen advises. "A sabbatical would be even better! Every year, I take 2-3 weeks off work. My husband and I travel somewhere new. You should enjoy your job, but it should not be your entire life."

For Dr. Amanda Steffen, it is precisely this balance that helps her to be such a fabulous veterinarian!





# MAKE LIFE GOALS, NOT RESOLUTIONS THIS YEAR!

*by AM Kuska*

Most of us are familiar with goal setting. We vow to lose weight or get a new raise at work. Many times, however, we are so busy chasing these smaller goals that we fail to look at the big picture. Life goals are the big goals in life. The goals that define who we want to be as people and what we want out of our lives.

Big goals might be traveling the world, founding a charity that empowers women, or maybe earning a gold medal in the Olympics. They define the things you really want out of life. It could be as simple as raising a family on an urban homestead, or as complex as becoming the CEO of a Fortune 500 company.



Few people formally put their life goals in writing because, after a busy day of just surviving, kicking back on the couch is just so much more appealing. Life goals are important, though, because they can give the life you have – yes, even those moments when you're just vegging on the couch – more purpose.

If you're ready to set some goals, here are a few tips on getting started.

## THINK ABOUT WHAT'S MOST IMPORTANT TO YOU

List out on paper all of the things in life that are important to you. The things that you dream of doing, as well as the things that you just enjoy. Once you've listed everything you can think of, start narrowing it down until all you have left are dreams you can't live without. When you've narrowed it down to just these dreams, you've got your life goals.

### Overcoming obstacles in your way

'You can do anything you set your mind to!' is a common phrase used to encourage children, but when faced with the sheer impossibility of some tasks, that seems like a particularly hard thing to do. Many of us struggle to quit just one bad habit alone, such as smoking – let alone having the drive to run hard enough to compete in a marathon.

If you have big obstacles in your path, such as being too poor to travel or wanting to go carbon free in the middle of a city, it can seem like there's no way to reach your goal.

The good news is, with good luck you will have a full lifetime in which to reach your goals. The trick is to break the goal down into manageable pieces, so you can move closer to your goal little by little. No one woke up one day and went from the couch to Iron Man in a single day. If you want to run a marathon, a step in the right direction is as simple as putting on your sneakers and going for a walk.

Having life goals can change who you are as a person. When you know more about what you want out of your life, it helps you make small shifts in what you do each day, so you can get closer to that goal one step at a time.





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# Having trouble sleeping?

## *Exercise can help!*

The vast majority of people have trouble sleeping from time to time. However, 10 to 20 per cent of the population struggle more than the rest of us and have serious long-term sleep problems.

Many people who struggle with insomnia sooner or later resort to some form of sleeping aid. However, one study of more than 34 000 adults would suggest that some of them should exercise instead.

“We’ve observed that people who are in better physical condition have a lower risk of taking prescription sleeping pills,” says Linda Ernstsén, an associate professor at the Norwegian University of Science and Technology’s (NTNU) Department of Public Health and Nursing.

The results of the recent study have now been published in Mayo Clinic Proceedings.

### **Linked health data to prescriptions**

The researchers reviewed participant data in Norway’s large Trøndelag Health Survey (The HUNT study). A total of 240 000 people from Trondheim have taken part in the survey since it began in 1984. Four survey rounds have been carried out to date.

The health survey enables researchers to follow how people’s health evolves over many years. This time they linked the HUNT data to information from the Norwegian Prescription Database.

The participants in the third HUNT study (2006-08) were tracked until 1 January 2018.

“Almost 5800 of the participants received their first prescription sleep medication during the study period,” says Ernstsén.

This means that approximately 17 per cent of the participants’ sleep issues were serious enough to warrant a prescription from their doctor. But the participants who were in the best condition used fewer of these prescription drugs.

### **Men benefit the most**

“These findings suggest that being in physically fit can also help you sleep better,” Ernstsén says.

Unfortunately, the beneficial effect of exercise is stronger for men than for women. The findings show that the fittest men had a 15 per cent lower risk of needing drugs for troublesome sleep issues.

“The corresponding percentage risk for the fittest women was much lower. But women who struggle with sleep can still benefit from getting in better shape,” says Ernstsén.

The extensive study follows the adult population over a long period of time. The researchers therefore conclude that these findings should influence the sleep advice that doctors give to their patients.

“Our findings support the idea that improving or maintaining fitness can be an effective alternative for preventing sleep problems,” says Ernstsén.

# Another reason to advocate for indoor cats

The next time you crack your backdoor to let your cat outside for its daily adventure, you may want to think again. For a cat, the outdoors is filled with undesirable potential. Like the risks of catching and transmitting diseases, and the uncontrollable drive to hunt and kill wildlife, which has been shown to reduce native animal populations and degrade biodiversity.

A new study by University of Maryland researchers has concluded that humans bear the primary responsibility, and that these risks can be significantly reduced by keeping cats indoors. The study's analysis used data from the D.C. Cat Count, a Washington, D.C.--wide survey that deployed 60 motion-activated wildlife cameras spread across 1,500 sampling locations. The cameras recorded what cats preyed on and demonstrated how they overlapped with native wildlife, which helped researchers understand why cats and other wildlife are present in some areas, but absent from others. The paper was published on November 21, in the journal *Frontiers in Ecology and Evolution*.

**America's most prolific rabies vector -- 61% spatial overlap with red foxes, and 56% overlap with Virginia opossums, both of which can also spread rabies," said Daniel Herrera, lead author of the study and Ph.D. student in UMD's Department of Environmental Science and Technology (ENST). "By letting our cats outside we are significantly jeopardizing their health."**

In addition to the risk of being exposed to diseases that they can then bring indoors to the humans in their families (like rabies and toxoplasmosis), outdoor cats threaten native wildlife. The D.C. Cat Count survey demonstrated that cats that are allowed to roam outside also share the same spaces with and hunt small native wildlife, including grey squirrels, chipmunks, cottontail rabbits, groundhogs, and white footed mice. By hunting these animals, cats can reduce biodiversity and degrade ecosystem health.



"Many people falsely think that cats are hunting non-native populations like rats, when in fact they prefer hunting small native species," explained Herrera. "Cats are keeping rats out of sight due to fear, but there really isn't any evidence that they are controlling the non-native rodent population. The real concern is that they are decimating native populations that provide benefits to the D.C. ecosystem."

In general, Herrera found that the presence of wildlife is associated with tree cover and access to open water. On the other hand, the presence of cats decreased with those natural features but increased with human population density. He says that these associations run counter to arguments that free-roaming cats are simply stepping into a natural role in the ecosystem by hunting wildlife.

"These habitat relationships suggest that the distribution of cats is largely driven by humans, rather than natural factors," explained Travis Gallo, assistant professor in ENST and advisor to Herrera. "Since humans largely influence where cats are on the landscape, humans also dictate the degree of risk these cats encounter and the amount of harm they cause to local wildlife."

Herrera encourages pet owners to keep their cats indoors to avoid potential encounters between their pets and native wildlife. His research notes that feral cats are equally at risk of contracting diseases and causing native wildlife declines, and they should not be allowed to roam freely where the risk of overlap with wildlife is high – echoing previous calls for geographic restrictions on where sanctioned cat colonies can be established or cared for.

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# HOW TO START EXERCISING WHEN YOU REALLY DON'T WANT TO

As lockdowns began around the world, many of us optimistically saw it as a sort of New Years resolution opportunity. We promised ourselves we would lose weight, eat better, and emerge from quarantine like a butterfly from a chrysalis.

If you're laughing right now, you probably also know about how well that works for most people. It's not easy to stick to new habits, and most of us have ended up overeating and binge watching Netflix instead of turning over a new leaf.

Luckily, there are ways you can motivate yourself to get going at a new habit, even if you don't want to in that given moment.

#### Allow yourself to be bad at exercising

So your end goal is to have a perfect six pack, and right now you can't even do one crunch without gasping for breath. That's okay. Even if you're only wobbling your way through a single crunch, that's more than you did the day before.

It's fine to only run for 30 seconds, because that's better than nothing. Our mind tends to let us slip back to the easiest possible thing, so if the easiest possible thing is running for one minute instead of not running at all, your worst days will still have you ahead.

#### Lower your expectations

We all have an image of our head as to what "perfect" looks like. Not only do you want to run a marathon, but you also want to be #1 on the podium. Stop setting unrealistic expectations for yourself. Instead, make your goal something you know you can achieve—such as being able to run for two minutes at a time instead of just one.

You can always build off those expectations, but it's a lot harder to struggle for a goal you may never be able to attain.

Setting a habit doesn't mean waking up a vegan athlete who can bench press a truck. It's about helping yourself become one step better than nothing, one step at a time. You can certainly build yourself to whatever level that you want, but in order to reach those goals you need steps—not a wall.



**By the way, did you know that we recently launched Vet Candy Fit? Now you can enjoy your favorite Vet Candy podcasts while you work out on a treadmill, elliptical, or stationary bike. Learn more at [myvetcandy.com/fit](https://myvetcandy.com/fit) and start getting smarter and stronger today!**

# The real benefits of walking in a winter wonderland

Research has shown for the first time that spending time in snowy surroundings can improve how you feel about your body.

Previous studies have found that green spaces, such as parks and forests, and 'blue environments', such as being at the coast or close to a river, can improve body image.

Now new research, published this month in the *International Journal of Environmental Research and Public Health*, has discovered that white spaces, in this case a snow-covered woodland, can have a similar effect.

Led by academics from the Medical University of Silesia, in Katowice, Poland, and Anglia Ruskin University (ARU) in the UK, the research was carried out last winter and involved 87 women, with an average age of 24, who took part in small groups.

Before and after walking in a snowy woodland in the Silesia region of Poland, the participants completed a measure of their body appreciation. Before the walk, they also completed measures of connectedness to nature and self-compassion.

The study found that spending a short amount of time in nature – in this case approximately 40 minutes – results in greater body appreciation. Additionally, people who scored highly in the trait of self-compassion displayed greater improvement in body appreciation.

As well as being the first study to examine the body image benefits of spending time in a snowy landscape, it is also the first to show that these benefits can be achieved when being in nature in small groups, rather than individually.

Lead author Dr Kamila Czepczor-Bernat, of the Medical University of Silesia, said: "A body of evidence now exists showing that nature expo-

sure – living close to, frequenting, or engaging with environments such as forests and parks – is associated with a range of physical and psychological wellbeing benefits.

"However, in contrast to previous studies which have focused on the impact of blue and green natural environments on body image outcomes, ours is the first to show the positive impact on body appreciation from spending time in snow-covered environments."

Senior author Viren Swami, Professor of Social Psychology at Anglia Ruskin University (ARU), said: "Natural environments help to restrict negative appearance-related thoughts and shift attention away from an aesthetic view of the body and toward greater appreciation of the body's functionality. Positive body image is important not only in its own right, but has other beneficial effects, including more positive psychological wellbeing.

"Our findings demonstrate the importance of ensuring that everyone can access restorative natural environments, which may be a cost-effective way of promoting healthier body image, and highlight that there are significant benefits of being outside in nature, whatever the weather."







# DO YOU KNOW ABOUT THESE NEW HEALTH TRENDS?

*By Shauna Simmons*

After COVID-19 pushed us into a world of seclusion, many new health and wellness habits began trending. The thing about health and wellness is that the habits we create greatly shape our quality of life. The better our habits, the better our lifestyles become. So what current trends might help us pay better attention to our physical, emotional, spiritual, intellectual, and occupational wellbeing?

## **CARING FOR YOUR IMMUNE SYSTEM**

The pandemic has raised a lot of awareness on immune health. People are now more aware of the benefits of maintaining a healthy immune system. Since our immune system is directly related to our ability to fight off viruses like COVID-19, immune boosters are trending like never before. It's best to create sustainable habits that promote health in the long run, rather than waiting until you are sick to begin working towards a healthy immune system.

## **MINDFUL FOOD HABITS**

Being at home more frequently has left many people contemplating their eating habits. After the pandemic, people have been eating at home more frequently, cooking more, and making it more of a ritual. People have also begun to utilize their food more intently. Scraps once seen as waste worthy are now finding their purpose in the kitchen.

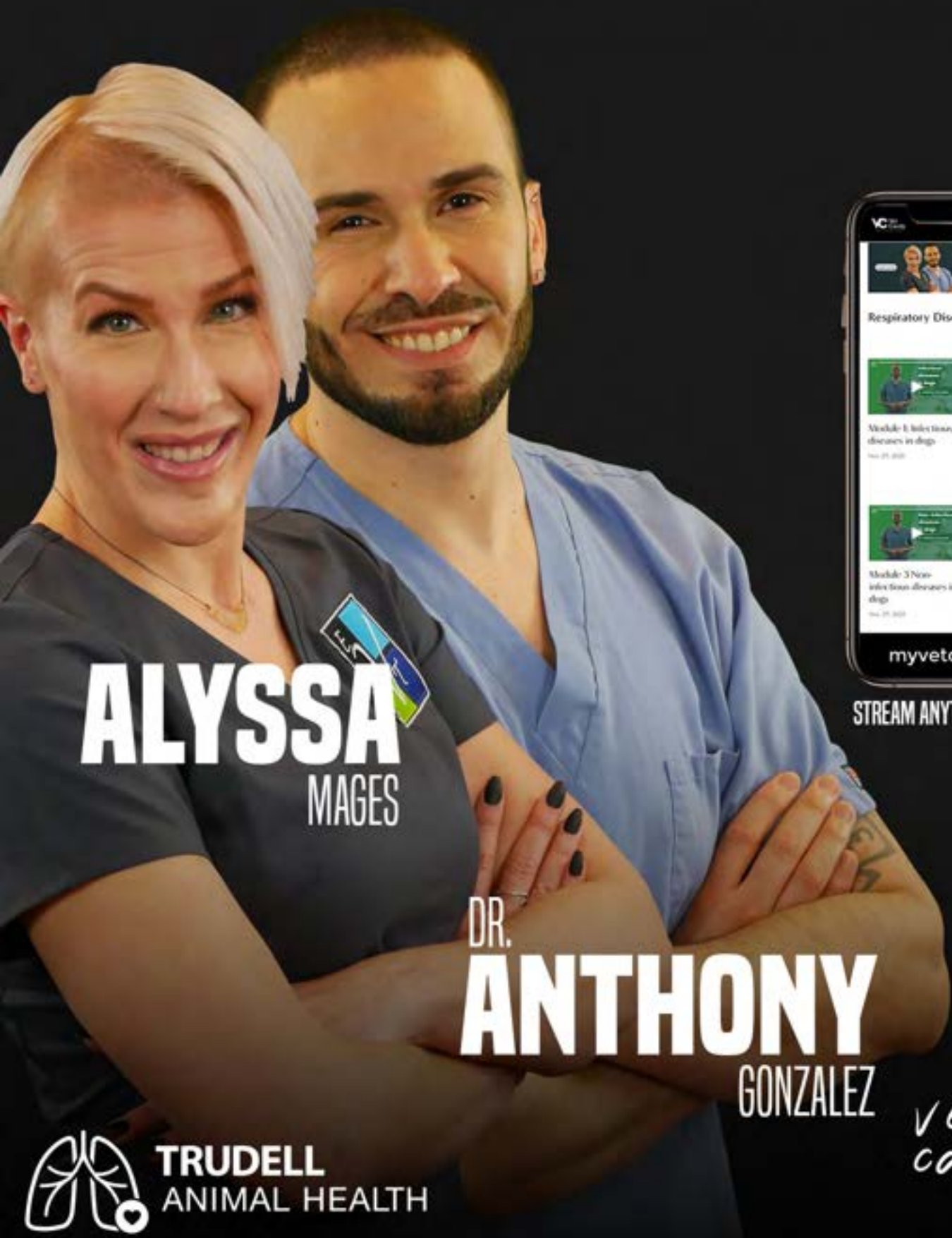
This is a way to combat some of the food insecurities that have come as a result of the pandemic and other issues in the U.S. With many people out of work, these new habits are helping people and families sustain themselves. Even some brands have offered subscriptions that give you lower prices for food that is perfectly fine, but not seen as marketable.

## **BREATHWORK, MEDITATION, AND MENTAL FITNESS**

Whether it's a meditation app, deep breathing yoga, or acknowledging your mental needs, self-care for your mind is important. It helps you challenge yourself in safe spaces and heal past trauma that might be standing in your way. It also allows you to better confront issues of overwhelming depression and anxiety. Practicing mental fitness could be going to therapy or reading a book. No matter what you choose, its role should be to help you stay sharp daily. Taking care of your health and wellness is one of the most important things you will ever do. You only get one body and one mind to work with. Forming healthy habits is a way to ensure you are promoting a healthy mind, body, and environment.



# MASTER COURSE IN RESPIRATORY DISEASE



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# How to be more\* attentive to life

By Giselle Richardson

Each of us have only have about 25,000 mornings in our adult life to enjoy. How did you spend yours? If it was rushing around trying to get things done or you simply can't remember, it may be time to reorient your life so that you have moments that are more worthwhile. While sometimes rushing around is unavoidable, you can carve out memorable moments throughout your life with these 3 tips.

## Unplug

You can't have a moment if you're scrolling through social media or checking your e-mail. Take time to look away from your screen, and see the people and places around you. Watch the sunrise or sunset, talk with your family over coffee, or simply be. Even an ordinary moment can be a pleasant one if you're present to enjoy it.

## Listen

Many times when we are speaking with others we aren't listening—we're waiting for our turn to speak. While taking turns is important, you'll get much more out of the conversation if you truly soak up what a person is saying. Even if you don't agree with them, listening is the first step in good communication.

## Let go of work

Many of us work full time, and if we don't we often take care of kids—also full time. When we come inside the door or tuck the kids in bed however, we often try to transfer to home life while carrying the burden of chores or parenthood with us.

It's important to have time off, but also to make sure that time off is quality. Take a few minutes to let go of work so you can truly be present when the day is done.

**Life is precious, and the best way to get the most out of it is to be attentive to what we have. Try these tips for a more focused life.**



# REVIEW PROVIDES NEW PERSPECTIVE ON GRIEVING *loss of a pet*



A new review published in the CABI journal *Human-Animal Interactions* provides counselors with new perspectives to consider in their practice when working with clients who are grieving the loss of their pet.

The research highlights how during the COVID-19 pandemic, there was more opportunity for people to spend longer with their pets – relying on them to help maintain a sense of normality and provide security during periods of isolation.

Dr Michelle Crossley, Assistant Professor at Rhode Island College, and Colleen Rolland, President and pet loss grief specialist for Association for Pet Loss and Bereavement (APLB), suggest that pets play a significant role in the lives of their caregivers.

However, they add that grieving the loss of a pet continues to be disenfranchised in society. Dr Crossley said, “Perceptions of judgment can lead individuals to grieve the loss without social support.”

“The present review builds on research in the field of pet loss and human bereavement and factors in the impact of the COVID-19 pandemic on human-animal attachment.

“A goal of the present review is to provide counsellors with perspectives to consider in their practice when working with clients who have attachments to their companion animals.

“It also aims to acknowledge the therapeutic benefits of working through the grief process to resolution as a way to continue the bond with a deceased pet.”

The researchers say that stigma associated with grieving a loss can complicate the healing process and that counselors would expect to see more clients wanting to discuss their grieving – particularly during the COVID-19 pandemic.

They add that while empathy may come more naturally when discussing human loss, there are other types of loss that are not acknowledged or given a similar amount of attention by society.

This includes death by suicide, a lost pregnancy/-miscarriage, death from AIDS and the death of a pet.

Ms Rolland said, "When relationships are not valued by society, individuals are more likely to experience disenfranchised grief after a loss that cannot be resolved and may become complicated grief.

"The major goals of this review are to provide counsellors with an aspect to consider in their therapeutic work with clients dealing with grief and loss and present different factors that may impact how one grieves the loss of a pet.

"It also discusses considerations for counseling that can be utilized to foster a supportive and non-judgmental space where clients' expressions of grief are validated."

Dr Crossley and Ms Rolland, in their review, suggest that having a safe space to discuss the meanings associated with the companion animal relationship is beneficial for moving through the loss in a supportive environment, leading to the resolution of the pain of the loss.

Dr Crossley added, "When an individual loses a pet, it can be a traumatic experience, especially given the strength of attachment, the role the pet played in the life of the individual, as well as the circumstances and type of loss.

"Giving a voice to individuals grieving a disenfranchised loss is one way in which counsellors can help clients through pet loss.

"It is also important to integrate pet loss work into counseling interventions and coping strategies that are already being used in the therapeutic space."

The researchers believe that group counselling sessions in person or web-based chatrooms can both work as healing spaces for those working through grief.

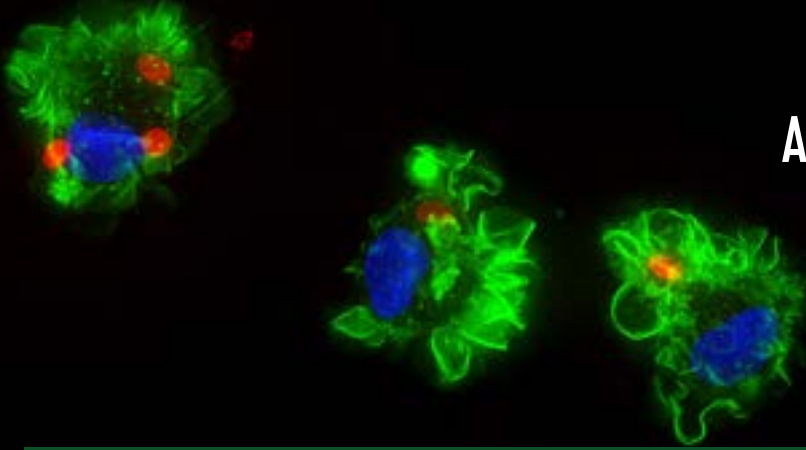
Counselors can also engage both children and adults who are navigating pet loss by providing them with supplies and space to paint, draw, or use figures to draw out their anxieties and fears about the loss, they state.



In conclusion, Dr Crossley and Ms Rolland argue that understanding the grief process of pet owners can better prepare professionals to foster non-judgmental spaces where clients can feel open to display their grief.

Furthermore, providing empathy and validating the feelings that any type of loss of a pet can create for the clients may lead to more open sharing among the community further enhancing the healing process and a possible societal shift in the recognition of grieving pet loss as a normative experience.





The image shows an immune cell that has been infected by Toxoplasma parasites (red). The surface of the cell is colored in green and the nucleus of the cell in blue (Image: Antonio Barragan)

## IDENTITY THEFT THE SECRET OF THE CAT PARASITE'S SUCCESS

In order to fight infections, the various roles of immune cells in the body are very strictly regulated. Scientists have long wondered how Toxoplasma manages to infect so many people and animal species and spread so efficiently.

"We have now discovered a protein that the parasite uses to reprogram the immune system", says Arne ten Hove, researcher at the Department of Molecular Biosciences, Wenner-Gren Institute at Stockholm University.

The study shows that the parasite injects the protein into the nucleus of the immune cell and thus changes the cell's identity. The parasite tricks the immune cell into thinking it is another type of cell. This changes the gene expression and behavior of the immune cell. Toxoplasma causes infected cells which normally should not travel in the body to move very quickly and in this way the parasite spreads to different organs.

The phenomenon has been described as Toxoplasma turning immune cells into Trojan horses or wandering "zombies" that spread the parasite. The newly published study provides a molecular explanation for the phenomenon, and also shows that the parasite is much more targeted in its spread than previously thought.

"It is astonishing that the parasite succeeds in hijacking the identity of the immune cells in such a clever way. We believe that the findings can explain why Toxoplasma spreads so efficiently in the body when it infects humans and animals," says Professor Antonio Barragan, who led the study, which was carried out in collaboration with researchers from France and the USA.

## ABOUT THE PARASITE TOXOPLASMA AND THE DISEASE TOXOPLASMOSIS:

Toxoplasmosis is probably the most common parasitic infection in humans globally. Toxoplasma also infects many animal species (zoonosis), including our pets. The WHO has estimated that at least 30% of the world's human population is a carrier of the parasite. Studies indicate that 15-20% of the Swedish population carry the parasite (the vast majority without knowing it). The incidence is higher in several other European countries.

Felines, not just domestic cats, have a special place in the life cycle of Toxoplasma: it is only in the cat's intestine that sexual reproduction takes place. In other hosts, for example humans, dogs or birds, reproduction takes place by the parasite dividing.

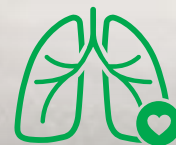
Toxoplasma is spread through food and contact with cats. In nature, the parasite spreads preferentially from rodents to cats to rodents and so forth. The parasites are "sleeping" in the rodent's brain and when the cat eats the mouse, they multiply in the cat's intestine and come out via the feces. The parasite ends up in the vegetation and when the rodent eats the vegetation it becomes infected. Humans become infected through meat consumption or through contact with cats, specifically cat feces.

The parasite causes the disease toxoplasmosis. When a person is infected for the first time, mild flu-like symptoms occur that can resemble a cold or a flu. After the first infection phase, the parasite transitions to a "sleeping" stage in the brain and begins a chronic silent infection that can last for decades or for life. The chronic infection usually causes no symptoms in healthy individuals. Toxoplasma can, however, cause a life-threatening brain infection (encephalitis) in people with a weakened immune system (HIV, organ transplant recipients, after chemotherapy) and can be dangerous to the fetus during pregnancy. Eye infections can occur in otherwise healthy individuals.



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# Chronic canine bronchitis and feline asthma management

Melissa Evans, CVT, LVT, VTS(ECC)

Say the words “inflammatory airway disease” and expect to see fear flicker across the faces of clients waiting at a veterinary hospital.

Yes, for cat and dog owners alike, inflammatory airway disease sounds downright scary. However, (as with all illnesses) the more people know about the causes, symptoms, and treatments, the less frightening each diagnosis becomes.

There are two types of inflammatory airway disease we will be learning about today: canine chronic bronchitis and feline asthma. These are both characterized by a chronic cough and airway inflammation and may cause bronchoconstriction.<sup>1,2</sup> Management of these airway diseases is focused on treating both acute flareups and chronic symptoms.

## 69 Time is of the Essence

When a patient walks through the door, it's necessary to treat them as emergent because they could be experiencing respiratory distress due to exacerbation of asthma or bronchitis.

A quick, thorough history from the owner should be taken. The goal? Discover what airway disease the patient may have.

The first step is to ensure the patient can breathe. Airway constriction and inflammation can progress to full airway obstruction quickly! Airways can be dilated by using an injectable steroid, such as dexamethasone. Dexamethasone is an anti-inflammatory glucocorticoid that is given at a dose of 0.1-0.5mg/kg intramuscularly (IM) or intravenously (IV).<sup>3</sup> An inhaled or injectable bronchodilator should also be used. Terbutaline is a beta2 adrenergic agonist which opens the airways to help reduce constriction. It can be given IM or subcutaneously (SQ) at a dose of 0.01mg/kg.<sup>3</sup> Inhaled bronchodilators come in short and long-acting formulations.

Short acting formulations are used as a ‘rescue’ medication. They typically last for 4-6 hours and relax smooth muscle in the airway to reduce bronchoconstriction.



Short acting formulations are used as a ‘rescue’ medication. They typically last for 4-6 hours and relax smooth muscle in the airway to reduce bronchoconstriction. Albuterol is the most common rescue bronchodilator (but salbutamol may also be used).

Be careful...

Airway inflammation may worsen if albuterol is used long term, so these are truly used in emergent situations.

### The Lifesaving Power of Inhaled Medications

Unlike humans, pets cannot speak using words. Naturally, they will not understand verbal commands such as “breathe deeply” or “wait ten seconds.” Therefore, veterinarians must get creative and use medical tools at their disposal when it comes to inhaled medications. Since an aerosol chamber is needed to make sure the patient successfully breathes in the medication, a mask can be placed over the muzzle. We want a tight fit. The inhaler is puffed into the chamber and the patient is allowed to take 5-7 breaths. These can be administered at a dose of 1-2 puffs every 30 min for less than 4 hours.<sup>3</sup>



## Here is another good tip.

Rescue inhalers and aerosol chambers can be prescribed to owners. This way, they can help manage acute bronchoconstriction from the comfort of their home. That means less stressful car rides and anxiety for our furry friends.

Once acute bronchoconstriction has been addressed, management can focus on long term medication. A short term course of systemic steroid should be prescribed for 10 days to reduce ongoing airway inflammation. Prednisolone (1-2mg/kg every 24 hours) should be given to cats and prednisone (0.5-1mg/kg every 24 hours) should be prescribed to dogs.<sup>2</sup> Corticosteroids are considered the cornerstone of treatment and must be administered orally, injectably or via inhalation. Inhaled steroids help limit systemic absorption which can prevent any adverse effects.

There are some unfavorable effects of systemic steroids, however.

These include behavioral changes, lethargy, weight gain, vomiting and diarrhea. Similarly, patients might be extra thirsty. Or experience urinary incontinence and be at increased risk for infections (such as urinary tract infections). Animals may also show immunosuppression and are at risk for iatrogenic hyperadrenocorticism.<sup>3</sup>

In order to switch an animal from systemic steroids to inhaled steroids the systemic steroids must be tapered and inhaled steroids started. The systemic and inhaled steroids should overlap for two weeks to give the inhaled steroids time to take effect. Fluticasone can be used at a dose of 1 puff of 110 ug every 12 hours for cats and dogs under 20kgs. Dogs over 20 kgs can be given 1 puffs of 220 ug fluticasone every 12 hours. A combination inhaler of an inhaled

steroid and long acting bronchodilator may be used instead. Fluticasone/salmeterol may be given to cats and dogs under 20kgs at a dose of 1 puff (115ug/21ug) every 12 hours. Dogs over 20kgs should be given 1 puff (230ug/21ug) every 12 hours.<sup>3</sup>

### Compliance and Education Go Hand In Hand

Client compliance and education are two sides to the same coin.

Start by having an honest conversation with the family. Discuss disease management. For example, veterinarians can prompt with a leading question such as, "What environmental factors that may trigger attacks? Can you think of any steps that can be taken to minimize them?"

We want clients to feel empowered about their pet's health! Cat owners may be instructed to administer rescue inhalers during flare ups to help stabilize their pets at home. Albuterol has not been shown to help manage canine bronchitis flare ups at home.<sup>3</sup> Learning about pet health is an ongoing process, and clients should walk away educated on the importance of giving medications for long term disease control.





# Can you solve these mini mysteries?

Dr. Anthony Gonzalez

Veterinary criticalist, Dr. Anthony Gonzalez has some mysterious cases for you to solve. Read through the cases. The correct answers are located at the end.

## ★ Case #1

Henry is an estimated 6-month-old intact male cat who was recently found as a stray. Henry was presented to your clinic with signs of sneezing, lethargy, nasal congestion, ptialism, and a mild fever (103.5 F). He seemed to be very bright and eating well the first few days, but signs started building about 48 hours ago. Henry is still adjusting to the new home and is still an indoor/outdoor cat. The pet owner has at least 4 other cats in the home.

### 1 What would you like to do next?

- A. Auscultate the lungs
- B. Examine the oral cavity
- C. Ask more information about the history of the cat, including vaccination status
- D. All the above

#### Examination:

Examination reveals that Henry is about 5% dehydrated. Nasal and ocular discharge is yellow and thick with minimal air flow appreciated from both nares. Lungs sound clear; however, referred upper airway noise is appreciated. There are superficial ulcers along the periphery of his tongue and the lining of the mouth. Based on your physical examination, you suspect this is a disease of the upper respiratory tract.

### 2 What would you like to do next for diagnosis?

- A. Ultrasound
- B. Chest radiographs
- C. PCR testing
- D. Fecal

The results of the PCR testing confirm calicivirus.



Treatment for calicivirus is focused on supportive care including:

- Use of nebulizer and saline nasal drops to break up the ocular and nasal discharge
- Broad-spectrum antibiotic to treat for secondary opportunistic bacterial infections.
- Analgesia for tongue ulcerations
- Nutritional support and fluid therapy as indicated.

In this case, there are multiple cats in the household and those cats are going outdoors – which means they could infect other cats in the neighborhood. These cats should be quarantined.

Cats that become carriers will continue to shed the virus in the home, even after they recover from the infection. Owners may need to re-home carrier cats before disinfecting the home to protect the remaining animals from exposure.

Vaccines are not 100% protective against calicivirus, but they can greatly reduce the severity of the infection if a cat is exposed. Several combination vaccines against FCV, feline herpes virus type 1 and feline panleukopenia virus are available, which can be given nasally or as an injection.

# \* Case #2

Max, a 2-year-old mixed-breed dog is presented to your clinic with signs of coughing, lethargy, and a mild fever (103.5 F). Max is a social butterfly who goes to a doggie day care daily, visits the dog park at least once a week, and also goes to the groomer once a month. The pet owner mentions that several other dogs at doggie day care have been sick lately. The dog is examined at your clinic.



## 3 What would you like to do next?

- A. Auscultate the lungs
- B. Examine the oral cavity
- C. Ask more information about the history of the dog, including vaccination status
- D. All the above

### Examination:

Examination reveals that the dog's lungs are congested. The respiratory issues are confined to the lower respiratory tract.

Treatment for Canine Influenza virus is focused on supportive care. That means using nebulizers to help with breathing. Non-steroidal anti-inflammatory drugs can lower the fever and broad-spectrum antibiotics can be used to treat secondary opportunistic bacterial infections.

In this case, this dog is a risk to other dogs. This dog should be quarantined to help stop the spread of disease. Vaccines are not 100% protective against Canine Influenza, but they can greatly reduce the severity of the infection.

## 4 What would you like to do next for definitive diagnosis?

- A. Ultrasound
- B. Chest radiographs
- C. PCR testing
- D. Fecal

The results of the PCR testing confirm Canine Influenza H3N2.



# ★ Case #3

Sprinkles, a 4-year-old neutered male domestic shorthair who has been noted to be coughing for the past several days without much improvement. No prior health concerns, no current medications, no travel history, indoors only, single cat household.

Before you even put hands on Sprinkles to examine him, you should already be thinking of differentials for a coughing indoor only cat.

Here are some differentials that should be considered:

- Feline Asthma
- Infectious
- Congestive heart failure
- Foreign body
- Neoplasia
- Heartworm disease

Of course we will want more information on the cough, including if the cough is wet/dry, productive, triggered by certain activity, or persistent. When we think about cats and a cough, our top considerations are generally going towards feline asthma versus congestive heart failure. My rule of thumb is that coughing cats are inflammatory until proven otherwise.

During your initial evaluation you note that Sprinkles has mild respiratory effort in addition to being tachypneic.



# \* Case #3

**5 Question:** During which half of a breath cycle would you expect cats with lower airway disease to demonstrate the most effort?

- A. Inspiratory phase
- B. Expiratory phase

The expiratory phase will demonstrate the most abnormal effort with lower airway disease. Expiration is normally a passive process due to the elastic recoil of the lungs. However, with lower airway disease, there is inflammation and secretion production that clogs the airways and creates resistance that the patient needs to breathe against, hence the efforted pattern.

One of the more prevalent feline inflammatory airway diseases include feline asthma and chronic bronchitis. While the pathophysiology of feline asthma is not completely understood, it is presumed to originate as a type I hypersensitivity reaction to aeroallergens. Inhaled allergens react with immunoglobulin E (IgE) that is bound to previously sensitized mast cells. This stimulates the degranulation of mast cells and the sudden release of inflammatory mediators (histamine, serotonin, cytokines, etc), resulting in the vascular leakage and smooth muscle spasm that occurs during an asthma attack. Allergens that are commonly implicated include dust, cigarette smoke, mildew, mold, parasitic, pollen, cat litter, and household chemicals.

Sneezing and ocular-nasal discharge may be seen. There is a wide spectrum of illness severity with some cats seeming relatively normal besides harsh lungs sounds versus some cats that are cyanotic and in respiratory distress.



**6 Question:** You decide to take thoracic radiographs. Which pulmonary pattern would be most supportive of lower airway disease?

- A. Diffuse nodular pattern
- B. Cranioventral alveolar pattern
- C. Diffuse interstitial pattern
- D. Diffuse bronchial pattern

Classic radiographic findings for feline asthma include diffuse bronchial to a bronchointerstitial pattern, hyperinflation due to air trapping, and collapse of the right middle lung lobe due to mucus plug. It should be noted that the severity of radiographic pulmonary infiltration was not found to be associated with duration of clinical signs.

Additional diagnostics would include an airway wash for cytologic examination, culture and infectious disease testing (mycoplasma PCR). If cytologically there is an eosinophilia present then the diagnosis of feline asthma is confirmed. Chronic bronchitis would have a dominance of neutrophils.

The most important part of treatment is going to be starting corticosteroids. Besides anti-inflammatory effects they will inhibit cytokine gene expression, stabilize cell membranes, and decrease the production of inflammatory mediators. Oral or injectable steroids can be given; however, use of metered dose inhalers and aerosol chambers have quickly become the standard of care in feline medicine. Avoiding system effects, aerosolized drugs are delivered right to the lungs and exert local effects. The aerosol chambers are well tolerated and easy to condition your pet to for routine use. Given fluticasone's slow absorberency, concurrent oral steroids must be given for the first 10 days of therapy.



## ★ Case #3

**7 Question:** True or False: The use of albuterol for management of feline asthma should be given routinely on a daily basis.

- A. Inspiratory phase
- B. Expiratory phase

### Summary of therapy:

- **Emergent:**
  - Supplemental oxygen
  - Albuterol 90 µg/puff by MDI, 1 puff every 30 minutes as needed for acute control for up to 6 hr intervals
  - Terbutaline 0.01 mg/kg SQ IM IV, works within 15 minutes of injection
- **Maintenance**
  - Prednisolone 1-2 mg/kg/day. The dose tapered by 25% every 2-4 weeks to lowest effective dose.
  - Fluticasone 110-220 mcg/puff by MDI
    - Found to not suppress HPAAs
    - Due to slow absorbcency, needs to be given concurrently with oral prednisolone for 10 days

### Owners to monitor for:

- Persistent coughing and/or wheezing
- Respiratory distress
- Squatting with the neck extended during coughing episodes
- Gagging or vomiting
- Open mouth breathing
- Labored breathing after exercise

### Home modifications for long term management:

- Avoid exposing the cat to cigarette and/or cigar smoke.
- Change furnace filters regularly.
- Control molds, mildew, and dust.
- Do not use perfumes, hair sprays, or air fresheners.
- Consider using an air filtration system, ideally a HEPA-type system.
- Use hypoallergenic household cleaning agents.
- Use shredded paper or even sand instead of cat litter.



## ★ Case #4

Ella is a 10-year-old spayed female Beagle. Ella is your 3 p.m. appointment this afternoon for coughing. Her owner reports that Ella has had a non-resolving cough that has been on and off for the past 4-6 months. The cough is described as dry and nonproductive.

# ★ Case #4

Common causes of coughing in dogs:

- Infectious
- Lung tumors
- Pleural effusion
- Upper airway obstruction w/ gastroesophageal reflux
- Interstitial lung disease
- Congestive heart failure

Coughing in dogs can often be mistaken with episodes of reverse sneezing and tracheal collapse. Effort should be made when distinguishing these airway episodes from each other as it can impact a therapy given in response. Youtube videos are always good auditory and visual references for owners.

You complete a thorough physical examination and on thoracic auscultation note the lungs sounded abnormal.

**8 Question:** Which abnormal lung sounds are associated with cases of lower airway disease?

- A. Expiratory wheezes
- B. Crackles
- C. Harsh
- D. All of the above

All of the above, correct. Patients with lower airway disease can develop any of these abnormal lung sounds depending on where they are in their disease state (chronicity, secondary insults). Evaluation for the presence of a heart murmur is important as cough can be highly associated with cardiac disease.

Canine chronic bronchitis (CCB) is a cough of more than 2 months duration without any underlying cause identified. Airway resistance is created as the airway lumen narrows due to airway thickening and mucus production.

CCB is like feline asthma in that resistance is greatest during expiration. However, it differs in that CCB does not cause bronchospasms.



**9 Question:** Which imaging modality is preferred for airway evaluation?

- A. Radiographs
- B. MRI
- C. Ultrasound
- D. Bronchoscopy

Bronchoscopy is the preferred imaging technique to evaluate the airways and requires moderate sedation or anesthesia. Airway sampling can be performed at that time either via a tracheal wash, blind bronchoalveolar lavage (BAL), or via use of bronchoscope to rule out underlying pneumonia or infectious causes for the cough.

After reviewing the diagnostic results, you feel that you have enough evidence to support a clinical diagnosis of CCB. Treatment is focused on reducing airway inflammation, reducing the cough, and improving stamina overall.

### **Treatment summary:**

- Prednisolone 1-2 mg/kg/d and then tapered to lowest effective dose
- Fluticasone 10-20 ug/kg via space chamber q12
- Bronchodilators have limited evidence of efficacy in dogs
- Antibiotics with clinical suspicion of secondary infection
  - Doxycycline, Azithromycin, Fluoroquinolones
- Cough suppressants
  - Need to be given consistently for steady state to be reached

Home management:

- Eliminate any environmental toxins (ex. smoking, incents. air fresheners)
- Avoid or treat obesity
- Use of a harness instead of a collar
- Behavioral modification



# Answers to Mini Mysteries

with Dr. Anthony Gonzalez

**1** D. All the above

**2** C. PCR testing

**3** D. All of the above

**4** C. PCR testing

**5** B. Expiratory phase

**6** D. Diffuse bronchial pattern

**7** False: Albuterol should be available but for use as a rescue drug for the bronchospasms that occur during an acute crisis episode. Due to the S-enantiomer found in inhalant albuterol, chronic use promotes airway inflammation and bronchospasms. Terbutaline given as a subcutaneous injection works well in cats as well.

**8** D. All of the above


**9** D. Bronchoscopy

# Are lactate levels in cats a good prognostic tool for emergency respiratory distress?

Researchers sought to evaluate the prognostic utility of plasma lactate concentration upon admission and plasma lactate clearance in cats presented to the emergency room with respiratory distress.

Seventy-one cats presented in respiratory distress to the ER at a university teaching hospital were evaluated.

According to the study, the initial admission lactate concentration was not associated with survival, duration of hospitalization, vital parameters, or underlying etiology for respiratory distress. However, lactate clearance was significantly associated with survival and length of hospitalization.



Results of this study suggest that lactate clearance may be a helpful prognostic tool for cats.

To learn more, click on the link below:

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# PARADOXES OF THE BRACHYCEPHALIC DOG-OWNER RELATIONSHIP

Popularity of brachycephalic dog breeds is likely at an all time high these days, with Frenchies leading the charge as influencers on Instagram, not to mention a Frenchie won the recent National Dog Show.

Even though these breeds have well-documented health issues, their popularity continues to soar. A study from 2168 owners of brachycephalic dogs evaluated health issues and owner awareness. The study involved 789 Pugs, 741 French Bulldogs, and 638 Bulldogs: The most common owner-reported disorders in their dogs were allergies, corneal ulcers, skin fold infections and Brachycephalic Obstructive Airway Syndrome.

One-fifth (19.9%) of owners reported that their dog had undergone at least one conformation-related

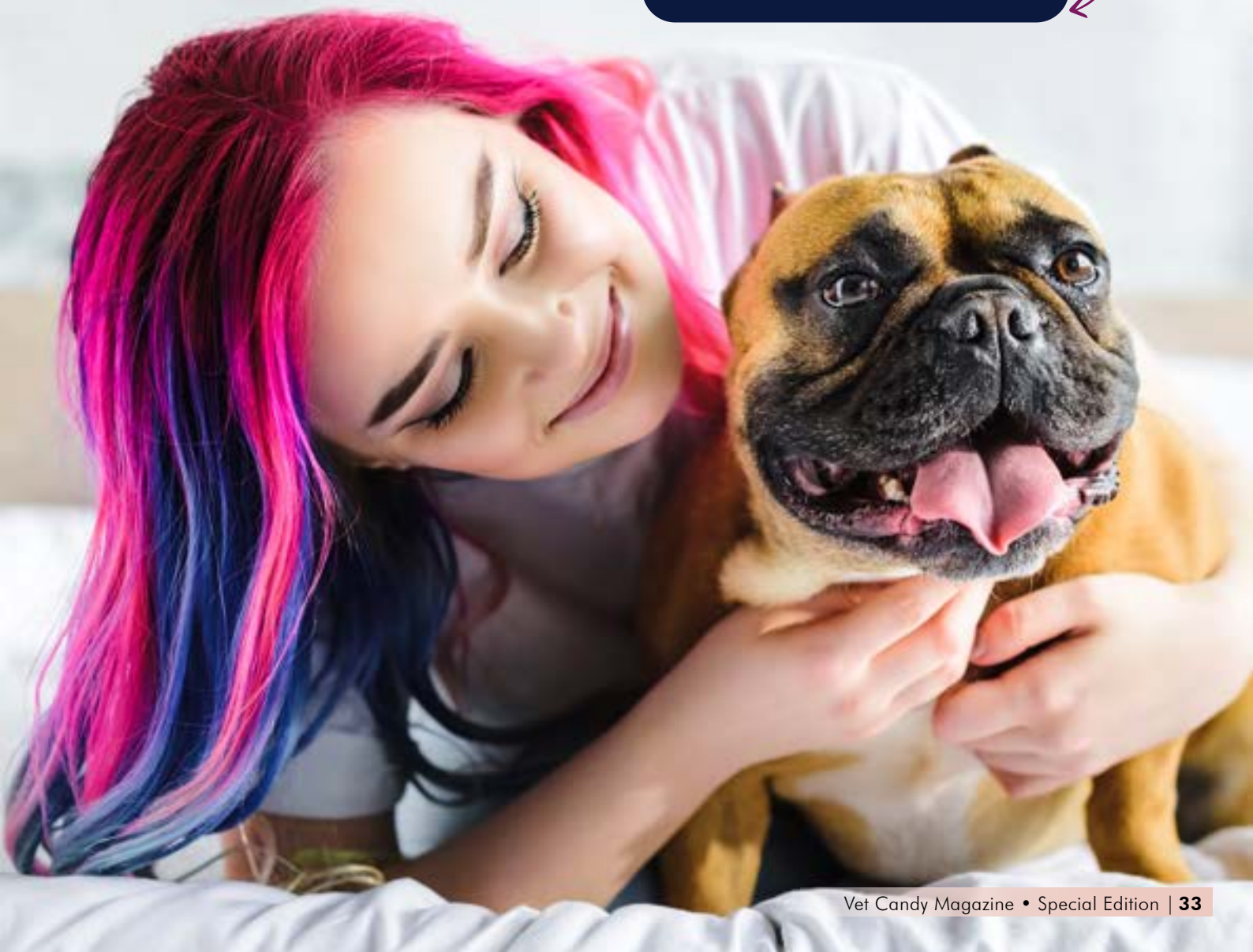
surgery, 36.5% of dogs were reported with a problem with heat regulation, and 17.9% with problems breathing.

Despite awareness of their dog's health issues, 70.9% owners considered their dog to be in very good health or the best health possible. Paradoxically, just 6.8% of owners considered their dog to be less healthy than average for their breed.

Dog owner-relationships were extremely strong across all three breeds. Emotional closeness to their dog was highest for owners of Pugs, female owners, and owners with no children in the household.

Read more by clicking on the link below

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# WHAT ARE THE MOST COMMON CAUSES OF UPPER RESPIRATORY *disease in cats?*

Researchers evaluated 94 cats who were diagnosed with upper respiratory disease.

The most common CT finding was rhinosinusitis (55.32%) followed by nasal neoplasia (26.6%) and nasopharyngeal polyp (14.89%), but in three cats, a cause of respiratory symptoms was larynx neoplasia, nasal dermoid cyst, and an oronasal fistula.

PCR test identified the most cause of rhinosinusitis was *Mycoplasma felis* while nasopharyngeal polyp were identified in 14 cats.

Nasal neoplasia as a primary CT diagnosis was determined in 25 cats. Histology diagnosis included four types of neoplasia - squamous cell carcinoma, sarcoma, adenocarcinoma, and aplastic carcinoma.

**Read more by clicking on the link below**



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# WHY WE SHOULD BE WORRIED ABOUT BULLDOGS

English Bulldogs must be bred with more moderate physical features, as a new study reports that the breed is significantly less healthy than other dog breeds. English Bulldogs are at increased risk of breathing, eye, and skin conditions due to their extreme physical features, including shortened muzzles, folded skin, and a squat body, reports the paper published in the journal *Canine Medicine and Genetics*. The authors advocate that the English Bulldog breed standards should be redefined towards more moderate characteristics, without which there may be a risk that the breeding of this type of dog is banned in the UK.

The English Bulldog was originally developed as a muscular and athletic dog for bull-fighting, but over the years has been bred to be a show and companion breed with a short (brachycephalic) skull, protruding jaw, skin folds, and squat, heavy build. This physique has been linked to several health conditions, and countries such as the Netherlands and Norway have restricted the breeding of English Bulldogs in recent years.



Authors from the Royal Veterinary College (Hertfordshire, England) compared the risks of common disorders in English Bulldogs to other dogs by analysing records from veterinary practices across the UK from 2016 using the VetCompass database.

Dan O'Neill and colleagues assessed the records of a random sample of 2,662 English Bulldogs and 22,039 dogs that were not English Bulldogs, and found that English Bulldogs were twice as likely to be diagnosed with at least one disorder than other dogs. The breed showed predispositions for 24 out of 43 (55.8%) specific disorders.

English Bulldogs were at 38.12 times greater risk of developing skin fold dermatitis than other dogs. They were also at 26.79 times greater risk of developing an eye condition called prolapsed nictitating membrane gland (also called 'cherry eye'), where the dog's third eyelid protrudes as a red swollen mass in the lower eye. English bulldogs were also at 24.32 times greater risk of mandibular prognathism (where the lower jaw is too long relative to the upper jaw), and 19.20 times at risk of brachycephalic obstructive airway syndrome (which can lead to severe breathing problems) compared to other dogs.

In contrast, English Bulldogs were at reduced risk of some conditions such as dental disease, heart murmur, and flea infestation compared to other dogs.

The authors also report that only 9.7% of English Bulldogs in this study were aged over eight years old compared to 25.4% of other dog breeds. This supports the view that a shorter lifespan in English Bulldogs is linked to their poorer overall health, suggest the authors.

Study author Dan O'Neill said: "These findings suggest that the overall health of the English Bulldog is much lower than that of other dogs. However, what is most concerning is that so many of the health conditions that English Bulldogs suffer from, such as skin fold dermatitis and breathing problems, are directly linked to the extreme structure of their bodies that has been selectively bred for.

"Given the continued popularity of the breed, the body-shape of the typical pet English Bulldogs should be redefined towards more moderate physical characteristics. Doing so will not only improve the dogs' health, but could also enable the UK to avoid following other countries in banning the English Bulldog on welfare grounds."

The authors suggest that future research could compare the predisposition of disorders between English Bulldogs with more moderate physical features compared to those with extreme physiques in order to assess potential welfare gains from breeding for less drastic characteristics.



# Impact of Obesity on Lung Function in Cats with Bronchoconstriction



Researchers evaluated the relationship between lung function measured by barometric whole-body plethysmography and obesity in cats with bronchoconstriction.

Fifty-three cats were included in the study.

Thirty-six cats were considered to be normal-weight cats and 17 cats were considered overweight or obese cats. Overweight cats were mainly male cats and older, and presented lower tidal volume values, lower minute volume values, and lower peak inspiratory and expiratory flows than normal-weight cats.

According to the study, overweight cats showed a more compromised lung function parameters related to restrictive pattern compared with normal-weight cats, but they did not show a higher bronchoconstriction level compared with normal-weight cats.

**Read more by clicking on the link below**



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# CASE OF THE HACKING KITTY

BY DR. CAREY HEMMELGARN

Seeing a cat struggle to breathe is a frightening experience.

When a family bursts through the doors of a veterinary hospital with their pet in respiratory distress, naturally there are concerns that this is an emergency situation.

Such was the case with Marcus, a 3-year-old male castrated domestic shorthair. Like many cats, Marcus occasionally coughed. Or in his owner's words, "hacked." However, they simply assumed it was due to hairballs, an annoying (but harmless) fact of life when it comes to sharing your home with felines. Unfortunately, this time Marcus' coughing was worse.

Much worse!

Suddenly, Marcus seemed to be in distress.

Before jumping into the specifics of how Marcus was treated, let's first examine his history. Marcus was adopted as a kitten and lived in the northeastern United States his whole life. There are two other cats in the house and one dog. He had no previous medical history, was up to date on vaccines, and on monthly heartworm and ectoparasite preventatives. He retroviral tested negative as a kitten.

On triage, several points were noted.

For starters, he was quiet and nervous. Marcus had a heart rate of 220 bpm with increased bronchovesicular sounds bilaterally. Abdominal palpation was normal. Limited orthopedic and neurological exam was within normal limits. Temperature was 102.5F. His mucous membranes were muddy to mildly cyanotic.

Still, Marcus was close mouthed breathing, he was tachypneic and dyspneic. At rest, we also heard intermittent wheezing.

Certainly, these were worrying signs...

So, the next step was to begin treatment to help sweet Marcus breathe easier!

## Tests and Steps Towards Treatment

To begin, Marcus started off with IV catheter placement. Next was administering two puffs of albuterol via inhaler and aerocat chamber. Marcus was placed in an oxygen cage with 40% oxygen. He was given a 0.2 mg/kg IV dose of butorphanol to provide sedation and reduce anxiety component to respiratory distress. After the butorphanol his respiratory rate had reduced (but was still elevated and had persistent increased respiratory effort).

To get to the root of the problem, diagnostics were performed.

These included: three view thoracic radiographs, complete blood cell count (CBC), chemistry panel, electrolytes, and venous blood gas. In addition, a snap pro-BNP was performed in house. Thoracic radiographs showed a diffuse bronchial to mild interstitial pattern with single lobar collapse.

Bloodwork demonstrated a moderate leukocytosis of 9000 (normal 2900-2830) characterized by a neutrophilia. Chemistry panel showed a mild hyperglycemia of 220 mg/dL suspected secondary to stress. Venous blood gas showed a mild respiratory alkalosis with hyperlactemia of 3.4. Snap pro-BNP was normal.

Ultimately, Marcus was lucky.

He was discharged on oral medication with inhaler therapy.

But before leaving the hospital, he had to be treated on IV fluid, terbutaline as a bronchodilator, anti-inflammatory doses of corticosteroids, oxygen therapy that was weaned to room air, and inhaled albuterol therapy.

## Feline Asthma: What it is (and isn't)

This case study is illuminating for several reasons. For one, it shines a spotlight on feline asthma.

What is feline asthma, you ask?

Well, feline asthma falls into a broad category of respiratory disease called inflammatory airway disease. The other disease that falls into this category is chronic bronchitis.<sup>1</sup> Feline asthma mimics the disease process in humans with the main characteristics being increased airway responsiveness and bronchoconstriction.<sup>1</sup> In people and in cats' asthma is suspected to occur secondary to exposure to allergens and the secondary inflammatory response. Other disease processes that can look similar in cats and should be excluded before diagnosing with inflammatory airway disease includes neoplasia, infectious including fungal diseases (pending geographical significance), heart worm disease, cardiac disease and parasitic disease.

The tricky part is that clinical signs for feline asthma are very similar to Marcus's presenting clinical signs!

For instance, coughing, wheezing, sneezing, tachypnea and dyspnea.

How to tell the difference?

Typically, additional testing is commonly recommended in cats presenting with respiratory distress to help diagnose feline asthma and exclude other disease processes include:

- Transtracheal wash or bronchoalveolar lavage- this can help to further differentiate respiratory disease, evaluate for eosinophilic component, and evaluate for the presence of bacteria and drug sensitivity.
- Echocardiogram- this helps to differentiate between respiratory and cardiac causes of respiratory distress. In Marcus the normal cardiac silhouette on radiographs and normal pro-BNP allowed cardiac disease to be deprioritized.
- Heart worm testing- in cats' antigen and antibody testing should be performed in cats
- Fecal testing- *Toxocara cati* and *Aelurostrongylus abstrusus* can present as respiratory disease in cats
- FeLV/FIV testing

Keep in mind, treatment may vary if any of the above diagnostics are abnormal/positive.

Mainstay treatment for feline asthma involves initial stabilization in an emergency setting, long term maintenance therapy and environmental modification. Initial stabilization is similar as described for Marcus, oxygen supplementation, bronchodilators, anti-inflammatory glucocorticoids, and sedation as needed.



For long-term maintenance therapy, we turn to bronchodilators and glucocorticoids. Bronchodilators help in the crisis and with long-term care. Can be given inhaled, injectable, or oral formulations. The most used bronchodilator is albuterol which is delivered through an inhaler. This is used in an asthmatic crisis either at home or in a clinic setting. Normal dose is 2 puffs every 4-6 hours if needed. Terbutaline and aminophylline are injectable medications that are given during times of hospitalization. Theophylline is an oral bronchodilator that has also been used in asthmatic patients.

Then there are glucocorticoids.

Glucocorticoids are used to help combat the immense inflammatory component to this disease process. Glucocorticoids can also be given in many formulations including: inhaled, injectable, oral and compounded transdermal forms. In an acute crisis setting injectable medications are recommended. Long term at home either oral or inhaled therapies are reached for. Long term oral glucocorticoids can lead to deleterious side effects in some cats including diabetes mellitus and exacerbation of underlying cardiac disease. Inhaled glucocorticoids are helpful in long term management as they can be easier and more routinely administered than daily oral medications. It is ideal for a patient to be on long term inhaled therapy instead of oral steroid therapy.

## Familiarizing Cats with Inhalers

Inhalers can be immensely "paw-sitive" for cats!

But using inhalers in cats requires acclimatation. The last thing we want is to induce more stress. Slow, gradual introduction is key. There are plenty of excellent YouTube videos showing how to introduce the inhaler with positive reinforcement. Over time, cats will tolerate the inhaler being held up to their face.

Be patient.

## What's Going on in the Cat's Immediate Environment?

Likewise, it's important to look at environmental factors.



That's because environmental modification can be very helpful in long term reduction of allergens. Many litter brands will create aerosolized dust which can be inhaled and trigger inflammation. Combat this by switching to a low dust producing litter – especially for asthmatic patients! Some cats can benefit from allergen testing through a dermatologist too.

Using air filters/air purification in the house (or particularly in whichever room the cat spends the most time in) can reduce circulating allergens.

Another easy tip: vacuum regularly.

## Final Thoughts

Fortunately, in the case of Marcus, initial treatment and at-home follow-up recommendations proved successful.

Remember, trying a few different modifications and in some cases, medications may be needed to identify what works best for each patient. The goal is to minimize oral medications, work for inhaled prevalent medication options and environmental modifications to minimize allergen burden.

That way, we have happy and healthy cats!

"I always recommend the AeroKat® and AeroDawg® Chambers to my patients because I've seen firsthand that they can be trusted to deliver the intended dose for management of respiratory diseases."





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## HOUSEHOLD TRANSMISSION OF **SARS-COV-2** FROM HUMANS TO PETS

Researchers evaluated pets in households with one or more confirmed SARS-CoV-2 infection in humans. Among 119 dogs and 57 cats with completed surveys, clinical signs consistent with SARS-CoV-2 were reported in 20 dogs (21%) and 19 cats (39%).

Out of 81 dogs and 32 cats sampled for testing, 40% of dogs and 43% of cats were seropositive, and 5% of dogs and 8% of cats were PCR positive.

Preventative measures showed a slightly protective trend for both illness and seropositivity in pets, while sharing of beds and bowls had slight harmful effects.

Read more by clicking on the link below:

[CLICK HERE](#)





# This is how you can get your clients on board with inhalers

By Dr. Amanda Steffen



It is a question many in the veterinarian community grapple with. Helping pet owners make informed decisions on behalf of their animals is an important part of what we do. From explaining a diagnosis to going over medical terminology and treatments, there is a lot of knowledge to share.

However, that doesn't necessarily mean doing so is easy!

On the contrary, educating clients is a skill that takes practice.

One way to get better at communicating? Look at case studies. In the summary below, let's explore how one client learned that using an inhaler is the best care for cats with asthma, plus examine how veterinarians can provide tips and tricks for client-friendly education.

## The Story of Little Man's Feline Asthma

It all started with a sweet orange tabby named Little Man. He presented for a cough that had been present his whole life and getting worse recently. Little Man was an older cat around 9 years of age. His owner approved bloodwork and radiographs and we noted two major changes:

- 1) Little Man was on the verge of becoming diabetic.
- 2) He appeared to have evidence of chronic lower airway disease or Feline Asthma.

Of course, we know most pet owners will be familiar with terms such as "diabetes" and "asthma." But when it comes to veterinary medicine, pet parents may need to be educated in language used for animal care vs. that used for human medical conditions. For example, when veterinary staff talk about asthma, and we describe it as chronic lower airway disease, we base this on x-ray findings. These findings show up as inflammation along the small branches of the lungs and vessels of the lungs. You can imagine with chronic inflammation in the lungs, there will be damage that is irreversible.

Understandably, hearing this news can be extremely distressing to clients!

As can the sight of their beloved cat wheezing, coughing, and open-mouthed breathing.

Because of this, it was imperative to explain our main goal to Little Man's owner: support the lungs by decreasing the inflammation present and preventing future inflammation.



## Cat Inhaler to the Rescue

Luckily, there is another option for Little Man that will give him a great quality of life (minus the steroid side effects).

You guessed it – a cat inhaler!

Inhaled steroid therapy has all the positive effects of decreasing inflammation in the lungs with a more direct pathway and it refrains from all the negative side effects noted above that are found with systemic oral steroids. It is the perfect option; not just for Little Man, but for any cat in need of relief from Feline Asthma. Inhaled steroid therapy is ideal for long term use in cats to help treat and prevent future asthma attacks.

Above all, it's vital that cat owners feel comfortable using this tool. And (this next part goes without saying) the cats themselves shouldn't be stressed or frightened of inhalers. The last thing anyone wants is to be hissed at or scratched...ouch. Fortunately, cats can be trained to accept inhalers in three to five days.

Again, this why the importance of client education cannot be understated.

Next, how to teach somebody to administer an inhaler to a cat?

This is done through the use of an AeroKat. This is an inhaler that is specifically designed for cats. You administer a puff of the inhaler while securing the other end over your cat's nose and mouth and then allow a few seconds for them to inhale the puff. This is done once to twice a day long term. This has been shown to increase survival time in cats with Feline asthma and it gives them an overall better quality of life than they would have with either oral steroids or no treatment.



## Oral Steroid Therapy Not Always the Solution

The concept of a “cat inhaler” may be new to your clients.

That is because steroids are often used. Unfortunately, Little Man's other finding complicated our treatment. Oral steroid therapy in a patient who is diabetic can cause a worsening of their diabetes and lead to other complications. Regardless of diabetes, it is not recommended for any patient to stay on steroid therapy long-term as it can lead to organ damage/-failure, heart disease and other unwanted side effects such as:

- ✓ Excessive urination
- ✓ Thirst
- ✓ Weight gain
- ✓ General lethargy

So, our client was naturally left wondering, “What else could be done about Little Man's asthma diagnosis?”

# Educating Clients with Helpful Tips

Remember, veterinarians must educate pet owners and empower them to care for their animals.

Tips and tricks – no matter how small – can make a BIG difference.

For instance, where to get medication? Here in the US, we often suggest owners order the inhaler medication for their cats from a pharmacy in Canada due to cost restrictions ordering it here in the US. So, it can be a little more work for us as veterinarians but totally worth it for healthy pets and happy clients.

Additionally, veterinarians can make the process easier for pet parents by sharing insider tips. I often tell owners to feed a palatable treat (such as canned tuna/chicken) to make sure their feline associates the Aerokat with positive reinforcement. Or, add a splash of tuna juice. Apply inside where the cat's nose will be to make it more palatable.

Food rewards, affection in the form of hugs and cuddles, as well as a gentle and calm approach will go a long way.

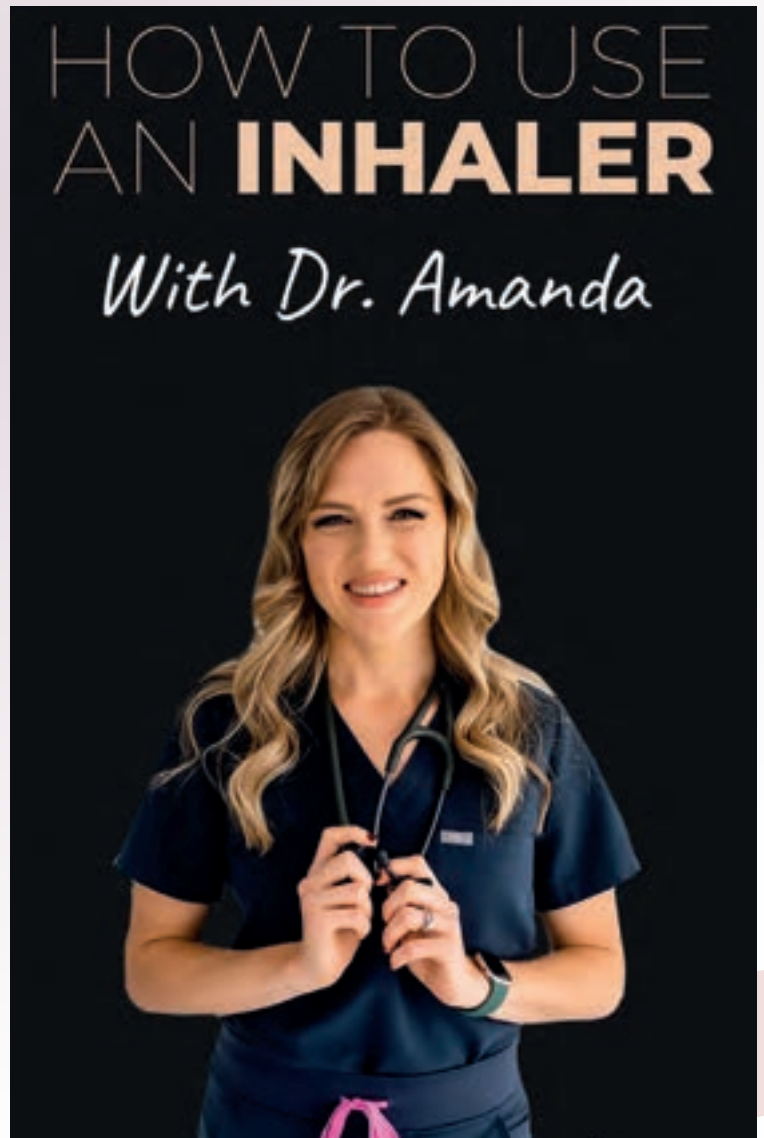
Long term, this needs to be a positive event for the client and the pet so that they will be willing to do it. Therefore, make sure you are checking in periodically and praising their hard work.

## Final Thoughts

In summary, using an inhaler is the best care for cats with asthma. For Little Man, this proved to be a lifechanging treatment. By educating the client from start to finish and offering tips, tricks, and hands-on training, we were able to successfully treat his feline asthma, and hopefully in the future, thousands more just like him!

“  
Veterinarian,  
**Dr. Amanda Steffen**,  
explains how to use  
an **inhaler** to deliver  
medication to  
pets.

**WATCH NOW**





# FELINE ASTHMA AND CANINE BRONCHITIS TREATMENT PATH & DOSING GUIDELINES

## 1 Treat Exacerbation!

### Ensure animal can breathe

- Immediate dilation of airways to provide respiratory relief
- Provide injectable steroid and either inhaled or injectable bronchodilator
- Injections administered in clinic/hospital
- Inhaled bronchodilator may be administered in clinic or at home by owner

#### MEDICATIONS

 Dexamethasone  
 AND  
 Terbutaline  
 OR  
 Albuterol

Dosing Guideline	
Dexamethasone	0.1–0.5 mg/kg IM or IV
Terbutaline	0.01 mg/kg IM or SC
Albuterol / salbutamol	1–2 puffs, every 30 minutes for ≤4–5 hours

#### Notes

- Owners unable to regain control at home should bring animal to veterinary care

## 2 Gain Airway Control

### Clear the airways

- Reduce airway inflammation and regain control of airways
- Provide short term course of systemic steroids
- 10-day therapy course

#### MEDICATIONS

 Prednisone / Prednisolone

Dosing Guideline	Cats	Dogs
Prednisolone	1.0–2.0 mg/kg every 24 hours	0.5–1.0 mg/kg every 24 hours
Prednisone		

#### Notes



- Review environmental modifications
- Ensure pet owners understand systemic steroids are only temporary
- Owners already using inhalers who treated exacerbation with albuterol can continue with inhaled steroid

## 3 Transition to Inhalers

### Introduce Inhaled Therapy

- Taper systemic steroids while introducing inhaled steroids
- Overlap therapy for 2 weeks
- Inhaled steroids effectively target the airways for disease control without the side effects of systemic steroids

#### MEDICATIONS

 Fluticasone  
 OR  
 Fluticasone + salmeterol

Dosing Guideline	Cats & Dogs ≤20 kg (44.1 lb)	Dogs >20 kg (44.1 lb)
Fluticasone†	1 puff 110 µg every 12 hours	1 puff 220 µg every 12 hours
Fluticasone + salmeterol	1 puff 115 µg / 21 µg every 12 hours	1 puff 230 µg / 21 µg every 12 hours

† Cats with more serious disease may require 220 µg every 12 hours

#### Notes

- Inhaled steroids can take 2-weeks to take effect

## 4 Daily Management

### Maintain disease control

- Maintenance therapy to keep inflammation controlled and prevent exacerbations
- Daily therapy for symptom management
- Cat owners can administer inhaled bronchodilator during flare ups from exposure to triggers

#### MEDICATIONS

 Fluticasone  
 OR  
 Fluticasone + salmeterol  
 AND  
 Albuterol

Dosing Guideline	Cats & Dogs ≤20 kg (44.1 lb)	Dogs >20 kg (44.1 lb)
Fluticasone†	1 puff 110 µg every 12 hours	1 puff 220 µg every 12 hours
Fluticasone + salmeterol	1 puff 115 µg / 21 µg every 12 hours	1 puff 230 µg / 21 µg every 12 hours

Albuterol / salbutamol as needed (cats)

† Cats with more serious disease may require 220 µg every 12 hours

#### Notes

- Albuterol is a rescue medication and should not be used as mono therapy
- Canines not shown to bronchoconstrict. Little evidence albuterol is effective for canine bronchitis

**Aerokät**  
Chamber

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# Easy to Train - Only 4-6 Days of Training for a Lifetime of Safer Therapy!



## CONDITION

Slowly and calmly familiarize your pet to the chamber before administering a dose.



## LOVE

Provide lots of hugs, pets and cuddles before, during and after treatment.



## REWARD

Give treats before and after.

## Go Slow

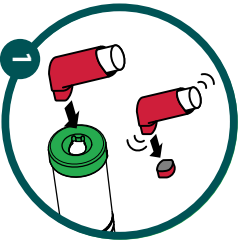
- Give your pet time to get used to the chamber before trying to administer medication.
- Lay the device on the ground and allow them to approach on their own terms.
- Allow a day or more for each step of training.
- As their comfort increases start holding the chamber out at a distance. Give them a chance to sniff and smell it while holding the chamber still.
- Create a positive link to the chamber by providing lots of treats, hugs, and play when they approach.
- Associate this positive response to the chamber by halting play and hiding the chamber behind your back. Bring it back out and renew the treats, hugs, and play.
- Once comfort is established, gently apply the mask for a short time without delivering any medication. Continue to praise and treat. Repeat and slowly build up time.

## Build Comfort and a Create a Positive Link

## Develop Confidence

- Place the chamber in your lap and call them to you.
- Leave a trail of treats leading to your lap to entice them.
- Wipe a little tuna fish or peanut butter inside the mask to encourage use.
- Swaddling in a towel or blanket may help some cats.
- Reward and praise as you go.

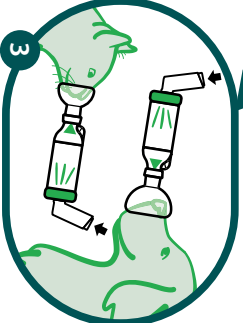
## Easy to Use



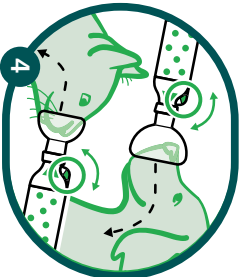
Shake inhaler and insert into back of chamber.



Gently apply the mask so that it covers the nose and mouth but not the eyes.



Press the inhaler.



Watch the Flow-Vu\* indicator and count 7-10 breaths.

Videos available at: [TrudellAnimalHealth.com/Resources](http://TrudellAnimalHealth.com/Resources)

**Steps 2 and 3 can be switched in order to prevent startling.** Only recommended with the AeroKat®, AeroDawg® or AeroHipus® chambers, which are designed to hold the medication longer?!

## Tips on Using the Inhaler

- Inhalers that have not been used recently may need to be primed again. Check the instructions for your specific inhaler.
- The chamber fits round and oval metered dose inhalers.
- Make sure to remove any caps on the inhaler before use.
- Remove the inhaler between treatments.

## Tips on Administering the Medication

- The mask should cover the nose and mouth and not the eyes.
- Ensure the nose is covered for pets with large snouts.
- Flow-Vu\* indicator movement confirms a good face to mask seal.
- Count breaths for assurance of medication delivery by validating that the required breaths were taken to empty the chamber of medication, regardless of erratic breathing or breath holding.
- Count a breath each time the Flow-Vu\* indicator moves or flutters.
- If prescribed, wait 30s before reshaking and puffing the next dose.
- Use a damp cloth to remove medication residue on fur or hair.



Teach Any Cat  
AeroKat® Chamber

Train any cat step-by-step with videos from an ASAB-accredited Certified Animal Behaviorist.



[TrudellAnimalHealth.com/TeachAnyCat](http://TrudellAnimalHealth.com/TeachAnyCat)

# CLIENT PERCEPTIONS OF FELINE CHRONIC LOWER AIRWAY DISEASE *management*

An online survey was distributed worldwide to cat owners caring for cats with a chronic cough. Only cats reported to have feline lower airway disease (FLAD) were included.

A total of 153 complete responses were analyzed.

Glucocorticoids and bronchodilators were the predominantly prescribed therapeutics for 140/153 (92%) and 80/153 (52%) of FLAD cats, respectively. Oral and inhalant administration routes were reported most commonly: glucocorticoids (64% oral and 75% inhalant) and bronchodilators (21% oral and 88% inhalant).

Almost half (43%) of owners reported adverse effects secondary to glucocorticoid administration, the most frequent being polyphagia (26%) and polydipsia (21%).

Only 10% of owners reported bronchodilator-associated side effects, with restlessness (9%) being the most common.

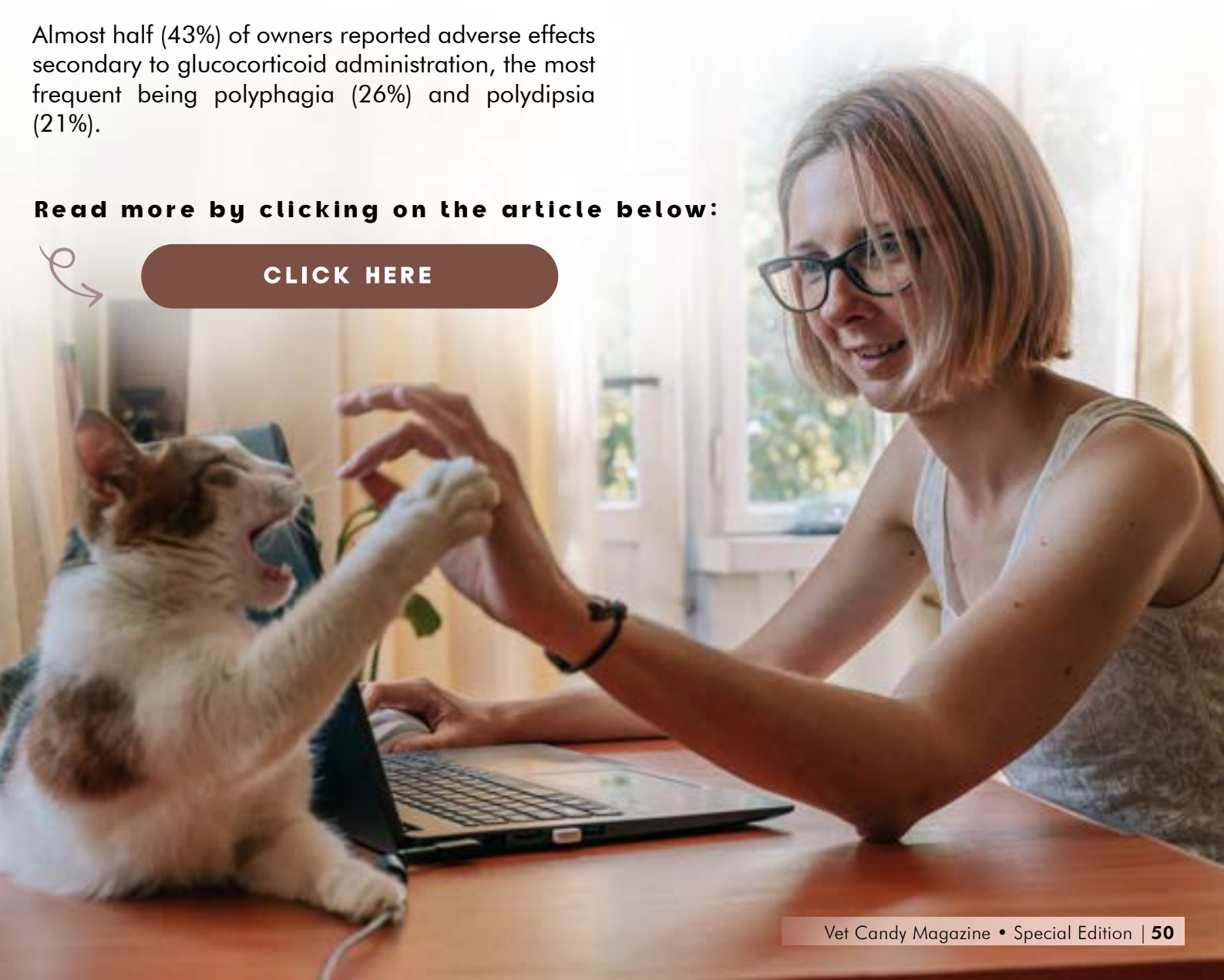
Difficulties giving glucocorticoid or bronchodilator tablets orally were reported for 33% and 71% of owners, respectively.

Glucocorticoid or bronchodilator inhalant therapies were difficult to administer for 28% and 31% of owners, respectively.

Frequency and severity of coughing were significantly lower after at least 2 months of treatment.

**Read more by clicking on the article below:**

[CLICK HERE](#)







# Smoke Inhalation Case Report

MELISSA EVANS, CVT, LVT, VS(ECC)

## It is a dog owners' worst nightmare...

A fire erupts. The home is engulfed in flames. Suddenly, through the hot blaze and grey smoke, it becomes apparent that your beloved pet might still be trapped inside the burning building.

Such was the case of Felix.

Felix is a 9-year-old male, neutered mixed breed dog who was brought to the emergency after firefighters found him trapped in a bedroom closet in his apartment. Sadly, the apartment had been part of a horrific building fire. Felix's owners stated that they were not home when the fire started. In addition, they were not allowed to go in to find Felix when they got there.

The closet was his favorite hiding spot.

So, it made sense that terrified of the fire, that's where he ran to.

When the firefighters eventually found Felix on the closet floor, he was unconscious but breathing. They administered 100% oxygen via mask. After approximately 10 agonizing minutes he regained consciousness. His owners immediately brought him to the emergency room.

This is where our story of Felix's smoke inhalation treatment begins.

## First Interventions for Felix

The American Veterinary Medical Association reports that approximately 40,000 pets in the United States die in residential fires each year. The main cause? Smoke inhalation.

Felix was one of the lucky ones.

Upon first laying eyes on Felix, it was obvious he was tachypneic, dyspneic and breathing with increased effort. He was given flow by oxygen via mask at 4 L/minute while being examined. His mucous membranes and capillary refill time were normal. Wheezing was heard on auscultation. A non-invasive doppler blood pressure (BP) was taken, and he was mildly hypotensive (70mmHg). He was estimated to be 5% dehydrated.

Right away, another issue was noticed. Felix's eyes were irritated from all the smoke and soot.

That being said, menace and pupillary light reflexes were within normal limits (WNL).

Miraculously, he did not have any obvious burn injuries to the dermis. It was suspected that he may have had some heat related irritation or even possible burns to his upper airway, but the presence of burn injuries was not able to be confirmed immediately.

## Further Interventions Taken

Next up, a 20-gauge intravenous catheter (IVC) was placed in his left cephalic vein and blood was pulled for a packed cell volume/total solids, complete blood count and biochemistry panel. An arterial blood sample was drawn to measure an arterial blood gas. The partial pressure of oxygen (PaO<sub>2</sub>) was slightly low, indicating mild hypoxemia. Felix was given a 10ml/kg bolus of Lactated Ringers solution (LRS) to address his dehydration. After the initial bolus his BP was 82 mmHg. He was started on a maintenance rate of LRS.

We then gave two puffs of albuterol.

This allows animals to breathe with less effort.

Albuterol is a bronchodilator which acts on beta-2 adrenergic receptors to relax smooth muscle in the airway. The mask of the aerosol chamber was placed over his muzzle and one puff of albuterol was dispensed into the chamber. Felix was allowed to inhale for 5-6 breaths before a second puff of medication was dispensed into the chamber.

As a follow up, Felix was placed into an oxygen cage set at 60% oxygen despite a pulse oximetry (SpO<sub>2</sub>) reading of 98%.

Why?

Well, keep in mind that pulse oximetry can be falsely elevated in cases of smoke inhalation because these machines are unable to differentiate between normal oxyhemoglobin and carboxyhemoglobin that may be present due to the smoke inhalation. It is recommended that all animals who have been exposed to smoke be given supplemental oxygen even if they appear stable.

That's because the effects of smoke inhalation may be delayed!



## Continued Care for Brave Little Felix

At this point, Felix was feeling much better.

Six hours in oxygen left him brighter and breathing easier. Every 4 hours, he was given saline nebulization to help treat airway irritation. Auscultation still showed wheezing, so he remained in the oxygen cage. His oxygen percentage was weaned down to 40% over the next 6 hours.

When removed from the oxygen cage, he happily went on short walks to relieve himself and eat.

Unfortunately, on day two of hospitalization Felix began coughing more often and his respiratory effort was increased. He was febrile, with a temperature of 103.2 F. Thoracic radiographs were taken and findings were consistent with bacterial pneumonia, which is commonly seen with smoke inhalation patients.

In an effort to treat the nasty pneumonia, Felix was started on cefazolin, a cephalosporin antibiotic.

The good news is Felix's coughing resolved and he no longer had respiratory effort after approximately 24 hours in oxygen. Success! Antibiotics also helped his temperature return to normal. He was weaned to room air and his symptoms continued to improve over the next 48 hours.

After 5 days of hospitalization, Felix was discharged. He left with a wagging tail and was happy to go home.

"Not all chambers are built the same, which makes choosing the right chamber essential. Some chambers may appear similar but perform differently which could mean that some patients will not receive the intended dose and as a result may be at heightened risk of poor disease control and potential for respiratory exacerbation."



# Discussion on the Dangers of Smoke Inhalation

## Smoke is a *silent killer*.

Firefighters will tell pet owners that the danger of smoke inhalation for companion animals is multifaceted. First, there is the toxic gas carbon monoxide (CO). Secondly, pets may inhale burning microparticulates.

Yikes.

CO is considered to be the most common cause of death in smoke inhalation injury. CO binds to hemoglobin with a much greater affinity than oxygen. CO is easily absorbed by tissues, displacing oxygen and leading to hypoxia. Delayed neurologic signs can result from CO toxicity. Patients that show delayed manifestation neurologic symptoms are at a much higher risk for death. It is important to treat these patients with a high fraction of inspired oxygen (FiO<sub>2</sub>) as quickly as possible – ASAP! The high FiO<sub>2</sub> helps oxygen replace the CO from hemoglobin despite the increased affinity.

This can help prevent and reverse tissue hypoxia, too.

But it's not just the smoke we must worry about.

Remember how Felix had upper respiratory irritation, likely from inhalation of heated air and possibly particulates?

What happens is this: inhaled hot air can cause direct injury to the upper airway. Because the upper airway is made to dissipate heat, it is unlikely that the lower airway will be affected. This irritation from this hot air can cause irritation and possibly upper respiratory tract obstruction. Burning or super-heated particulates can be inhaled deep into the lower respiratory tract causing irritation.

The takeaway is to watch for secondary infections.

In the case of Felix, it was pneumonia.



Animals that have smoke inhalation injuries can get infections due to injury to the respiratory tract. Bacterial pneumonia is a common sequela to smoke inhalation and as with Felix, is usually seen after 12 to 24 hours. Antibiotic therapy is the treatment of choice for patients who show concurrent infection, but antibiotics should not be prescribed prophylactically to prevent bacterial resistance.

The reality is prognosis for animals with smoke inhalation depends on the extent of injury but is generally guarded. Animals with neurologic signs, either at presentation or delayed, are less likely to survive to discharge. Patients who do not have neurologic signs or have improving neurologic signs after 24 hours, are much more likely to have a good prognosis.

Just like humans, the faster pets are rescued from a fire and the sooner they are treated, the better their health outcomes will hopefully be. Mariani CL. Full recovery following delayed neurologic signs after smoke inhalation in a dog.

Further reading below:

J Vet Emerg Crit Care 2003;13:235-239.  
Jasani S. Smoke Inhalation. In: D. Silverstein and K. Hopper, ed., Small Animal Critical Care Medicine, 2nd ed. St. Louis: Saunders Elsevier, pp. 785-788.

Burkitt-Creedon JM. Treating Environmental Lung Injuries: Drowning and Smoke Inhalation. Today's Veterinary Practice [online]. December 7, 2018. Available at:

[CLICK HERE](#)



# Incidence of deformities in cork screwed- tailed dogs

One hundred and twenty four dogs 124 were evaluated, of those, 68 dogs (34 females and 34 males) aged from 3 weeks to 15 years were classified as screw-tailed dogs and 56 dogs (30 females and 26 males) aged from 3 weeks to 15 years were classified as normal-tailed dogs.

The greatest risk of pectus excavatum was seen in Maltese (60%) and English Bulldog (58%), while for pectus carinatum: Pug (41%) and French Bulldog (18%). Dogs of screw-tailed brachycephalic breeds carry a greater risk of kyphosis and tracheal hypoplasia, compared to "normal-tailed" breeds.

The study also showed that brachycephalic breeds have a greater risk of co-incidence between kyphosis of the thoracic spine and lateral heart displacement, as well as kyphosis of the thoracic spine and tracheal hypoplasia.

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on the link below:**

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# Inhalant therapy in cats with feline chronic lower airway disease.

BY DR. MATHIEU PAULIN



## What does cat coughing sound like?

If your home is shared with a cat, then you are probably familiar with the sound of gagging or retching (most often heard when coughing up hairballs).

But as it turns out, chronic coughing affects cats worldwide with multiple etiologies. According to the research, feline asthma and feline bronchitis are the most common causes of chronic cough and are frequently referred to under the umbrella term of 'feline lower airway disease' (FLAD).<sup>1-5</sup>

In the paragraphs below, let's explore the ins and outs of FLAD. That way, you are better prepared when a case of chronic cough inevitably comes across your desk.

## Managing Feline Lower Airway Disease: What You Need to Know

To begin, here are the must-know points about FLAD.

First, it frequently requires long-term medical management.

The traditional therapeutic approach involves glucocorticoid and bronchodilator use.<sup>4</sup> The therapeutic goal is to lessen the severity and frequency of coughing attacks and improve overall quality of life.<sup>6</sup> After all, we want our cats to be not just healthy... but happy too!

Oral glucocorticoids are reported to be more prevalent than inhalant forms in the literature.<sup>1</sup> However, oral administrations of glucocorticoids or bronchodilators come with a variety of substantial challenges. For example, many cats are reluctant to swallow pills. Similar, pet parents often struggle with reluctance to swallow, vomiting, hypersalivation, and medication-induced esophagitis or stricture after "dry swallowing" solid medication.<sup>7-10</sup>

And that's not all. Systemic glucocorticoid administration may also lead to major adverse effects and may be contraindicated in certain patients (such as cats with concurrent diabetes mellitus or heart disease).



# Following the Science via Real-Life Examples

In a recent prospective study, an online survey was distributed worldwide to cat owners caring for cats with chronic cough. Only cats reported to have FLAD were included.<sup>6</sup> This survey reported client experiences associated with the administration of common medications, particularly glucocorticoids and bronchodilators, in managing cats with FLAD. The study also aimed at determining client perception of response to treatment and level of satisfaction.

AKA, how easy vs. difficult was administering the medications? And how did pet owners feel about the outcome?

To find out, glucocorticoids and bronchodilators were prescribed for 92% and 52% cats with FLAD (n = 153), respectively. Interestingly, in this study, glucocorticoids and bronchodilators were both preferentially administered by an inhalant device. This exemplifies a shift in owners' preferences when dealing with FLAD. However, the survey participants were likely to represent the most dedicated cat owners, which likely impacted the preferential choice of inhalant therapy and the diligent reporting.

What researchers discovered what this: inhaled glucocorticoids appear to be advantageous due to maximized local drug deposition and minimized systemic exposure.<sup>4, 8, 11</sup> Despite these advantages, inhaled glucocorticoid therapy can also be challenging for owners. In a recent survey,<sup>6</sup> approximately one quarter (28%) and one third (31%) of the surveyed owners reported difficulties administering inhaled glucocorticoids or inhalant bronchodilators, respectively.

Still, not all clients found treating FLAD straightforward. Difficulties administering glucocorticoid or bronchodilator tablets orally were reported for 33% and 71% of owners, respectively. These findings are compatible with another study describing the long-term use of inhaled budesonide in 43 cats with FLAD, for which therapy had been withdrawn by 47% of owners, reportedly due to owner compliance (n = 12), cat compliance (n = 4) or drug ineffectiveness (n = 4).<sup>8</sup> That being said and despite these challenges, in a recent survey,<sup>6</sup> overall owner satisfaction when treating FLAD was assessed by a slider scale with hidden numerical input between 0 and 100 (best satisfaction), and the overall median numerical input of owner satisfaction was 83%.

This is positive news! Most people were indeed pleased with FLAD treatments.

In summary, inhalant therapies offer new perspectives in veterinary medicine and could be beneficial for cats with feline asthma or chronic bronchitis. However, client education is critical in the management of FLAD, so that owners develop realistic expectations of the effectiveness of treatments and the potential for complications and challenges.

Remember, educated owners make for happier and healthier pets!

## References

1. Trzil JE. Feline Asthma: Diagnostic and Treatment Update. *Vet Clin North Am Small Anim Pract* 2020; 50: 375-391. 2019/12/10. DOI: 10.1016/j.cvsm.2019.10.002.
2. Garrity S, Lee-Fowler T and Reinero C. Feline asthma and heartworm disease: Clinical features, diagnostics and therapeutics. *J Feline Med Surg* 2019; 21: 825-834. 2019/08/27. DOI: 10.1177/1098612X18823348.
3. Dear JD and Johnson LR. Lower respiratory tract endoscopy in the cat: diagnostic approach to bronchial disease. *J Feline Med Surg* 2013; 15: 1019-1027. 2013/10/25. DOI: 10.1177/1098612X13508253.
4. Venema CM and Patterson CC. Feline asthma: what's new and where might clinical practice be heading? *J Feline Med Surg* 2010; 12: 681-692. 2010/08/31. DOI: 10.1016/j.jfms.2010.07.012.
5. Reinero CR, Masseau I, Grobman M, et al. Perspectives in veterinary medicine: Description and classification of bronchiolar disorders in cats. *J Vet Intern Med* 2019; 33: 1201-1221. 2019/04/15. DOI: 10.1111/jvim.15473.
6. Paulin MV, Caney SM and Cosford KL. Online survey to determine client perceptions of feline chronic lower airway disease management: response to therapy, side effects and challenges encountered. *J Feline Med Surg* 2022: 1098612X211070988. 20220207. DOI: 10.1177/1098612X211070988.
7. Siven M, Savolainen S, Rantila S, et al. Difficulties in administration of oral medication formulations to pet cats: an e-survey of cat owners. *Vet Rec* 2017; 180: 250. 2016/12/17. DOI: 10.1136/vr.103991.
8. Galler A, Shibly S, Bilek A, et al. Inhaled budesonide therapy in cats with naturally occurring chronic bronchial disease (feline asthma and chronic bronchitis). *J Small Anim Pract* 2013; 54: 531-536. 2013/09/05. DOI: 10.1111/jsap.12133.
9. Graham JP, Lipman AH, Newell SM, et al. Esophageal transit of capsules in clinically normal cats. *Am J Vet Res* 2000; 61: 655-657. 2000/06/13. DOI: 10.2460/ajvr.2000.61.655.
10. Westfall DS, Twedt DC, Steyn PF, et al. Evaluation of esophageal transit of tablets and capsules in 30 cats. *J Vet Intern Med* 2001; 15: 467-470. 2001/10/13. DOI: 10.1892/0891-6640(2001)015<0467:eo-etot>2.3.co;2.
11. Allen DB, Bielory L, Derendorf H, et al. Inhaled corticosteroids: past lessons and future issues. *J Allergy Clin Immunol* 2003; 112: S1-40. 2003/09/30. DOI: 10.1016/s0091-6749(03)01859-1.



# Albuterol in Hyperkalemia

Melissa Evans CVT, LVT, VTS(ECC)

**W**heezing and shortness of breath can be uncomfortable – especially if you happen to be a pet!

There are plenty of reasons why an animal might have trouble breathing. For example, asthma. While not too long ago, asthma treatment options for our four-legged cat and dog friends were limited, nowadays veterinarians have incredible modern tools at their disposal.

Do you know which one is “leading the pack” so to speak?

Albuterol sulfate.

This is a bronchodilator that is mainly used to treat bronchoconstriction in cats with asthma. It is most commonly delivered as an inhaled treatment via an aerosol canister. Outside of the US there is an injectable version available for use. In addition to its use as a bronchodilator, albuterol can be used in patients with hyperkalemia to lower the serum potassium levels.

Why the focus on potassium?

Potassium is the body’s major intracellular cation. It generates normal resting cell membrane potential, which regulates the function of cardiac and skeletal muscle and nerves. Normal potassium levels are between 3.5-5.8 mmol/L in cats and dogs. When serum concentrations of potassium are greater than 7.5 mmol/L it is considered life threatening!

Thankfully, what happens is this: Albuterol forces potassium intracellularly to help combat the life-threatening effects that hyperkalemia has on the cardiovascular system, therefore helping pets feel comfier and (literally) saving lives.

## Causes

“Hyperkalemia” is one of those scary sounding diagnosis. Yet the better veterinarians and clients understand it, the easier it is to treat. Let’s begin in simple terms. The first thing to note is that hyperkalemia happens when there is extra potassium.

Usually, it’s seen when there is impaired potassium excretion. For instance, maybe due to kidney failure or most commonly, urinary obstruction.<sup>1</sup> In a healthy patient, excess potassium is constantly excreted in urine, ensuring that serum potassium levels stay within a normal range. But when the ability of the kidney to remove potassium from the body is compromised, life-threatening hyperkalemia can occur.

Uh oh...

Unfortunately, hyperkalemia can also be seen in patients with Addison’s disease.<sup>1</sup>

## Clinical Signs

From a clinical point of view, there are specific signs to be on the lookout for.

To start, sensitivity of cardiac and neuromuscular cells to changes in serum potassium concentration causes alterations in the cardiac conduction system leading to bradycardia.<sup>2</sup> Additionally, changes in ECG occur, including tented T waves, P waves that become wider and small and eventually disappear. This is known as atrial standstill. As potassium increases QRS complexes widen and become abnormal. Eventually, all electrical activity in the heart stops and asystole occurs.

That’s why it is so incredibly important to address hyperkalemia rapidly to prevent dangerous cardiovascular complications.<sup>3</sup>

After all, we want to help our patients feel better – and stay healthy – as soon and for as long as “paw-sibile.”

paw-sibile.  
B9W-sipje.



## Mechanism of Action

Albuterol may sound like a wonder cure, and in some ways, it is!

This beta-adrenergic agonist acts on beta-2 adrenergic receptors to relax smooth muscle in the airway. Pets can breathe with less effort since the airways have been loosened. As bronchoconstriction is a main feature of asthma, albuterol can be used as a rescue therapy. Just remember, to address underlying inflammation for asthma management it's recommended you use it in combination with other medications.

Incredibly, that's not all Albuterol is capable of.

Albuterol also up-regulates the activity of sodium potassium ATPase ( $\text{Na}^+ - \text{K}^+ - \text{ATPase}$ ) pump in skeletal muscle. This moves potassium intracellularly, thus lowering potassium levels in the serum within an hour. Albuterol has been shown to lower serum potassium levels by approximately 1 mEq/L after about 1 hour. The effects last 3 to 4 hours.<sup>4</sup>

Administering the medication is quick, easy, and painless. In an emergency setting, 2 puffs of albuterol via an aerosol chamber are usually given. The aerosol chamber comes with a mask that fits tightly around the animal's muzzle. The albuterol is puffed into the chamber and the animal can breathe in the medication before it dissipates.

As with asthma, albuterol use in hyperkalemia should not be the sole treatment. Regular insulin activates the  $\text{Na}^+ - \text{K}^+ - \text{ATPase}$  pump via a different pathway than albuterol, making the effects of the two treatments additive. Dextros is often given in conjunction with insulin, serving two purposes:

- 1) It helps to prevent hypoglycemia.
- 2) Dextrose stimulates endogenous insulin secretion, encouraging the body to help move potassium intracellularly.

Insulin administration begins to work fast! Results appear within 15 minutes with serum potassium levels dropping by about 1.5 mEq/L within 30-60 minutes. These effects last for 3-4 hours.<sup>4</sup>

## REFERENCES

1. DiBartola SP, de Morais HA. Disorders of potassium: hyperkalemia and hypokalemia. In: Fluid, Electrolyte, and Acid-Base Disorders in Small Animal Practice. 4th ed. St. Louis, MO: Saunders Elsevier; 2011:92-119.
2. Odunayo, A. (2014). Management of Potassium Disorders. Clinician's Brief, [online] March 2014, pp.69-72. Available at: <https://www.cliniciansbrief.com/article/management-potassium-disorders> [Accessed 5 Dec. 2022]
3. Riordan, L. and Schaer, M. (2015). Potassium Disorders. In: D. Silverstein and K. Hopper, ed., Small Animal Critical Care Medicine, 2nd ed. St. Louis: Saunders Elsevier, pp. 269-273.
4. Shingarev R, Allon M. A physiologic-based approach to the treatment of acute hyperkalemia. Am J Kidney Dis. 2010 Sep;56(3):578-84.

# *Behavioral predictors of **subsequent respiratory illness** signs in shelter dogs*

A study evaluated whether behavior at intake can predict occurrence and progression of upper respiratory disease in dogs at animal shelters. Eighty-four dogs were assessed throughout their stay at an animal shelter. The dogs were subjected to a behavioral assessment, 1 min in-kennel behavioral observations across two observation periods. Urine cortisol:creatinine (C:C) ratio was also evaluated. The occurrence and progression of upper respiratory disease was monitored through repeated clinical exams.

The study showed that sociability and curiosity scores were associated with increased illness. However, activity and anxiety scores were not associated with illness. Urinary cortisol levels did not predict subsequent illness.

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# Inhalant glucocorticoid therapy in dogs with chronic bronchitis or eosinophilic bronchitis



Asthma is a fact of life for many people.

Believe it or not, The World Health Organization estimates that 262 million people are affected by asthma.

That is a huge number!

Thankfully, medicine has come a long way since the first inhaler was invented by English physician and astronomer John Mudge in 1778. But despite the increasing use of inhalant therapy in humans with respiratory diseases, there is a lack of published data regarding its indication and efficacy in dogs.

Nevertheless, inhalant glucocorticoid therapy has been reported in the treatment of chronic bronchitis and eosinophilic bronchopneumopathy in dogs.<sup>1, 2</sup>

Let's look at what veterinarians are actually experiencing on the ground.

## The "What" and "Why" of Inhalant Glucocorticoid Therapy

To begin, chronic bronchitis (CB) in dogs is defined when the following diagnostic criteria are met: (1) chronic cough (> 2 months); (2) evidence of excessive mucus or of mucus hypersecretion; (3) exclusion of other chronic cardiopulmonary diseases (such as congestive heart failure, chronic infectious bronchopneumonia, pulmonary neoplasia, or eosinophilic bronchopneumopathy).<sup>3</sup> Glucocorticoids are the primary treatment of CB, acting by reducing mucous hypersecretion and bronchial mucosal thickening, which eventually leads to cough reduction.<sup>3</sup>

Similarly, idiopathic eosinophilic bronchopneumopathy (EBP) is a chronic disease characterised by eosinophilic infiltration of the lung and bronchial mucosa.<sup>4</sup> The traditional therapeutic approach consists in long-term oral administration of glucocorticoids.<sup>5</sup>

Unfortunately, it's not a cure all.

Around 30% to 70% of dogs show relapse of their clinical signs (within weeks or months) after glucocorticoids cessation. These dogs require long-term oral therapy to maintain clinical remission.<sup>4</sup>

Additionally, keep in mind that systemic glucocorticoid administration may lead to major adverse effects (such as iatrogenic hyperadrenocorticism) and may be contraindicated in certain patients (such as dogs with concurrent diabetes mellitus or cardiac disease). Inhaled glucocorticoids appear to be advantageous due to maximized local drug deposition and minimized systemic exposure.<sup>2, 6</sup>

## How Are These Administered to Dogs?

It's one thing to prescribe a medication to dogs, and something else entirely convincing them to take it.

We have seen success via a metered dose inhaler into a spacer device and a face mask. The stipulated dose of medication is discharged into the spacer device and the mask is held over the dog's nose for approximately 5 to 10 breaths.<sup>1</sup>

In a retrospective study including 10 dogs with CB and 3 with EBP, the use of inhaled glucocorticoids resulted in improvement in clinical signs in all cases. Ten dogs were treated with inhaled beclomethasone dipropionate and 3 with fluticasone propionate. Most animals treated with beclomethasone dipropionate received a dose of 250 µg twice daily. The dose of fluticasone propionate used in all three dogs was 125 µg twice daily.<sup>1</sup>

Furthermore, veterinarians can look at another study for more insight. A case series was published in 2016 consisting of 8 dogs diagnosed with EBP treated with fluticasone propionate monotherapy for at least 6 months<sup>2</sup>. The initial dosage of inhaled fluticasone varied from 100 to 250 µg twice a day. Luckily the medication using a face-mask was well tolerated in all cases.

Cough initially improved in all dogs – a good sign!

However, long-term treatment failed to resolve the cough in some individuals: 3/8 dogs showed severe relapse of their respiratory signs, and oral steroid therapy was ultimately required after at least 14 months of inhaled therapy.<sup>2</sup> Despite only one dog showing clinical signs of iatrogenic hyperadrenocorticism, sustained long-term inhaled fluticasone therapy can induce inhibition of the pituitary–adrenal axis.<sup>2</sup>


Ultimately, if inhaled glucocorticoid therapy may not be satisfactory for the long-term management of chronic bronchitis or eosinophilic bronchopneumopathy in dogs, it may allow a reduction of oral steroid dosage in patients requiring long-term steroid therapy. Likewise, inhaled corticosteroids should also be considered an alternative therapy when the use of oral corticosteroids is contraindicated.

As science continues to improve, veterinarians will learn more and more. Large, prospective, and randomized studies including both inhaled and oral glucocorticoids are needed to define the benefits and indications of inhaled glucocorticoids in dogs with chronic bronchitis or eosinophilic bronchopneumopathy.

That way, we are offering the best and most effective care to our four-legged patients.



1. Bexfield NH, Foale RD, Davison LJ, et al. Management of 13 cases of canine respiratory disease using inhaled corticosteroids. *J Small Anim Pract* 2006; 47: 377-382. DOI: 10.1111/j.1748-5827.2006.00028.x.
2. Canonne AM, Bolen G, Peeters D, et al. Long-term follow-up in dogs with idiopathic eosinophilic bronchopneumopathy treated with inhaled steroid therapy. *J Small Anim Pract* 2016; 57: 537-542. DOI: 10.1111/jsap.12529.
3. Clercx C. Diseases of the Trachea and Small Airways. In: Ettinger SJ, Feldman EC, Côté E, eds. *Textbook of Veterinary Internal Medicine*. Vol 1. 8th ed. St Louis, MO: Elsevier; 2017:1098-1099.
4. Clercx C and Peeters D. Canine eosinophilic bronchopneumopathy. *Vet Clin North Am Small Anim Pract* 2007; 37: 917-935, vi. DOI: 10.1016/j.cvsm.2007.05.007.
5. Clercx C, Peeters D, Snaps F, et al. Eosinophilic bronchopneumopathy in dogs. *J Vet Intern Med* 2000; 14: 282-291. DOI: 10.1892/0891-6640(2000)014<0282:ebid>2.3.-co;2.
6. Allen DB, Bielory L, Derendorf H, et al. Inhaled corticosteroids: past lessons and future issues. *J Allergy Clin Immunol* 2003; 112: S1-40. DOI: 10.1016/s0091-6749(03)01859-1.



# ACVIM

## consensus statement guidelines for pulmonary hypertension in dogs

The American College of Veterinary Internal Medicine released a consensus statement is to provide a multidisciplinary approach to guidelines for the diagnosis, classification, treatment, and monitoring of pulmonary hypertension in dogs.

## Dogs with PH can be classified into the following 6 groups:

- 1 Pulmonary arterial hypertension; group
- 2 Left heart disease
- 3 Respiratory disease/hypoxia
- 4 Pulmonary emboli/pulmonary thrombi/  
pulmonary thromboemboli; group
- 5 Parasitic disease (Dirofilaria and  
Angiostrongylus)
- 6 Disorders that are multifactorial or  
with unclear mechanisms.

The consensus' approach to treatment of pulmonary hypertension focuses on decreasing the risk of progression, complications, or both, recommendations to target underlying diseases or factors contributing to the disease. Dogs should be monitored for improvement, static condition, or progression, and any identified underlying disorder should be addressed and monitored simultaneously.

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the link below:*



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# Quick guide to infectious respiratory diseases in dogs

Dr. Jill Lopez

Dogs that are social or visit pet businesses, like doggie day cares, groomers, boarding facilities, and dog parks, are at risk for infectious diseases, including those that cause coughing.

Multiple bacterial and viral pathogens can result in clinical signs of canine infectious respiratory disease complex. Outbreaks associated with canine cough are very common and reported worldwide.

Pathogens associated with disease are transmitted via the aerosol route through direct or indirect contact with fomites. Most have short incubation periods ranging from a few days up to 2 weeks.

## Bacterial pathogens

*Bordetella bronchiseptica* is a gram-negative coccobacilli that can cause respiratory disease in many species, including dogs, cats, pigs, rabbits, and people.

*Bordetella* is considered highly contagious. The incubation period ranges from 2 to 10 days. Most cases are mild and involve the upper-respiratory tract. The organism can be shed for at least 1 month, and in some cases, for several months.

*Streptococcus equi* Subspecies *zooepidemicus* is a  $\beta$ -hemolytic, streptococcus organism.

Strep zoo has been associated with acute, severe bronchopneumonia in dogs. Outbreaks of severe hemorrhagic pneumonia from it has been described in group-housed dogs.

Dogs initially have mild clinical signs, including a cough and nasal discharge; however, their clinical signs can rapidly progress within 24 to 48 hours of onset, resulting in development of severe acute fibrinosuppurative, necrotizing, and hemorrhagic bronchopneumonia.

*Mycoplasma* spp. Are gram negative, non-acid fast prokaryotes that lack a cell wall.

Mycoplasmas are currently divided into hemotropic and non-hemotropic types.

Mycoplasmas can be difficult to identify and the pathogenesis of disease is unclear. Most cases of disease are mild in severity.

## Viral pathogens

Canine Adenovirus 2, is a nonenveloped double-stranded DNA virus of the family Adenoviridae. The virus infects the non-ciliated bronchiolar epithelial cells, the epithelial cells of the nasal mucosa, pharynx, and tonsillar crypts and the mucous cells in the trachea and bronchi.

Clinical signs are most often mild and consist of sneezing, nasal discharge, and a dry cough.

The incubation period is 3-6 days and viral shedding typically wanes 1 to 2 weeks after infection. The virus can survive in the environment for weeks to months.

Canine distemper virus is in the genus *Morbillivirus* and family *Paramyxoviridae*. It is an enveloped RNA virus that can cause clinical signs involving the respiratory, neurologic, and gastrointestinal systems.



Canine distemper is highly contagious and spreads through aerosol secretions.

Viral particles initially infect monocytes within the lymphoid and tonsillar tissues of the upper-respiratory tract and then disseminate throughout the body through the lymphatics.

CDV also infects lymphocytes and causes widespread lymphocyte destruction which results in lymphopenia. The virus is shed through secretions and shedding can continue for up to 4 months.

Fortunately, because of the viral envelope, environmental survival is only several hours, and routine disinfectants will inactivate the virus.

Canine distemper can be fatal. Dogs with the disease can have a wide variety of clinical signs including diarrhea and vomiting, ocular discharge, and various neurologic signs.

Canine influenza viruses are enveloped RNA viruses. Canine influenza belongs to the family Orthomyxoviridae and is further subtyped based on its hemagglutinin (H) and neuraminidase (N) genes.

**H3N8:** The first documented cases of canine influenza H3N8 were found in Florida racing greyhounds in 2004. The virus then spread throughout the country, mostly being reported in kennels and shelters, and sporadically within the pet population.

**H3N2:** In 2015, an outbreak H3N2 canine influenza was identified for the first time in the US. This subtype was similar to a strain previously reported in South East Asia and was suspected to be the result of a mutated avian influenza virus. Since 2015, this strain of CIV has spread throughout the United States and reintroductions from Asia have resulted in the appearance of additional outbreaks.

Canine influenza can cause a wide range of severity, from mild to severe. Clinical signs associated include lethargy, cough, nasal and ocular discharge, and occasionally more severe clinical signs associated with pneumonia and death.

Viral shedding from H3N2 has been reported to last up to 24 days.

Canine Parainfluenza Virus is an enveloped single-stranded RNA virus belonging to the family Paramyxoviridae.

Parainfluenza is highly contagious and is found worldwide. Before introduction of vaccines, this virus could be isolated from up to 50% of kennel dogs with respiratory disease.

Parainfluenza, is also spread via respiratory droplets, and infection occurs within the respiratory epithelial cells. The incubation period is between 3-6 days.

Dogs can exhibit no clinical signs or mild clinical signs of a dry, harsh cough for several days with or without pyrexia.

The envelope of the virus renders it susceptible to inactivation by most commercial disinfectants.

Canine Respiratory Coronavirus is a group 2 coronavirus in the family Coronaviridae and is an enveloped RNA virus.

This virus was first described in a group of shelter dogs with respiratory disease in 2003 in the UK and has now been identified in dogs worldwide.

Infection with canine coronavirus is usually associated with mild clinical signs, including nasal discharge, cough, and sneezing.

Although respiratory tissue appears to be the primary site of viral replication, the virus has also been detected in the stool or intestines of dogs that presented with primary respiratory disease in the absence of GI signs. Viral shedding can occur up to 10 days after infection.

## Diagnosis of canine cough:

Clinical diagnosis is usually made with just a history of exposure to other dogs, typical clinical signs, and a physical examination. Complete blood count may show evidence of inflammation, including mild to moderate neutrophilia, presence of band neutrophils, or lymphopenia.

Thoracic radiographs are recommended for cases of moderate to severe illness.



## Confirmatory laboratory testing:

PCR testing has become a popular test for respiratory disease. Respiratory panels have been developed that detect the nucleic acid from pathogens, including CPIV, CAV-2, CDV, CRCoV, CHV, CIV, B bronchiseptica, and Mycoplasma sp.

Swabs of the nasal cavity, oropharyngeal cavity, or specimens collected from the lower-respiratory tract can be submitted for testing but false negative are possible with low or intermittent shedding or inappropriate sample handling. PCR testing is best performed on samples that are less than 3 days old. Vaccination within the previous few weeks with live-attenuated vaccines can lead to false positive results.

Serologic assays for measurement of antibodies are also available; however, their clinical use is limited because antibodies occurring in response to vaccination cannot be distinguished those produced from disease.

## Treatment

Treatment of dogs with uncomplicated respiratory disease usually involves supportive care and may include hydration and nutritional support, oxygen therapy, nebulization, and coughage.

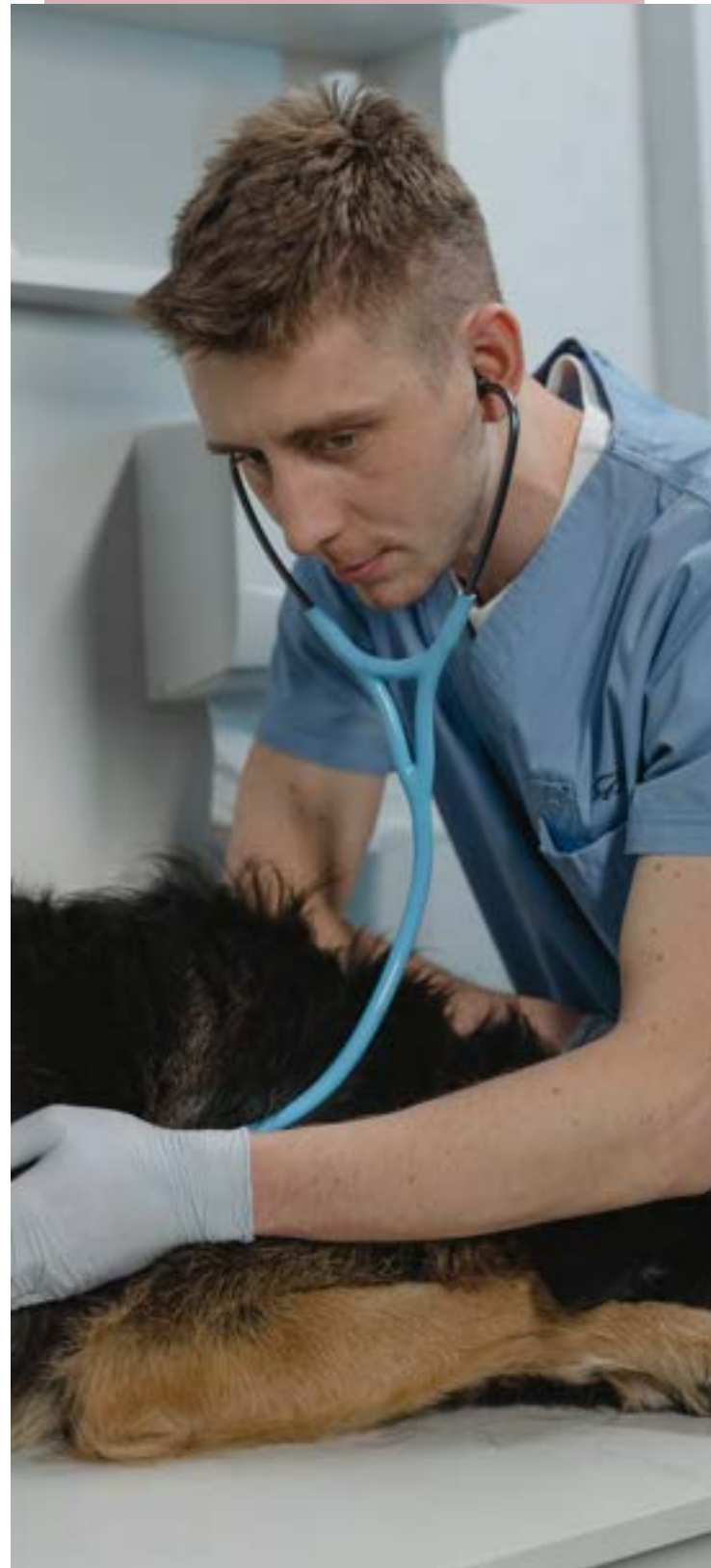
Expectorant medications, such as guaifenesin are not recommended. Antiviral therapy is not recommended

Treatment of bacterial pathogens, B bronchiseptica, or opportunistic secondary pathogens should be guided by culture and susceptibility testing, because of antimicrobial resistance issues. Doxycycline is the antibiotic of choice for suspected B bronchiseptica or M cynos infection.

## Prevention:

Vaccination protocols for dogs that are social or visit pet businesses, like doggie day cares, groomers, boarding facilities, and dog parks should include vaccines that protect against parainfluenza, adenovirus, distemper, dog flu H3N2 and H3N8 and and B. bronchiseptica.

Reference: Greene CE, ed. Infectious Diseases of the Dog and Cat. 4th ed. St. Louis, MO: Saunders/Elsevier; 201







## RESEARCHERS IDENTIFY TARGET FOR IMPROVING RECOVERY FROM LUNG INJURY

After a severe bout with a respiratory illness like flu, COVID, or RSV some patients' lungs never fully recover. In these cases, scientists have seen cells normally found in the upper airway growing deep in the lungs, where gas-exchange cells should be. While this regrowth may serve as a patch for the damage, the out-of-place cells, known as basal cells, don't promote the same respiratory functions, and a reduction in lung capacity may result.

Yet these basal cells possess the ability to mature into gas-exchange cells, given the right prompts. In a new study in *Cell Reports* by a team from Penn's School of Veterinary Medicine, genetic and environmental tweaks to basal cells caused them to become gas-exchange cells, known as alveolar cells, in the lungs of mice who survived a flu infection.

Uncovering the factors responsible for inappropriate lung-tissue regeneration may point the way toward new, druggable targets for encouraging a more functional regrowth of lung tissue down the line, the researchers say.

"With severe acute respiratory distress syndrome, as some people develop from the flu or COVID, what you see at the tissue level is diffuse alveolar damage," says Andrew Vaughan, an assistant professor at Penn Vet and senior author on the study. "You get these basal cells growing ectopically in the alveoli, and that seems to be a contributor to long-term loss of function."

"These cells were doing their job quite well; they were just doing it in the wrong place," says Aaron Weiner, a doctoral student in Vaughan's group and the lead author on the study. "We were able to show that these basal cells could maintain some plasticity and capitalized on that plasticity to get them to differentiate into alveolar cells."

Early evidence of basal cell plasticity came from work Vaughan had done during his postdoctoral research, revealing that basal cells, while typically destined to become airway cells, held a capacity—albeit very limited—to become alveolar type 2 (AT2) cells, which produce surfactant and generate gas-exchanging type 1 cells, playing a key role in ensuring proper lung function.

Weiner took that understanding and paired it with additional background information related to the protein p63, expressed in many tissues and known as a master regulator of basal cell identity. Previous research on other types of tissue that also contain basal cells demonstrated that, when p63 activity was blocked, the cells take on the characteristics of mature cells in whatever tissue they reside in. "So, for example, if you're in skin, you differentiate into more superficial skin cells," says Weiner.

To test this in respiratory cells, the researchers asked what happens when p63 is deleted from these lung basal cells, both in mice and in cell culture.

They found that taking some of these cells and putting them in growth conditions that mimicked the upper airway prompted them to become airway cells. But when the cells were grown in more alveolar-like conditions, they became provocatively similar to AT2 cells.

The team reasoned that by removing p63, basal cells appeared open to receiving cues from their local environment to become the “right” cell type. They found the same seemed to be true in mice that had experienced a lung injury. By transplanting basal cells that lacked p63 from mice that had lung injury from a flu infection into genetically normal controls that also had a lung injury, they were able to see that alveolar cells arose from the transplanted basal cells, enmeshed in the lining of the lungs—the epithelial tissue—of the recipient mice.

“These became the actual gas exchanging cells of the epithelium,” Weiner says.

“They were almost indistinguishable from the native epithelium,” Vaughan adds, only able to be identified by a lineage-tracing marker implanted in the transplanted cells.

Digging deeper into the mechanism by which p63 deletion enabled a greater plasticity in basal cell maturation, Vaughan, Weiner, and the team performed analyses to look for patterns in gene expression and epigenetic changes associated with the presence of the protein.

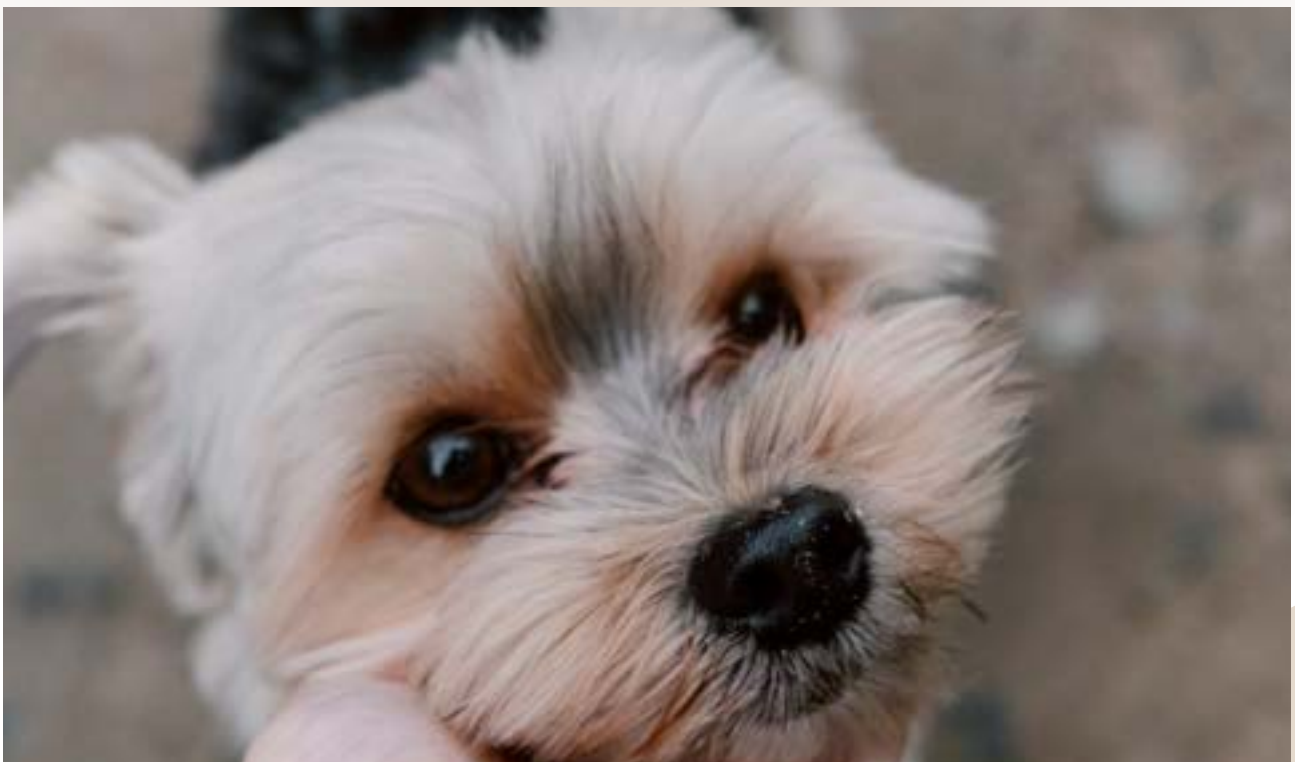
Among the signals they uncovered was a tendency for cells lacking p63 to have more activation of markers associated with alveolar cell pathways and a repression of basal cell characteristics, such as those associated with the ability to migrate.

“There was a general shift toward a more distal lung, or alveolar state,” Vaughan says.

In other words, the researchers believe p63 may “lock in” basal cells to take on the characteristics of upper airways. When that “lock” is removed, they regain the ability to be more flexible and develop into alveolar cells.

Vaughan, Weiner, and others are already following up on leads from the study, exploring, for example, a means of specifically “turning off” p63 in alveolar cells after injury, so airway cells and other cell types that also express p63 would not be affected.

“There might be a short-term emergency benefit to having basal cells cover up these damaged parts of the lung tissue, so this is probably not a strategy that would be used during acute infection,” Vaughan says. “But you can imagine, given what we’ve seen with long COVID and how a loss of lung function can persist, that treating with a drug that guides these cells to take on an alveolar identity, as patients start to get over that acute phase and maybe for months after, could be valuable.”





# MYSTERY OF THE COUGHING QUARTER HORSE



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