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REVIEW

CLINICAL SPOTLIGHT

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FELINE STRESS MANAGEMENT DURING AIR TRAVEL
A multimodal approach

Katrin Jahn and Theresa DePorter

Practical relevance: More cats are travelling by air every year; however, air travel involves several common causes of stress for cats, such as environmental changes and a lack of control and predictability. The use of a multimodal stress management protocol for all stages of the relocation process, including appropriate and effective anxiolytic medication where necessary, is therefore important in order to safeguard the cat's welfare while travelling.

Clinical challenges: Cats may be presented to veterinarians for the purpose of preparing them and/or their documentation for air travel. Maintaining and protecting a cat's physical, mental and emotional health in a stressful environment, while subjected to likely unfamiliar sights, noises, smells and the movement of the aircraft, and additionally dealing with international legislation, regulations and documents, can pose a complex challenge to veterinarians.

Aims: This review describes the importance of stress management during air travel for cats, aims to raise awareness about the often poorly understood challenges involved, and outlines effective and airline-compliant stress management modalities. While the discussion is focused on air travel specifically, the stress management methods described can be applied to all types of longer distance travel, such as a long road trip or a ferry crossing, as well as a stay in a holiday home.

Evidence base: There are currently no studies specifically on air travel in cats and, similarly, there are also limited data on air travel in other species. Many of the recommendations made in this review are therefore based on the authors' extensive experience of preparing pets for travel, supported by published data when available.

Keywords: Air travel; travel; stress; management

Introduction

Pet travel has increased by 19% in the past decade and over 2 million pets and other live animals are transported by air every year in the USA alone.[1] Cats have been reported to make up 22% of all pet travellers annually.[2] While there is no research-based evidence for cats, research in other species and current knowledge about stress in cats indicate that air transportation is likely to be stressful for them. A study investigating physiological signs and behaviour of dogs during air transport concluded that air transportation is stressful for this species.[3] Further studies have shown that horses experience a sharp increase in heart rate and changes in behavioural activities during air transport, especially during the transitional stages such as the aircraft ascending and descending,[4] and that in two Giant Pandas transported by air from China to the USA, urinary cortisol was highest during the time of the flight compared with the remainder of the 30-day period post-transport.[5]

For cats, air transportation involves some of the main causes of stress, suggesting that feline welfare may also be negatively impacted.[6]

While there is no research-based evidence for cats, research in other species and current knowledge about stress in cats indicate that air transportation is likely to be stressful for them.

Stress response
The stress response can be defined as the physiological, behavioural and psychological response to a challenge or threat to an individual's optimal state of wellbeing (homeostasis), with the threat being the 'stressor'.[7]

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Understanding and recognising stress related to air travel

Some of the main causes of stress in cats include environmental changes, such as displacement from territory (eg, when moving to a new house), and a lack of control and predictability,[8] both of which occur during air transportation. Further stressors that cats encounter in relation to air travel can be found in Figure 1.[9,10]

Stressors have additive effects, which means that when several stressors impinge upon the animal at the same time, the resulting stress response will be much greater than if the animal was exposed to one stressor only – a phenomenon known as 'stressor-stacking' or 'trigger-stacking'. The first response to this is a behavioural one. If the animal finds itself in a situation where their ability to perform the behavioural response is limited or thwarted (eg, by confinement), the animal's second line of defence is activation of the autonomic nervous system.[11]

When the stress load is perceived to exceed the coping ability of the individual, this can lead to distress – a negative state of mental or emotional strain resulting from adverse or potentially over-demanding circumstances.[6] A cat's ability to respond appropriately to a stressor will profoundly influence which emotion(s) it experiences and whether distress will develop. Distinct emotional responses may include anxiety/fear, frustration and pain.[12]

When the stress response activates the autonomic nervous system, it affects a diverse number of biological systems including the cardiovascular and respiratory systems, the gastrointestinal tract, urinary tract, exocrine glands and the adrenal glands.[11] Activation of these systems leads to physiological responses, such as increased heart rate, blood pressure and gastrointestinal activity, extremes of which are undesirable and particularly problematic during air transportation as they may lead to physiological decompensation during a time when the cat is not under direct supervision, longer term tissue and organ injury (especially eyes, brain, kidneys and heart)[13] and soiling of the travel carrier.

When feeling threatened, cats can try to escape, freeze or act aggressively to protect themselves. These behavioural responses can have a significant negative effect on welfare and, in the context of air travel, may pose a serious security risk, as well as safety concerns for handlers.

Recognising stress in cats

Although cats are predators by nature, when restrained or confined they can exhibit many behaviours characteristic of a prey species, including flight reactions to noises and unfamiliar stimuli, avoidance responses to unfamiliar individuals and defensive reactions. When feeling threatened, cats may try to escape, freeze or act aggressively to protect themselves. These types of behavioural responses, although appropriate and adaptive in some short-term situations, can have a significant negative effect on welfare if they occur excessively or for long periods.[14] Additionally, in the context of air travel, these responses may pose a serious security risk (flight and escape), as well as safety concerns for handlers, who may be unfamiliar or inexperienced with the handling of cats. The behavioural, as well as physiological, signs of stress in cats are listed in the box on page 3.

Figure 1 Air transportation involves a number of causes of stress for cats. If several of these affect the cat at the same time, the stress response will be much greater than if the animal was exposed to one stressor only

Short- and long-term indicators of stress in cats

There are a number of physiological and behavioural effects of short- or long-term stress that can be encountered before, during and/or after air travel.

Physiological signs

- Increase in heart rate, respiratory rate and blood pressure[15]
- Increase in rectal temperature[15]
- Hyperglycaemia[15]
- Increased catecholamine concentrations owing to activation of sympathoadrenal response – can lead to physiological leukogram[15]
- Increased glucocorticoid concentrations owing to activation of the hypothalamic–pituitary–adrenal axis – can lead to stress leukogram and immunosuppression[15]
- Dilated pupils[16]
- Piloerection
- Salivation, tongue licking nose and/or exaggerated swallowing[16]
- Trembling/shaking[16]
- Vomiting and/or diarrhoea[16,17]
- Development of feline idiopathic cystitis, infectious diseases, gastrointestinal disease, endocrine diseases, skin disease and allergies[15]

Body language and behavioural signs

- Tense musculature[16]
- Closed, crouched body position with tail tucked and head and neck pulled close to the body[16]
- Ears flattened down against head[16]
- Decreased movement/remaining very still (freezing) and quiet, hiding[16]
- Hypervigilance[16]
- Tail thrash/thump or tail swish from side to side[16]
- Vocalisations (growling, hissing, spitting)[16]
- Defensive aggressive behaviour – attempts to scratch and/or bite can be directed towards the stressor as a last resort when escaping or freezing/hiding is not possible[16,18]
- Low threshold flight reaction, high escape risk
- Attempting to open the latch or dig out of the carrier[16]
- Pushing on the carrier door with front paws or body weight[16]
- Licking, biting or rubbing on the carrier door, pushing paws through the bars[16]
- Disruption to the carrier[16] – absorbent pads and ice-filled water tray may be moved or pushed around
- Anorexia, polyphagia or altered eating patterns[16]
- Changes in sleep patterns[16]
- Inhibition of maintenance behaviours such as grooming[16]
- Overgrooming, self-mutilation[16]
- Decreased exploratory and play behaviour[16,19]
- Decreased or increased facial marking and scratching behaviour
- Urine spraying or pseudospraying[16,20]
- House-soiling[16,21]
- Decreased or increased human social interactions

Assessment of suitability to fly

A cat's fitness to travel should be assessed as soon as air travel is considered. The overall mental, emotional and physical health of the cat needs to be taken into account in order to make a well-considered recommendation regarding the appropriateness of air travel and relocation for that individual, as well as the potential effect on their welfare; this may be particularly relevant for senior or geriatric cats. The decision to travel can pose several ethical challenges and may be largely dependent on any options other than air travel that are available for the cat (eg, rehoming to a local family member), as well as the opinion and emotional attachment of the cat's owner. The routine 'fit to fly' physical examination (Figure 2), which is required by most airlines and authorities issuing travel documents, is usually performed within 10 days of travel, but can also be a useful guidance tool for the initial assessment of a cat's physical suitability to fly. The cat's mental and emotional suitability to fly should be assessed and taken into consideration at the same time, or sooner, if possible.

FIT TO FLY CHECK LIST PHOTOS TAKEN ☐

Date:

Client: Patient:

Travel Date: Destination:

Veterinarian performing the Fit to Fly Examination: Signature:

☐ Vaccination book seen and vaccination status checked
☐ Blood test results seen and verified animal ID on blood result document
☐ Blood test type and results are compliant
☐ Importing country Health Certificate checked and signed
☐ Screwworm Certificate checked and signed

PHYSICAL EXAMINATION

☐ **Patient signalment** and ID details correct according to animal in front of you
☐ **Microchip** working and matches vaccine book ☐ Microchip location verified
☐ **Weight** checked; kg _____

Body Condition Score	1	2	3	4	5	
FAS / Emotional Score	1	2	3	4	5	☐ recommend anxiolytics

Coat and Skin	Any alopecia must have WOODS LAMP		Lumps & Bumps	
Head	Eyes	Nose	Mouth	Ears
Heart	Heart Auscultation	Murmurs	HR	MM & CRT
Respiration	Chest Auscultation	Respiratory Pattern	Respiratory Effort	RR

Temperature – if appropriate

☐ **ECTOPARASITE AND MYIASIS CHECK**

Ears & Pinnae	Roof of Mouth	Muzzle		
Body	Inguinal Area	Under Tail		
Between Digits and Pads	RF	LF	RH	LH

MEDICATION

☐ Internal / External Parasite Treatment applied
☐ Current Medication? ☐ Accompanying letter needed

Figure 2 Example of a 'fit to fly' checklist used by the primary author at their practice, German Veterinary Clinic. This can be used as a helpful starting point for veterinarians to create their own checklists based on their individual, country-specific and organisation needs

Managing stress related to air travel

Physical health

When preparing and planning for air travel, physical health is an important consideration. Managing any health conditions and medications, as well as meeting cats' needs and keeping them comfortable during air travel, for example, by providing absorbent materials in the travel carrier, are all important in ensuring the maintenance of physical health. As changes in health can be a stressor,[22] poor physical health will likely contribute to overall levels of stress.

Brachycephalic breeds

Special consideration needs to be given to brachycephalic breeds such as Persians. These breeds often require a larger travel carrier so there is increased ventilation, and there may be embargoes on travel to certain countries, with certain airlines or at particular times of the year. An experienced pet shipping agent can advise on the specific details.

Chronic health conditions and pre-flight screening

Where a chronic health condition, such as those listed below, is known or suspected, additional planning and input, as well as pre-flight screening, will be required from the veterinary team to increase the cat's comfort and safety during the flight. This may be particularly relevant to senior or geriatric cats.

Conditions warranting extra consideration may include, but are not limited to:

- Osteoarthritis
- Diabetes mellitus
- Chronic cardiac conditions
- Chronic respiratory conditions such as feline asthma
- Hypertension
- Hyperthyroidism
- Chronic renal failure
- Any chronic health conditions that lead to dehydration

Depending on the clinical presentation and history of any existing or chronic health conditions, best practice suggests that relevant screening tests, such as blood assays (haematology, biochemistry, renal panels, total thyroxine, N-terminal pro-brain natriuretic peptide), radiography (thoracic, musculoskeletal), continuous ECG tracing (at least 5 mins) for patients with known or suspected cardiac arrythmias, cardiac ultrasonography, blood glucose curves, blood pressure studies and pain assessments, should be performed. In addition, procedures such as intravenous fluid therapy and multimodal analgesia treatment plans may be recommended, and any current treatment should be reviewed and optimised.

Organisation of continued long-term medication

The continuation of any long-term medication needs to be managed throughout the journey, as well as at the destination. This will require pre-planning and effective communication. Any medication should be supplied to the guardian (owner or accompanying person) with an accompanying letter, or it can be pre-ordered to, or dispensed by a local veterinarian at, the destination. If medication is to be given during the journey, detailed instructions should be included in the travel documents.

Where a chronic health condition is known or suspected, additional planning and input, as well as pre-flight screening, is required.

Food and water intake

Traditional and anecdotal advice from the pet shipping industry is to withhold food for 2–3 h before placing the cat into its carrier to avoid vomiting and/or defecating during the journey. Depending on the route of travel, the cat may receive a meal at a transit location; however, it is possible that the cat will not receive food again until arrival at the destination. Considering a cat's normal eating pattern of several small meals per day,[23] withholding food for up to 24 h during air travel (including check-in, flight time and the post-arrival period) is likely to be stressful and may also have a significant effect on some medical conditions, such as diabetes mellitus, which will require consideration and management. Unless the cat is known to suffer from travel sickness, the primary author (KJ) does not routinely withdraw food for 2–3 h before the cat is placed in the carrier.

Water can be given in a bowl that is attached to the inside of the carrier throughout the journey. To minimise spillage and provide longer-term access to water, the bowl can be filled and frozen and then attached (Figure 3a) just before placing the cat in the carrier. Depending on the length of the journey, the water bowl may be filled more or less deeply (the average size of carrier water bowls is 4 cm × 11 cm × 10 cm, holding 250 ml of water) and then frozen to allow the ice to melt more or less quickly to provide access to water. On longer journeys, this may result in spillage of water as the ice melts completely; therefore, the primary author tapes a 500 ml bottle of still water to the travel carrier and attaches a funnel to the outside of the cage for journeys over 6 h so the water bowl can be manually refilled by airline or ground handling staff (Figure 3b).

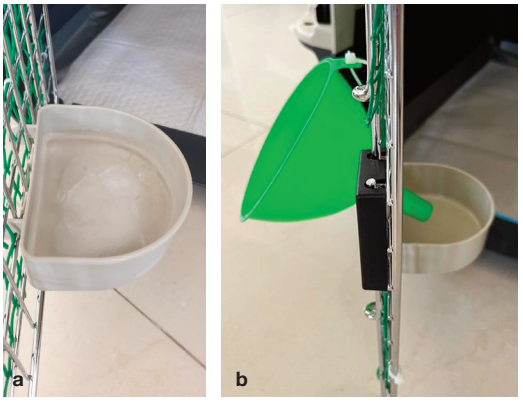


Figure 3 (a) Before travel, a bowl can be filled with water and frozen in order to minimise spillage and provide longer-term access. (b) A funnel can also be attached to the outside of the carrier for journeys over 6 h so the water bowl can be manually refilled by airline or ground handling staff

Urination and defecation

In the primary author's experience, it is very rare for cats to soil their travel carriers, even on long journeys. An absorbent pad can be used to soak up any urine or spilled water to prevent the cat becoming soiled or wet; taping it to the bottom of the carrier avoids it slipping. Placing a small litter tray in the carrier has not proven successful owing to space constraints, spillage and, in some cases, aversion or avoidance by the cat.

Logistical considerations

The logistical aspects of managing pet air travel are complex, detailed and ever-changing. While this review cannot provide an extensive discussion of the logistical factors of pet air travel, there is no doubt that careful planning and meticulous preparation have a beneficial impact on the stress and welfare of the animals travelling (see box).

To achieve the best outcome for pets travelling by air, veterinarians and owners should work with experienced, reputable pet shipping agents.

Pet shipping has, in recent years, become an industry of its own and while there are no qualifications necessary to become a pet shipper and no official industry standards other than the IATA LAR[24] (a specific set of guidelines that are updated each year to address any changes and improvements that need to be factored into the daily workings of shipping pets by air[25]), there are organisations, such as the International Pet and Animal Transportation Association (IPATA)[26] and Animal Transportation Association (ATA),[27] that hold their members to high standards and are a good point of reference to give to pet owners.

The authors highly recommend that veterinarians and pet owners work in collaboration with experienced, reputable pet shipping agents to achieve the best outcome for pets travelling by air.

Logistical factors that affect stress and welfare

- The travel carrier should be appropriate in size for the cat and should be large enough so the cat can stand and sit erect, lie in a normal position and turn around normally while standing.[24] The most commonly used rigid carrier sizes are length (L) 60 cm × width (W) 40 cm × height (H) 41 cm for smaller cats and L 68 cm × W 51 cm × H 47 cm for larger cats. If the cat is travelling in the cabin of the aircraft, the carrier should also be compliant in size according to airline in-cabin requirements. One airline, for example, stipulates that the size of the in-cabin carrier must not exceed L 40 cm x W 40 cm x H 22 cm. Most airlines require in-cabin carriers to be placed in the footwell or under the seat in front during take-off and landing, and thus in-cabin carriers are usually soft-sided and made of material to allow for this.
- The carrier should be made of appropriate materials (details of all allowed materials can be found in the International Air Transport Association Live Animals Regulations [IATA LAR][24]); the most commonly used materials are rigid plastic or non-impregnated solid wood or plywood, unless the cat is travelling in-cabin and a soft-sided, material carrier is required (see above). The carrier should have ventilation on at least three sides, and be secure and in a good state of repair (no sharp points or edges, and no loose, damaged or missing screws). Welded metal or mesh doors of rigid travel carriers must be 'nose- and paw-proof',[24] and, for cats, the size of the mesh must therefore not exceed 19 mm × 19 mm.[24] This is smaller than for most commercially manufactured travel carriers and, therefore, an additional mesh layer may need to be attached to the door (Figure 4).

Figure 4 An additional mesh layer can be attached to the door of the carrier in order to ensure it is nose- and paw-proof

- The length and route of travel must be considered. Pet shipping agents are familiar with the shipment process and have the ability to source and choose the best and most direct route, and so should be utilised. There are no data for cats on the effects of journey length on stress levels; however, a study in horses showed that journey length did not change how they responded to transport events. Instead, it was in the transitional stages of air transport, such as take-off and landing, that horses showed sharp increases in heart rate and changes in activities.[4] It is therefore possible that in both national and international air travel, direct routing with as few transits and layovers as possible is more important than overall journey length. Current industry standards indicate that the maximum flight time per leg should be 15–16 h and the authors feel that a single, longer direct flight may be less stressful than multiple shorter flights with layovers and transits.
- Temperature, especially extremes of temperature at departure, transit and destination locations, must be considered when choosing the route and timing of travel.
- Transit times between connecting flights should be as short as possible and in a dedicated animal lounge wherever feasible (only available at certain airports).
- All paperwork (Figure 5), required blood tests and medical treatment must be in place to avoid animals being turned away, sent back or having to spend time, or additional time, in quarantine.

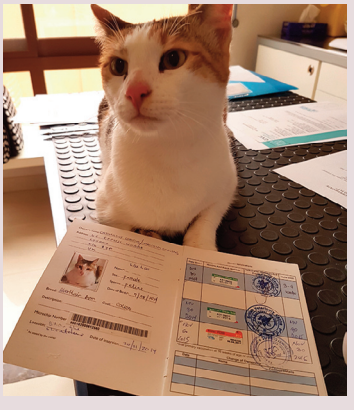


Figure 5 It is important to ensure the cat has the correct documentation before travelling, whichever method of booking is used, and a pet shipping agent can help with this

Different types of 'booking' for air travel

There are a few different ways in which pets can be booked onto flights, each with different advantages and disadvantages (see box). What will be possible and appropriate in each individual case is largely dependent on the airline used, as well as regulations at the countries of departure and arrival. For example, some countries stipulate that all pets arriving by air must arrive as airfreight cargo and not all airlines allow in-cabin air travel or may only allow this up to a certain weight and carrier size; in addition, some airlines may stipulate a maximum number of in-cabin pets per flight.

The type of booking will have implications for stress owing to differences in waiting times, sensory experiences, handling and separation from the owner. It is important to consider each case individually; for example, while some cats may prefer being close to their owners at all times, other cats may struggle with the type of sensory experiences present in a passenger terminal or during an in-cabin flight.

Recently, a Centre of Excellence for Independent Validators (CEIV) for Live Animals Logistics airline accreditation was introduced to establish baseline standards to improve the level of competency, infrastructure and quality management in the handling and transportation of live animals.[29] Increasing numbers of airlines are achieving this accreditation and it is the authors' recommendation to choose a CEIV-accredited airline for pet transportation where possible.

Booking options for air travel

Airfreight cargo

Pets are booked on an 'airway bill' and travel as cargo. These bookings are usually made via the airline's cargo department and pets are delivered to and collected from the respective cargo terminals or animal reception centres (airport dependent). It is recommended that both delivery at origin and clearance at destination are facilitated by an experienced pet shipping agent.

Advantages:

- Experienced airline cargo departments have well-trained and experienced staff, stringent safety procedures and smooth protocols relating to pet air travel.
- Pets can travel without a guardian being on the same flight.
- Likely to be fewer different sensory stimuli in the hold of the aircraft compared with passenger terminals and in-cabin; this may be preferable for some cats.
- Crate is sealed at the time of check-in so there is less risk of escape.

Disadvantages:

- Potentially longer waiting times at check-in and arrival (usually at least 3 h at either side).
- Not all cargo terminals have dedicated pet waiting areas or animal reception centres.
- Sights, smells and noises are likely to be unfamiliar and extreme.
- Handling by airport staff who may lack familiarity with cats.
- Usually more expensive than other options.

Excess baggage

The pet is booked onto the guardian's flight ticket as excess baggage and is checked in together with that person at the passenger terminal. The pet will then be taken away for separate loading into the hold of the aircraft. Upon arrival, the pet is collected by the guardian, usually at the baggage reclaim area. The pet still requires all the same documentation as for airfreight cargo travel and will need to be cleared through customs at the destination airport. It is possible to engage the help of a pet shipping agent to smoothly facilitate this process.

Advantages:

- Less expensive than airfreight cargo.
- Possibly shorter waiting times at check-in and arrival.
- Likely to be fewer different sensory stimuli in the hold of the aircraft compared with passenger terminals and in-cabin; this may be preferable for some cats.

Disadvantages:

- Pet must travel on the same flight as the guardian.
- Handling by either the guardian or airport staff, who may lack familiarity with cats, during security checks may increase the risk of escape and the risk of injury to people and the cat.
- Sights, smells and noises are likely to be unfamiliar and extreme.
- Not all airports have dedicated pet waiting areas or animal reception centres.

In-cabin

The pet is booked onto a guardian's flight ticket and travels in the cabin with the guardian. The pet usually travels in a soft-sided carrier and is placed in the footwell in front of the guardian's seat. Alternatively, the guardian may purchase a separate seat for the pet depending on the airline. The pet still requires all the same documentation as for airfreight cargo travel and will need to be cleared through customs at the destination airport. It is possible to engage the help of a pet shipping agent to smoothly facilitate this process.

Advantages:

- Pet remains united with a guardian and is not left unsupervised at any time.
- Less expensive than airfreight cargo.
- Possibly shorter waiting times at check-in and arrival.

Disadvantages:

- A soft-sided carrier may afford less safety and stability, exposing the cat to risk of flight and injury. Soft-sided carriers are more difficult to clean if soiled and can collapse when opened, which may cause distress to the cat.[28] One of the authors (TD) has known a cat to bite its way out of the soft mesh area of a soft-sided carrier and, therefore, caution is always advised when travelling with a soft-sided carrier. It may be advisable to teach the cat to wear a harness and lead for added safety in these situations.
- The types of sensory stimuli experienced in the passenger terminal and in-cabin may be stressful for some cats.
- The pet must travel on the same flight as the guardian.
- Handling by either the guardian or airport staff, who may lack familiarity with cats, during security checks may increase escape risk and risk of injury to people and the cat.
- Accidental or deliberate opening of the cat carrier in the passenger terminal or during the flight poses an increased risk of escape and of injury to people and the cat.

Stress management methods: a multimodal approach

It must be remembered that both shipping agents and veterinary teams can only influence the process of air travel to a certain point; their influence ceases once the pet has been handed over to the ground handling staff at the airport. Meticulous preparation pre-flight, as well as at the destination, is therefore vital. The importance of airlines and air service providers to educate their teams involved in the pet shipping process worldwide to ensure a safe and successful outcome cannot be emphasised enough. A multimodal approach to stress management should be taken, and the different aspects involved are described below. In order to be successful, stress management methods for air travel should: (1) be effective; (2) be airline compliant (in accordance with individual airline regulations); (3) be easy to accomplish; (4) not negatively affect the animal's physiology; and (5) be based on evidence.

Figure 6 Acclimatising the cat to the carrier before air travel at home helps to reduce stress levels during transportation

Crate familiarisation

One of the most reproducible methods for reducing a pet's stress levels during air transport is for the pet to be acclimatised to the carrier and trained to use it at home (Figure 6).[30] In the home environment, the carrier can become a 'safe' zone and/or a place that the pet associates with pleasant experiences, such as feeding, so that on the day of travel, the cat is less likely to be concerned about being inside the carrier. Carrier training via positive reinforcement methods has been shown to reduce behavioural signs of stress in cats during car rides.[9]

A number of videos describing cat carrier training can be found at: catfriendlyclinic.org/cat-owners/getting-your-cat-to-the-vet.

Acclimatising the cat to its carrier is one of the most reproducible methods for reducing its stress levels during air transport.

Environment and handling

✣ **Management of environmental stimuli and handling prior to the flight** Minimising sensory input throughout the air travel process aids with reducing stress; examples of how this can be achieved include:

- Placing a towel or blanket over the carrier whenever appropriate to limit visual stimuli but without limiting ventilation.[31]
- Protecting the cat's line of vision from animals and people.[31]
- Providing a quiet environment wherever possible and speaking softly.
- Minimising noises that may startle the cat such as phones, alarms, whistles, announcement speakers and fans.
- Playing calming music around the carrier.[31]
- Using acoustic dampeners.
- Managing odours by keeping a clean environment wherever this is applicable (veterinary clinic, boarding facility, car/van) and avoiding harsh detergent smells.
- Using feline friendly handling techniques when interacting with the cat. If necessary, using anxiolytic medication (see later) or sedative protocols for certain procedures, such as blood sampling, if necessary and if not immediately prior to the flight.

✣ **Management of the environment upon arrival** The attachment to environmental familiarity makes cats very vulnerable to stress when they are relocated or moved to a new house.[8] Appropriate introduction to a new core territory, following the steps below, reduces stress and the likelihood of problem behaviours due to fear, and a list of things to pack, pre-order and consider in order to best facilitate the transition can be found in 'Checklist for managing the new environment' box on page 8.

- Prior to transport, when the cat is still in its original environment, rub a cloth over the cat to harvest some of its flank and facial odours – it is important to only do this when the cat is calm and relaxed – and place the cloth into a sealed bag.[32] Use the cloth to transfer the flank and facial odours to furniture in a quiet room of the new home that the cat will initially be introduced to.
- Place a plug-in of the synthetic pheromone analogue of the F3 fraction of the feline facial pheromone in the quiet room (see later).
- Prepare the quiet room in the new home with food, water, a litter tray and familiar items from the cat's previous home. Also, provide a place to hide – this can be either a high or low hiding place depending on the cat's preferences. Hiding is one of the most important coping behaviours expressed by cats confronted with an aversive situation.[33] In one study, cats took between 1 and 5 weeks to adapt to a new environment (boarding kennel vs quarantine); however, each cat needs to be considered as individual and the timeframe may be longer. Allow the cat to explore the room – it should be able to get back into its carrier if desired. Do not pull or coax the cat out of the carrier but rather allow it to come out on its own.
- Allow access to the rest of the house once the cat is completely relaxed in this room. This may take hours to days.[32] Then allow access to additional rooms in the house until the cat has explored the whole house. The cat should be allowed to do this in peace.

Checklist for managing the new environment

Items to pre-order or have pre-delivered to the new home/environment

- A place to hide – cave beds and boxes.
- Synthetic pheromone analogues – plug ins and spray (see later).
- Calming supplements (see later).
- Litter trays according to the cat's known preferences.
- Food and special diets (veterinary diets) according to the cat's previous diet, known preferences or recommendations.
- Water bowls (large, shallow); water fountain to encourage drinking.
- Food bowls, puzzle feeders and/or hunting feeders according to the cat's known preferences.
- Toys, to allow the performance of play and predatory behaviour.
- Scratch post or scratch pad.

Items to pack from the old home

- Items that carry the cat's scent, such as unwashed beds, blankets and a cloth with harvested facial and flank odours. Put the unwashed items into a sealed plastic bag and pack them in hand luggage or a suitcase.
- Favourite toys, puzzle feeders and/or hunting feeders.

Other factors to consider

- Will there be unfamiliar cats in the new household?
- Which room will be most appropriate to introduce the cat into?
- Multiple rooms with separate resources may be needed if more than one cat is travelling.
- Is outside space available and, if so, when/how will the cat be introduced to this?
- Weather/climatic differences; for example, how will a Sphynx moving to a cold climate or a longhaired cat moving to warm climate be managed?
- How will the environment be different from the previous home from the cat's perspective; for example, indoor vs outdoor access, noises, new animals and new people?

– Reintroduce cats from the same household. If two or more cats from the same household have been transported at the same time, keep them in separate rooms that each contain all the important resources such as litter trays, water and food, resting places, toys and scratching posts[34] and reintroduce the cats as if they are unfamiliar with each other (see box below) – they will smell differently and will have had stressful experiences, both of which may predispose to agonistic behaviours.

Reintroduction protocol (adapted from Ramos[34])

Step 1 Create positive associations with the new room. Encourage play by hanging toys in the room or playing with toys with the cat in the room. Frequently offer small portions of delicious, special food, such as treats, wet food or cat purée.

Step 2 Exchange scents between the cats. This can be achieved by harvesting pheromones on a cloth from each cat's face and flank when they are in a relaxed state, as described earlier, and presenting these cloths to the other cat(s). If no negative emotional states are observed in the cats' body language,[12] bedding can be swapped, and the cats can be switched into each other's rooms temporarily.

Figure 7 Reintroducing cats from the same household that have travelled at the same time should be carried out as if they are unfamiliar with each other – they may be stressed and will smell differently, which can lead to agonistic behaviours

Step 3 Allow visual contact. This should only commence when there are no signs of aggressive or agonistic behaviours or negative emotional states in any of the cats, especially around the door of the room. The cats should be able to see each other, but still be physically separated and able to move away and hide if desired. This can be achieved by having a transparent or netted door, holding the door open a little way by the owner to provide a small crack, narrower than the width of the cat's body, or having one or more cats wearing a cat harness, if they are comfortable with this. Given that the cat carrier may represent a recent stressful event (air travel), the authors do not recommend using a carrier for the reintroduction process.

Step 4 Allow physical contact with supervision. This can commence if there are no agonistic behaviours displayed by any of the cats during the 'visual contact' phase (Figure 7). Start with 5 mins under the owner's supervision and gradually increase the length of time. The use of special treats and toys at a distance from each other are recommended during these sessions to distract the cats from staring at each other or directing too much attention towards each other.

Step 5 Allow free access without supervision for short periods. This can occur if there are no agonistic behaviours between any of the cats during step 4. These sessions can then be gradually increased in length. At this stage, enrichment and the provision of multiple resources is important, especially adequately positioned and available hiding/escape areas, to ensure relationships remain positive. It is important to continue to monitor interactions; this can be achieved using cameras in the home where possible.

The length of time that the reintroduction process may take is variable and depends on the individual cats involved, the environmental set-up and available resources, and whether adjunctive measures are taken, such as using pheromone products, calming supplements and possibly psychoactive medication, where necessary.

Practical use of the F3 facial pheromone analogue

F3 facial pheromones are available as diffusers, spray and wipes.

For use in a travel carrier and/or boarding/quarantine units

Spray Spray once in each corner of the travel carrier/boarding unit (totalling eight spray applications)[37] 15 mins prior to placing the cat inside to allow the alcohol scent to disappear.[40]

Wipes Wipe the inside of the cat carrier 15 mins prior to placing the cat inside to allow the alcohol scent to disappear.

For use in the new home environment

Diffuser Place a diffuser in the room the cat will spend its time initially. Make sure the diffuser is not obstructed by furniture.

Synthetic pheromone analogue products: F3 fraction of the feline facial pheromone

Scent marking through facial rubbing of objects and preferred pathways allows cats to deposit the F3 fraction of the feline facial pheromones in these areas, thus classifying the environment into 'known objects' and 'unknown objects'.[35]

A synthetic analogue of the F3 fraction of the feline facial pheromone (Feliway Classic; Ceva Sante Animale) has been reported to reduce anxiety in cats placed in unfamiliar surroundings.[36] It has also shown high efficacy in reducing somatic stress responses and anxiety-related behaviours in cats during car travel.[37]

In a new home, personalised scent signals will be absent and there also may be odours from previous resident cats, causing stress and anxiety.[32] One study showed that, compared with a control group, treatment with the F3 synthetic pheromone decreased the amount of time it took for cats to be seen eating after arrival in a holiday home. Furthermore, the cats treated with the F3 synthetic pheromone returned to the holiday home every night, which was not the case in the cats receiving a placebo; additionally, the cats in the treatment group did not urine spray.[38]

While the discussion here is limited to the F3 fraction of the feline facial pheromone, as this is most relevant to air travel, other pheromone products, such as appeasing pheromones and pheromone blends, may also be useful, especially if reintroducing cats to each other in a new home.

For guidance on how to use pheromone therapy and the different products, see the paper by Vitale[39] and the box above.

A synthetic analogue of the F3 fraction of the feline facial pheromone can help to reduce anxiety in unfamiliar surroundings where personalised scent signals will be absent.

Supplements, natural remedies and diets

✣ **Alpha-casozepine** Alpha-casozpeine (tryptic bovine alpha-S1-casein hydrolysate) is a milk protein that has a molecular structure similar to gamma-aminobutyric acid (GABA) and has some affinity for GABA A receptors. It is reported to have an anxiolytic effect similar to benzodiazepines but without the same accompanying side effects, such as incoordination and disinhibition of aggression.[41] There is evidence that alpha-casozepine is effective in the management of cats that exhibit anxiety in socially stressful conditions[42] and it may influence the autonomic nervous system, inhibiting sweaty paws during stressful situations for cats.[43]

Alpha-casozepine is the active ingredient in the veterinary product Zylkene (Vetoquinol). Zylkene can be given once a day, is lactose free, easy to dose, palatable and has not been associated with significant side effects.[42] The authors begin with the recommended manufacturer dose of 15 mg/kg for Zylkene but may increase this up to 45 mg/kg in cats that show more extreme signs of stress, owing to the observed increased effect at higher doses.[43] Alpha-casozepine is also contained in the Royal Canin Feline Calm Diet, which is suggested to reduce the anxiety response of cats when placed in an unfamiliar location.[41]

✣ **L-Theanine** L-Theanine is an amino acid extracted from green tea that competitively binds to glutamate receptors, decreasing excitation and causing an increase in the GABA inhibitory neurotransmitter. It has been shown to reduce anxiety in cats.[44]

L-Theanine is the active ingredient in the veterinary product Anxitane (Virbac), which is highly palatable for cats, and is also contained in proprietary blends of the veterinary products Composure (Vetriscience), Composure PRO (Vetriscience) and Solliquin (Nutramax Laboratories). L-Theanine should be dosed according to the manufacturer's guidelines.

✣ **Tryptophan** Tryptophan is an essential amino acid and metabolic precursor to melatonin and serotonin (5HT) that has been implicated in the regulation of many behavioural processes such as mood, aggression and susceptibility to stress. Supplementation with tryptophan alone may not be effective because of limitations in its ability to pass the blood–brain barrier as it competes with other

How long to use supplements, natural remedies and diets for

Depending on the cat's presentation of stress signs, both in day-to-day life and at the veterinary clinic, alpha-casozepine, L-theanine or tryptophan can be used from the time of presentation (if stress levels are high) or at least 2 weeks prior to a flight (if stress levels are low). They can then be continued for at least 2 weeks, or as long as necessary, after arrival at the destination.

large neutral amino acids for a common transporter.[41] There is no veterinary supplement that contains tryptophan alone; however, it is included alongside alpha-casozepine in the Royal Canine Feline Calm Diet, which has been shown to have an anxiolytic effect on cats that are placed in an unfamiliar location.[41] The manufacturer's guidelines should be followed for the dose.

✣ ***Magnolia officinalis* and *Phellodendron amurense*** *Magnolia officinalis* and *Phellodendron amurense* extracts have been shown to have anti-anxiety effects in dogs[45] and are currently available in the proprietary blend of the veterinary product Solliquin (Nutramax Laboratories).

✣ **Bach Flower Remedy and cannabidiol** Bach Flower Remedy and cannabidiol (CBD) products are frequently mentioned or suggested by pet owners in relation to air travel. It is important to note and relay to owners that there have so far been no studies in animals on any Bach Flower Remedy products but a double-blind, placebo-controlled study in humans showed no clinical efficacy,[46] making it likely that Bach Flower Remedy products show a strong placebo effect. CBD products are currently the cause of much interest and controversy. Based on available information at the time of writing this review, the use of CBD products to relieve signs of stress and anxiety in cats is not recommended by the authors.[47]

Anxiolytic medication

✣ **Off-label use and consent** It is important to note that, at the time of publication, only one of the below-mentioned short-term medications is available as a veterinary formulation and licensed for cats – pregabalin (Bonqat; Orion Animal Health), which is approved in the EU, UK, Norway and Iceland for the indication of 'Alleviation of acute anxiety and fear associated with transportation and veterinary visits'.[48] None of the other below-mentioned short-term medications are available in a veterinary formulation or licensed for use in fear, anxiety or stress in cats; these medications are therefore considered 'off-label' and the authors thus recommend obtaining informed consent forms and educating clients on the current 'off-label' use of these medications in cats. It should also be noted that there are currently no data available for any of these medications at altitude.

The optimal dose for any anxiolytic should be determined pre-flight. Cats should be quietly comfortable but alert and able to balance and respond to movements of the carrier.

✣ **Trial doses and determining the optimal dose for air travel** Trial doses of any medication to be given pre-flight are essential to assess the effects in the individual and to screen for unwanted side effects. It is also important to determine the optimal dose for air travel and a balance needs to be established between achieving anxiolysis but not causing levels of sedation or ataxia that might influence the animal's balance or righting reflex. Cats should be quietly comfortable but alert and able to balance and respond to movements of the carrier. If airlines perceive excessive ataxia or sedation at check-in, they may refuse to accept the cat onto the flight.

When trialling a dose, a low therapeutic dose should be used initially and then titrated upwards until the desired effect has been achieved. Dose ranges for a number of anxiolytic medications can be found in Table 1. Owners should be asked to send videos of the cat 90–120 mins after receiving the trial dose so its effect can be assessed, and provide feedback on whether any unwanted side effects, such as ataxia or signs of sedation, are present. As mentioned in the box, the definition of a 'true anxiolytic' is that it has the ability to alleviate fear while preserving the animal's ability to function relatively normally, both emotionally and physically.[59]

Historical views of medication use for air travel

There is much controversy about medicating pets for air travel and this likely stems from the historical use of tranquilisers and sedatives. Almost half of airline transport deaths in animals from 1990 to 1995 resulted from sedation.[56] According to the IATA LAR, sedating animals with the use of tranquilisers either prior to or during a flight is deemed a considerable risk to the animal and is not recommended.

Historically, antipsychotics such as acepromazine have been prescribed to alleviate stress during air transport; however, tranquilisation with acepromazine, for example 0.5 mg/kg in one study, did not affect the physiological or behavioural stress responses in dogs during air transport.[3] Acepromazine is a phenothiazine derivative that has minimal impact on an animal's emotional state of fear and/or anxiety; the tranquilliser effect is instead dependent on motor inhibition mechanisms.[57] Phenothiazines have poor anxiolytic properties, cause sedation and may increase startle reactions to noise,[58] making them a poor choice for management of fear, anxiety and stress during air travel.

In the authors' opinion, it is likely that the historical use of acepromazine and its unfavourable effects have influenced opinion and the willingness to use other kinds of medication to manage stress in pets during air travel.

With the advent of modern anxiolytics and other modalities for anxiolysis and stress reduction in the last few years, it is important to consider anxiolytic medications to mitigate stress and therefore positively impact welfare in cats travelling by air. What should be considered now are medications that can be classed as 'true anxiolytics' and that have the ability to alleviate fear while preserving the animal's ability to function relatively normally, both emotionally and physically.[59]

Table 1 Medication chart (continued on page 12)

Dose range	Onset of action	Duration of action	Side effects	Contraindications	Author comments
GABAPENTIN The authors have had success with the following pre-flight gabapentin protocol: giving the established dose q12h for 2–4 days before the flight and then the final pre-flight dose 90–120 mins prior to placing the cat in the travel carrier					
5–25 mg/cat PO q8–12h for more frequent or regular use, with an 'as needed' dose range of 50–100 mg/cat PO q8–12h	90–120 mins; individual differences should be established during trial doses	6–12 h; individual differences should be established during trial doses	Hypersalivation and vomiting, and, at higher doses, ataxia and sedation[49]	Patients with renal disease[50]	Anecdotally, veterinary practitioners likely use doses higher than those listed here for veterinary visits, but these are not necessarily suitable for air travel as more profound sedation and ataxia are not desired
PREGABALIN The authors have not yet had the opportunity to use Bonqat (Orion Animal Health) as it is not yet available in their countries of practice, but this may be a good option for the future					
5–10 mg/cat PO q12h	90–120 mins; individual differences should be established during trial doses	6–12 h; individual differences should be established during trial doses	Hypersalivation and vomiting, and, at higher doses, ataxia and sedation[49]	Patients with renal disease[50]	

Only pregabalin is licensed for cats (in the EU, UK, Norway and Iceland) and so the use of all other short-acting medications for fear, anxiety or stress in cats is off-label.

✣ **Gabapentin and pregabalin** The anxiolytic effect of gabapentin and pregabalin is believed to be mediated by the binding of voltage-sensitive calcium channels in the amygdala, preventing the release of the excitatory neurotransmitter glutamate and the associated fear response.[49] Peak levels occur about 100 mins after dosing in cats and gabapentin at a dosage of 50–100 mg/cat PO reduces visible signs of stress 1–2 h after administration.[49] Gabapentin at a dosage of 100 mg/cat PO helps to facilitate transport and compliance during veterinary examinations.[49] In one study a single pre-appointment dose of gabapentin was shown to cause a significant reduction in stress-related behaviours in the transportation and examination of cats,[55] and in another study cats showed reduced fear-based aggressive behaviours during a veterinary examination after oral administration of gabapentin 2 h prior.[60]

Bonqat (Orion Animal Health) is currently the only pregabalin product licensed for cats and is approved in the EU, UK, Norway and Iceland for the indication 'Alleviation of acute anxiety and fear associated with transportation and veterinary visits', which means that the product is, as per label, approved for single use.[48] As gabapentin and pregabalin have no active intermediate metabolites and minimal passage through the cytochrome (CYP) 450 metabolism, the likelihood of side effects is low.[61] If side effects occur, they typically include hypersalivation and vomiting or, if given at a higher dosage, ataxia and sedation.[55] Pregabalin is considered to have fewer side effects than gabapentin and to be more potent.[61]

As renal excretion is the main route of elimination, care should be taken when prescribing gabapentin to patients with renal disease[61] and a lower dose should be used[50] or an alternative medication considered.

See Table 1 for further information about gabapentin and pregabalin.

✣ **Trazodone** Trazodone is a serotonin antagonist and reuptake inhibitor (SARI) and has been used successfully for its anxiolytic and mild sedative effects. It has been shown to be useful for cats in the amelioration of signs of anxiety associated with car transportation or veterinary visits.[52] Further information can be found in Table 1.

✣ **Benzodiazepines** Benzodiazepines are anxiolytic medications[62] that facilitate GABA activity by binding to GABA-A receptors in the central nervous system[51] and are potentially useful for any problems involving fear, anxiety or phobias.[59] These medications have a rapid onset of action, and the effects last between 2 and 12 h, depending on the medication.[62] For further information about the benzodiazepines alprazolam, clonazepam, diazepam, lorazepam and oxazepam see Table 1.

Table 1 **Medication chart (continued from page 11)**

Dose range	Onset of action	Duration of action	Side effects	Contraindications	Author comments
TRAZODONE					
The authors currently do not use trazodone very often due to its increased sedative effects					
15–25 mg/cat PO q12–24h, or up to 50 mg/cat for 'as needed' usage[51]	90–120 mins; individual differences should be established during trial doses	6–12 h; individual differences should be established during trial doses	Lethargy, sedation, vomiting, increased vocalisation, restlessness, agitation[52]	Cautious use in patients with cardiac disease; may lead to hypotension[53]	The pre-flight dose should be given 90–120 mins prior to placing the cat in the travel carrier
BENZODIAZEPINES					
Benzodiazepines are not frequently utilised for air travel by the authors due to the risk of side effects, including ataxia and increased appetite during a period when food is being withheld, and as there are alternative medication choices available that pose less risk of side effects					
Alprazolam					
0.125–0.25 mg/cat PO q8–12h	30–45 mins; individual differences should be established during trial doses	Short/medium: 2–6 h; individual differences should be established during trial doses	Sedation, ataxia, muscle relaxation, increased appetite (this may not be beneficial when food is being withheld for long periods due to travel), paradoxical excitation, disinhibition of behaviour, which may lead to aggression	Patients with hepatic or renal disease; doses should be decreased in older or obese patients with known sensitivity to benzodiazepines; pregnant or lactating females; cats with glaucoma; should not be used in conjunction with itraconazole or ketoconazole	
Clonazepam					
0.25–1 mg/cat PO q12–24h	45–60 mins; individual differences should be established during trial doses	Long: 8–12 h; individual differences should be established during trial doses	Sedation, ataxia, muscle relaxation, increased appetite (this may not be beneficial when food is being withheld for long periods due to travel), paradoxical excitation, disinhibition of behaviour, which may lead to aggression	Patients with hepatic disease due to extensive metabolism in the liver; patients with renal disease; patients with a known sensitivity to benzodiazepines; pregnant or lactating females; cats with glaucoma	
Diazepam					
1–2.5 mg/cat PO (but avoid where possible in cats)	45–60 mins; individual differences should be established during trial doses	Medium/long: up to 6 h; individual differences should be established during trial doses	Sedation, ataxia, muscle relaxation, increased appetite (this may not be beneficial when food is being withheld for long periods due to travel), paradoxical excitation, disinhibition of behaviour, which may lead to aggression	Oral diazepam has been associated with idiopathic hepatic necrosis in one case series[54] (single case series that has not been replicated) and is therefore not frequently used	
Lorzepam					
0.125–0.25 mg/cat PO q12–24h	30–45 mins; individual differences should be established during trial doses	Short: 2–4 h; individual differences should be established during trial doses	Sedation, ataxia, muscle relaxation, increased appetite (this may not be beneficial when food is being withheld for long periods due to travel), paradoxical excitation, disinhibition of behaviour, which may lead to aggression	Cats with a known sensitivity to benzodiazepines; pregnant or lactating females; cats with glaucoma	
Oxazepam					
1–2.5 mg/cat PO q12–24h	45–60 mins; individual differences should be established during trial doses	Medium: 4–6 h; individual differences should be established during trial doses	Sedation, ataxia, muscle relaxation, increased appetite (this may not be beneficial when food is being withheld for long periods due to travel), paradoxical excitation, disinhibition of behaviour, which may lead to aggression	Cats with a known sensitivity to benzodiazepines; pregnant or lactating females	In animals with hepatic or renal disease, a benzodiazepine without active metabolites, such as oxazepam, is recommended
MAROPITANT (not an anxiolytic)					
1 mg/kg SC or PO	45–60 mins	24 h	Diarrhoea, anorexia lethargy, sedation, pain at injection site[55]	Gastrointestinal obstruction, ingestion of toxins	Oral tablets may be cost-prohibitive in some countries

❖ **Another useful medication: maropitant** Indicated for the treatment of motion sickness and other causes of nausea in dogs and cats,[63] maropitant (not an anxiolytic) acts centrally and peripherally by blocking substance P, the neurotransmitter associated with vomiting.[64] See Table 1 for further information.

❖ **Use and continuation of long-term anxiolytic medication** There are a few situations in which a cat may be treated with a long-term anxiolytic medication:

– The cat has previously been diagnosed with a mental or emotional ill health disease and prescribed a long-term anxiolytic medication such as selective serotonin reuptake inhibitors, tricyclic antidepressants, azapirone or monoamine oxidase inhibitors.

– The cat has, in the course of evaluation and preparation for air travel, been diagnosed with a mental or emotional ill health disease and been prescribed a long-term anxiolytic medication as mentioned above.

Long-term anxiolytic medications require at least 4–6 weeks to reach therapeutic levels and this timeframe should be considered if an anxiolytic effect is desired for air travel. The short-term medications mentioned earlier (gabapentin and pregabalin, trazodone and benzodiazepines) as part of the stress management methods of air travel are intended specifically for the management of the flight and events surrounding the flight and can be given in addition to long-term anxiolytic medications as part of a polypharmacy protocol. Unwanted drug interactions between psychopharmaceutical medications and other long-term medications are rare; however, the authors recommend checking for contraindications and interactions of any medications prescribed.

Timeline

When considering stress posed by air travel, it is important to not only consider the immediate periods of check-in and the flight, but to bear in mind that stressors can be present for considerably longer, both pre- and post-flight.

Important periods during the process of air travel

(1) Packers and unfamiliar people in home, disruption of pheromone marks, disruption of routine leaving the familiar territory.
(2) Veterinary visits to prepare for travel. This may include vaccinations, blood tests, internal and external parasite treatment and the 'fit to fly' pre-travel health examination.
(3) Potential boarding in a cattery.
(4) Car travel.
(5) Arrival at the airport and loading.
(6) The flight and the effects of altitude during the flight.
(7) Offloading and handling at the destination.
(8) Car ride from the airport to the final destination.
(9) Possible quarantining and/or boarding in a cattery.
(10) Arrival in a new environment, new territory.

The box below shows the proposed timeline when planning the preparation of cats for air travel.

Reported outcomes: which stress management methods have proven to be most successful?

In the authors' experience, it is the multimodal approach, the combination of the methods described, as well as tailoring the stress management protocol to the individual and its specific needs, that has shown the most successful outcomes.

In addition, in the primary author's experience, short-term, true anxiolytic 'event' medications, especially gabapentin, have been 'game changers', both during the flight as well as in the immediate periods pre- and post-air travel.

The authors have, at the time of publication, not yet had the opportunity to use the licensed pregabalin product, Bonqat; however, they feel that this may be a very useful short-term medication for cats for air travel.

Timeline of air travel

As far as possible prior to air travel (weeks to months)
- Assessment of the cat's suitability to fly, taking into consideration its overall mental, emotional and physical health, and initiation of screening tests and treatment where necessary
- Veterinary procedures necessary for air travel (eg, blood tests, vaccinations, microchipping)
- Specific destination considerations
- Possibly initiate long-term anxiolytic treatment (if indicated)
- Crate familiarisation
- Order supplies to the destination
- Trial doses of short-term/event anxiolytic medication

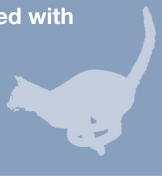
10 days prior to air travel and day of flight
- Start using anxiolytic supplements and pheromone products
- Start using short-term/event anxiolytic medication
- Continue long-term anxiolytic treatment (if applicable)
- Final veterinary procedures prior to flight (eg, fit-to-fly health examination, parasite treatment, final veterinary treatment procedures)

Arrival – first days to weeks
- Continue anxiolytic supplements and pheromone products
- Continue short-term/event anxiolytic medication if necessary
- Continue long-term anxiolytic treatment (if applicable)
- Environmental management

Settling in – first 1–6 weeks
- Continue anxiolytic supplements and pheromone products if necessary
- Continue short-term/event anxiolytic medication if necessary
- Continue long-term anxiolytic treatment (if applicable)
- Environmental management

KEY POINTS

- Air travel is likely stressful for cats but there are strategies that can be used to reduce and manage the stress experienced.
- Using a multimodal stress management approach is important in order to reduce the amount of stress experienced as much as possible.
- Physical, mental and emotional health should be evaluated, and health screening tests should be performed, and treatment initiated or optimised, prior to air travel.
- It may be helpful to use modern anxiolytic medications, supplements, diets and pheromone analogues.
- The recommendations in this review can be adapted to other means of transport, such as long car journeys and travel by ferry, as well as time spent in a holiday home.
- It is important for veterinarians and pet owners to collaborate with experienced and reputable pet shipping agents to assist with the logistical process, as this has implications for stress and welfare. While veterinarians are concerned with the animal's physical, mental and emotional health and welfare, they should not be expected to have in-depth knowledge about the logistical complexities and details of pet air travel.



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Informed consent

This work did not involve the use of animals (including cadavers) and therefore informed consent was not required. No animals or people are identifiable within this publication, and therefore additional informed consent for publication was not required.

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