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RECOVER Guidelines: First Aid for Dogs and Cats. Clinical Guidelines

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ABSTRACT

Objective: To present evidence- and consensus-based guidelines for prehospital first aid in dogs and cats.

Design: Prioritized clinical questions pertaining to first aid posed in the Population–Intervention–Comparator–Outcome (PICO) format were used to inform systematic literature searches by information specialists, which facilitated extraction of research findings from relevant publications and these findings' synthesis into evidence. This evidence was assessed for quality and used to draft treatment recommendations. These steps were followed by an international commenting period for veterinary professionals prior to finalization. These 2026 RECOVER First Aid Guidelines summarize treatment recommendations enabling veterinary professionals to provide clear, actionable instructions to animal owners, handlers, and paraprofessionals in the prehospital setting.

Setting: Transdisciplinary, international collaboration in university, specialty, emergency, and general practice.

Results: A total of 10 PICO questions pertaining to first aid in dogs and cats were addressed in the main portion of this project. This resulted in 38 treatment recommendations covering a variety of conditions for which timely aid in the prehospital setting may improve morbidity and mortality outcomes in dogs and cats. Conditions included heat stroke, choking, burns, noncaustic toxin ingestion, hypoglycemia, and severe extremity bleeding, among others. One main and four condition-specific RECOVER First Aid Recognize and Act Algorithms display the flow of assessments and actions bystanders may use to help distressed animals outside the clinical setting. Six additional instructional figures can be used to teach small animal owners, handlers, and paraprofessionals to provide first aid.

Conclusions: These 2026 RECOVER First Aid Guidelines present a concise and comprehensive framework for first aid provision for dogs and cats in the prehospital setting. These works serve to support veterinary professionals, educational systems, and research initiatives in conducting, implementing, and advancing the provision of first aid in dogs and cats.

Abbreviations: AC, activated charcoal; BG, blood glucose concentration; BLS, basic life support; CPA, cardiopulmonary arrest; CWI, cold water immersion; EE, Evidence Evaluator; FA, First Aid (Domain); FARA, RECOVER First Aid Recognize and Act (Algorithm); FBAO, foreign body airway obstruction; GRADE, Grading of Recommendations, Assessment, Development, and Evaluation; OHCA, out-of-hospital cardiopulmonary arrest; PICO, Population–Intervention–Comparator–Outcome; RECOVER, Reassessment Campaign on Veterinary Resuscitation.

Jamie M. Burkitt-Creedon, Deborah C. Mandell, and Vincent J. Thawley contributed equally to this work.

1 | Introduction

First aid is medical assistance provided in the preclinical setting, generally by people who are not medical professionals, until professional medical treatment is available. Such aid has been shown to reduce morbidity and mortality for certain conditions in people, and for certain problems such as foreign body airway obstruction (FBAO) and out-of-hospital cardiopulmonary arrest (OHCA), bystander intervention is the victim's best chance of survival by a wide margin [1–11]. To this end, the International Liaison Committee on Resuscitation ("ILCOR") regularly provides treatment recommendations that inform human first aid guidelines publications around the world [12, 13].

The Reassessment Campaign on Veterinary Resuscitation (RECOVER) initiative first published evidence- and consensus-based consensus guidelines for CPR in dogs and cats in 2012, with an update in 2024 [14, 15]. Various resources provide recommendations for prehospital care for small animals in specific scenarios [16–18], and a set of best practice recommendations for prehospital care were published approximately 10 years ago [19]. However, to date, there have been no evidence- and consensus-based guidelines for first aid in dogs and cats using a systematic and transparent evaluation framework such as GRADE (Grading of Recommendations, Assessment, Development, and Evaluation). Such guidelines could allow for standardization and optimization of preclinical treatment recommendations for certain conditions in dogs and cats, and more clearly describe critical knowledge gaps for first aid provision in these species. Therefore, at the time RECOVER evaluated the evidence for the small animal CPR topic domains for the 2024 update, the initiative also endeavored to create the first evidence-based consensus guidelines on first aid in dogs and cats. This paper is the end result of these efforts (Figure 1).

The goal of the RECOVER 2026 First Aid Guidelines project was to provide evidence-based consensus guidelines to enable veterinary professionals to educate and advise animal owners and paraprofessionals, such as animal control officers, professional animal handlers, and boarding facility employees, to improve outcomes of dogs and cats experiencing specific emergencies in the preclinical setting. To this end, the objective of the project was to generate evidence- and consensus-based treatment recommendations for provision of first aid to dogs and cats. The purpose of this paper is to present the RECOVER 2026 First Aid Guidelines for dogs and cats.

2 | Methods

2.1 | Definitions

Basic life support (BLS) is defined as the administration of external chest compressions and positive pressure ventilation with the intention to support the cardiorespiratory system in animals that are pulseless and apneic. BLS can be performed in a nonclinical setting by trained individuals.

Bystander in this paper describes any person(s) who encounters a small animal in the out-of-hospital setting that requires first aid for specific conditions outlined herein. A bystander can be an owner, handler, paraprofessional, or simply a member of the public who encounters a small animal in need of first aid.

Handler is used in this paper to describe the professional person(s) handling a working animal, such as the military member working with an operational canine or the law enforcement officer working with a canine officer.

Owner is used in this paper to denote the primary caregiver(s) of companion animals or "pets." Owners may be home cohabitants (traditional pets), or people who assume responsibility for outdoor domesticated small animals such as livestock dogs and barn cats that live primarily on property that the person owns or frequents.

Paraprofessional is used broadly in this paper to describe nonveterinary professionals who may assume temporary custody of a small animal. Paraprofessionals in this context include animal control officers, boarding facility staff, community or professional dog walkers, groomers, community or professional home care providers ("pet sitters"), among other nonveterinary professionals who are compensated to care for small animals.

The *prehospital* setting is any setting outside the veterinary clinic or hospital, including homes, community locations, businesses, campsites, wilderness, or any other space not equipped to provide clinic-level veterinary care. The prehospital setting also includes civilian, public service/safety, or professional (e.g., pet ambulance) vehicles used to transport the animal to a veterinary clinic or hospital. As implied by the term "prehospital," animals requiring first aid should be presented to a veterinary clinic or hospital as soon as possible after first aid is administered.

Provider in these Guidelines is defined as a person who provides first aid for a specific urgent medical condition in the prehospital setting. The provider may be an owner, handler, paraprofessional, or other bystander. In some circumstances, a trained veterinary professional such as a veterinarian or veterinary technician/veterinary nurse may act as a first aid provider in the prehospital setting due to time sensitivity of the aid, as in the case of cooling the animal with heat-related illness on scene, or due to lack of equipment availability, as in placement of a tourniquet for severe extremity bleeding.

A *rescuer* is a provider performing BLS (CPR) on an animal.

Veterinary professional is a person working in a clinical setting who is a licensed veterinarian, licensed veterinary technician or registered veterinary nurse, or unlicensed person working in the capacity of, for instance, an assistant veterinary technician or nurse. Veterinary professionals may also be animal owners, handlers, paraprofessionals, and bystanders, depending on the circumstances.

2.2 | Paper Structure and Intended Audience

The 10 Population–Intervention–Comparator–Outcome (PICO) questions covered in this paper are distinct, and thus unlike in

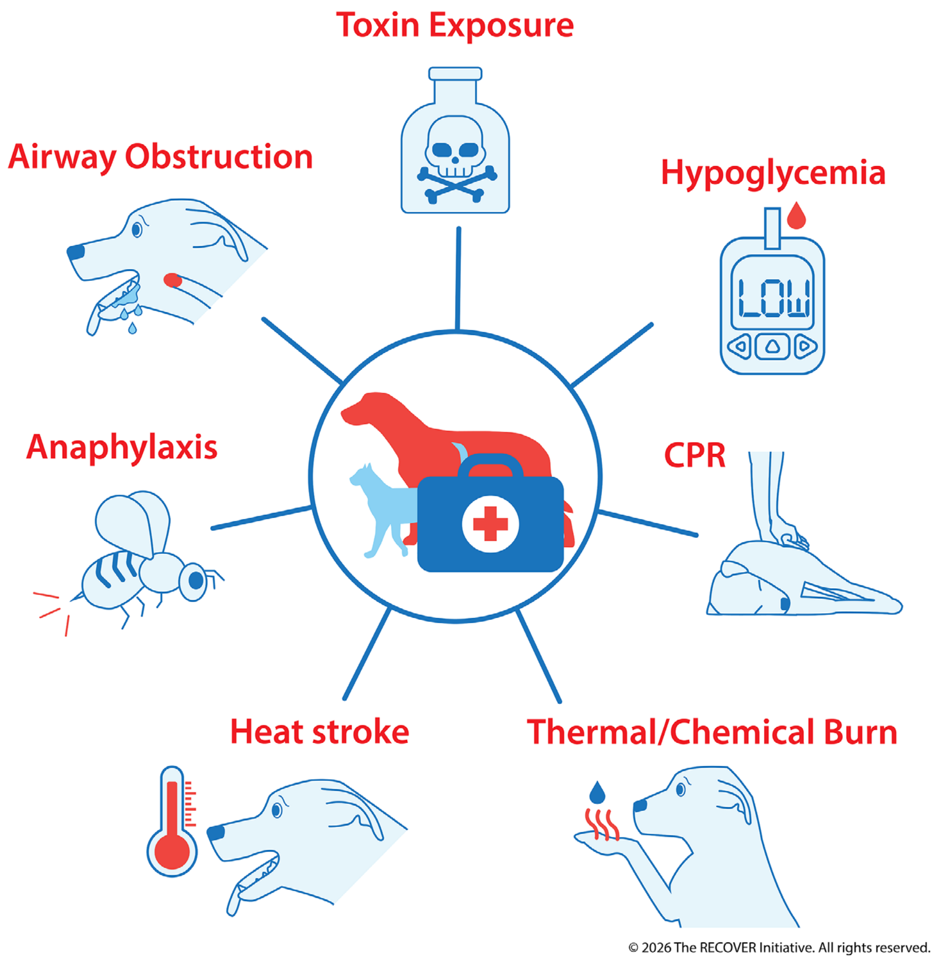

FIGURE 1 | RECOVER First Aid. The purpose of the RECOVER First Aid Guidelines is to provide evidence-based consensus guidelines to help providers improve outcomes of dogs and cats experiencing specific emergencies in the preclinical setting.

other RECOVER Guidelines consensus guidelines papers, each PICO question and its associated treatment recommendations are fully described and discussed separately.

2.2.1 | Intended Audience

While first aid for dogs and cats is generally performed in the preclinical setting by animal owners, handlers, paraprofessionals, and other lay bystanders, this paper is written for a veterinary professional readership. The intention is for veterinarians and veterinary staff to use information contained in these guidelines to educate the animal owners, handlers, and paraprofessionals who are more likely to act as prehospital first aid providers. In some cases, such guidance may be as preparation for possible emergency scenarios: for instance, educating owners of diabetic pets at the time insulin is prescribed about handling hypoglycemic episodes in the home. In other cases, such guidance may be relayed to first aid providers who contact the veterinary hospital for advice at the moment of care, such as for an unexpected thermal burn or toxin ingestion in the community. While the treatment recommendations and text within this paper are intended for veterinary professionals, the algorithms and figures herein are intended to help educate first aid providers, and so are written using lay terminology.

2.3 | PICO Question Generation and Evidence Evaluation

These guidelines followed the 2024 RECOVER Guidelines methodology, originally described elsewhere, and modified to bridge literature search time gaps [20, 21]. In short, these RECOVER First Aid Guidelines were generated using a modified version of the GRADE system for guideline generation in health care [22]. The process started with the generation of a list of prioritized questions pertaining to first aid, many of which were extrapolated from topics covered in contemporaneous human first aid guidelines [23, 24]. This task was accomplished through the collaboration of RECOVER First Aid (FA) Domain Chairs and RECOVER Co-Chairs. Fourteen of 28 initially proposed PICO questions were included in the evidence evaluation. During evidence synthesis, two additional PICO questions were added in late 2025. Thus, a total of 16 FA Domain PICO questions were addressed; 10 are presented in this consensus guidelines paper and six in a companion paper focusing specifically on preclinical and emergency department management of allergy and anaphylaxis [25].

The 10 First Aid PICO questions covered in this paper served as the foundation for information specialists to develop literature search strategies [26]. These search strategies were applied to

PubMed, CAB Abstracts using the CAB Direct platform, and Scopus, and the resulting articles were uploaded to a systematic review tool[1] for identification of relevant articles. Two independent Evidence Evaluators (EEs) were assigned to each PICO question and conducted an initial culling process based on title and abstract review. The full-text versions of selected articles were then uploaded to a purpose-built RECOVER GRADE website, and EEs decided based on full-text review whether to include an article for data extraction or to exclude it. The decision to include an article for full analysis was based on its relevance to components of the respective PICO question, including the study population, the intervention under evaluation, its comparator intervention, and the outcomes reported. Articles that were non-English, non-peer reviewed, reviews, meta-analyses, case reports or case series, and observational or experimental studies without control groups were excluded.

The EEs then extracted from each publication and for each outcome therein relevant quality metrics, such as the study's design and risk of bias; indirectness regarding PICO; imprecision of results; inconsistency among studies; and other characteristics following a standardized questionnaire embedded in the RECOVER GRADE website. From these assessments, a summary of findings table was generated for each outcome of every PICO question. Finally, RECOVER Domain Chairs and Co-Chairs used this information to further synthesize the evidence, to gauge the overall quality of evidence for or against an intervention, and, ultimately, to draft treatment recommendations.

2.4 | Drafting Treatment Recommendations

The final evidence synthesis and drafting of consensuses on science and treatment recommendations ("CoSTRs") for this domain occurred between July 2025 and February 2026. Because this domain's original literature searches had been conducted in 2020, each PICO in this domain underwent bridge literature searches between July 2025 and February 2026 [20]. Details of these bridge literature searches are available in each PICO question's full Evidence Profile Worksheet, which are available elsewhere[2].

The quality of evidence was categorized as high, moderate, low, or very low, while evidence relevant to the most critical outcomes (e.g., survival) was prioritized over evidence found for lower priority outcomes (e.g., severity of clinical signs). The quality of evidence was denoted as expert opinion if there was no evidence identified to inform a recommendation.

We used the quality of evidence to determine how certain we can be that the desirable effects of an intervention outweigh the undesirable effects. Consequently, and in accordance with GRADE, we either *recommended for* an intervention if the certainty for benefit > risk was supported by high or moderate quality of evidence or *suggested for* an intervention if we were less certain (e.g., low or very low quality of evidence). To indicate that undesirable effects outweigh desirable effects, we *recommended against* or *suggested against* an intervention. In other words, a *recommendation for* or *against* an intervention indicates there is clear benefit or harm expected with that intervention, while a *suggestion for* or *against* an intervention indicates that there is probably overall benefit or harm, or that the effect might be small. Due to the importance of generating treatment recommendations capable of informing decision-making in the prehospital or clinical context, the committee further considered the feasibility (e.g., Can it be implemented?) and the ease or challenge (e.g., Is it worth the effort?) for implementation in the given setting. Thus, the final strength of the recommendation for an intervention may be higher or lower than what the quality of evidence alone would indicate; detailed justification for each recommendation is provided in a companion article [20].

2.5 | Consensus Process

RECOVER Domain Chairs with expertise in first aid (D.M., V.T.) and RECOVER Co-Chairs (J.B., D.F.) reviewed and edited all draft treatment recommendations and algorithms using videoconference meetings, shared online documents, and email. Drafted versions of small animal first aid treatment recommendations, a general first aid recognize and act decision tree for providers, and a drafted flowchart regarding heat stroke were then made accessible[3] to the EEs, subject matter experts, and the international veterinary community at large for a 4-week commenting period from March to April 2026. Comments were considered by the Co-Chairs and Domain Chairs, and relevant treatment recommendations were refined to create a finalized set of consensus guidelines for first aid in dogs and cats, which appear in this publication. The full Consensus on Science, Treatment Recommendations, and Justification for Treatment Recommendations for each PICO question can be found in an accompanying manuscript [20], and the complete Evidence Profile Worksheets and supportive files can be accessed in a public repository.

3 | Treatment Recommendations

Provision of first aid must start with the bystander recognizing a problem. We present the RECOVER First Aid "Recognize and Act" (FARA) Algorithm to help guide owners, handlers, and paraprofessionals in recognizing conditions that may benefit from prehospital care, and the basics of what those care actions may entail [Figure 2]. This algorithm includes signs that lay bystanders can recognize and ties these signs to the specific problems for which first aid could be impactful. Other than the "poorly responsive" animal that responds to bystander stimulation for which the bystander has no further concerns (i.e., the bystander decides the animal had been sleeping), every concern ultimately leads to a recommendation to go to the nearest open veterinary clinic for professional veterinary care. FARA Algorithms are presented for other specific scenarios throughout these Guidelines.

3.1 | Scene Safety and Provider Competence

Before attempting to provide first aid to a dog or cat, the bystander must consider the setting, the availability of other potential first aid providers or veterinary professionals, the bystander's own skill level, and general scene safety. Human first aid guidelines prioritize the provider's preparation and safety [12, 13]. Similarly, we recognize that some scenes may not be safe, and some animals

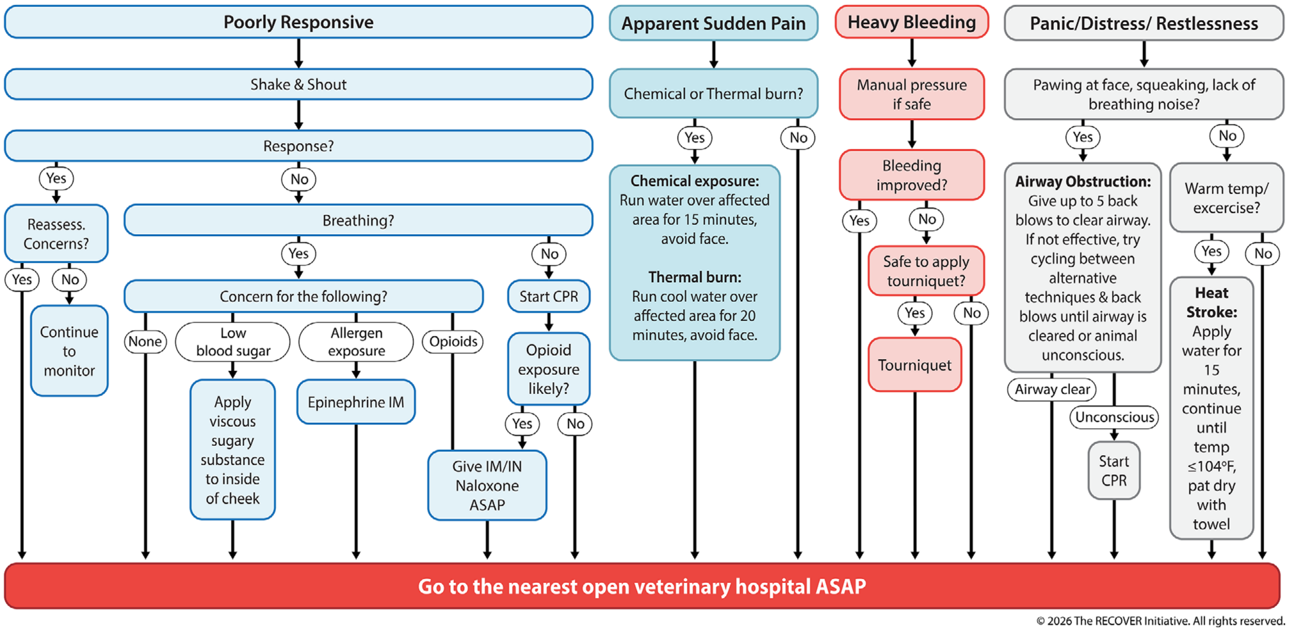

FIGURE 2 | RECOVER General First Aid "Recognize and Act" Algorithm. This algorithm includes signs that lay bystanders can recognize and ties these signs to the specific problems for which first aid could be impactful.

that could benefit from first aid may be aggressive due to pain, fear, or temperament. Bystanders should not attempt to perform first aid procedures that put them at risk, and so we uniformly recommend against providing first aid if the risk to the provider is considered high.

Thirty-eight treatment recommendations for the 10 PICO questions described in this 2026 RECOVER First Aid Guidelines are listed in Table 1.

3.2 | Hypoglycemia (FA-06)

Hypoglycemia in isolation from severe illness is seen in the out-of-hospital setting in small animals receiving insulin and in neonatal puppies and kittens with inadequate caloric intake, among other less common situations (Box 1) [27, 28]. Severe hypoglycemia can lead to collapse, seizures, and cardiopulmonary arrest (CPA). Given the life-threatening nature of severe hypoglycemia, people caring for at-risk dogs and cats with any degree of hypoglycemia should give an oral form of simple carbohydrate, provided it does not delay timely transport to a clinic for professional veterinary care. Such treatment is intended to treat life-threatening hypoglycemia in severe cases and to prevent worsening hypoglycemia in milder cases.

3.2.1 | Recognizing Hypoglycemia and the Need for Sugar Support in Dogs and Cats

Caretakers should consider the possibility of hypoglycemia if the at-risk animal shows signs consistent with hypoglycemia, such as lethargy, obtundation, stumbling or apparent weakness, collapse, or seizures, or if the animal is found in CPA. Hypoglycemia falls under the "Poorly Responsive" category in the General FARA Algorithm (Figure 2), but small animals with hypoglycemia could still benefit from first aid administration of sugar even if showing the less severe signs mentioned above. Finally, dogs and cats with known hypoglycemia, such as diabetics with home glucose monitoring, should also be treated for hypoglycemia to prevent it worsening.

BOX 1 | **Conditions that put previously stable dogs and cats at risk of hypoglycemia in the out-of-hospital setting.**

- Iatrogenic, from insulin administration*
- Neonatal life stage*
- Insulinoma
- Paraneoplastic, from secretion of insulin-like factors
- Xylitol ingestion in dogs
- Pregnancy and labor

*Most common conditions.

3.2.2 | First Aid Treatment for Hypoglycemia in Dogs and Cats

There is evidence that oral application of simple carbohydrate can decrease morbidity and mortality in hypoglycemic patients [29–32]. Additionally, the strongest clinical evidence suggests that mucosal application of simple carbohydrate is adequately effective [33] and possibly more effective [29] than swallowed carbohydrate. Thus, we suggest application of 0.2–10 mL (i.e., up to ~2 teaspoons scaled for patient size) of a viscous, simple carbohydrate (e.g., corn syrup, honey) to the buccal mucosa between the maxillary premolars/molars and the cheek of at-risk, symptomatic animals with suspected or known hypoglycemia, as long as the animal is not seizing, the risk to the caregiver is

TABLE 1 | Treatment recommendations for general first aid in dogs and cats.

Treatment recommendations	Strength of recommendation	Quality of evidence	PICO
Hypoglycemia			
In asymptomatic dogs and cats with hypoglycemia documented by continuous glucose monitor or glucometer in the prehospital setting, we recommend feeding dietary carbohydrate (e.g., pet food)	Strong	Very low	FA-06
In dogs and cats with documented or suspected, symptomatic hypoglycemia without active seizures in the prehospital setting, we suggest applying a viscous simple carbohydrate (e.g., corn syrup, glucose syrup) to the buccal mucosa between the maxillary premolars and the cheek, provided that this does not delay timely veterinary care	Weak	Very low	FA-06
In dogs and cats with active seizures, we recommend against oral or mucosal administration of any substance in the prehospital setting	Strong	Expert opinion	FA-06
In dogs and cats with documented or suspected hypoglycemia in the prehospital setting, we recommend against oral or mucosal administration of any substance if there is perceived risk to the caregiver	Strong	Expert opinion	FA-06
Non-caustic toxin ingestion			
We recommend against the routine prehospital administration of emetics to dogs and cats following acute toxin ingestion	Strong	Low	FA-11
We suggest the prehospital administration of emetics to dogs and cats following acute toxin ingestion if immediate access to a veterinary facility is not available and emesis is recommended by a veterinarian or animal poison control center	Weak	Expert opinion	FA-11
Heat-related illness and heat stroke			
We recommend moving dogs and cats showing signs of heat stroke to a cool environment as soon as possible	Strong	Expert opinion	FA-07
We recommend prehospital active cooling in dogs and cats showing signs of heat stroke	Strong	Very low	FA-07
We suggest actively cooling dogs and cats showing signs of heat stroke in the prehospital setting by applying cool running water to the animal's trunk with emphasis on the area with the thinnest haircoat, usually the ventral abdomen, soaking to the skin	Weak	Expert opinion	FA-07
We suggest actively cooling dogs and cats showing signs of heat stroke in the prehospital setting to a rectal temperature of 39.7°C–40°C (103.5°F–104.0°F), and then discontinuing active cooling measures (e.g., stop running water, dry the animal)	Weak	Expert opinion	FA-07
We suggest continuing active cooling in dogs and cats with stertor or stridor that are showing signs of heat stroke in the prehospital setting until clear improvement in panting, or until temperature reaches 38.6°C (101.5°F), whichever is sooner	Weak	Expert opinion	FA-07
We recommend against prehospital active cooling measures in dogs and cats showing signs of heat stroke if risk to the first aid provider is perceived to be high	Strong	Expert opinion	FA-07
We recommend that dogs and cats showing signs of heat stroke be transported to a veterinary facility immediately following prehospital active cooling	Strong	Expert opinion	FA-07
Thermal burns			
We recommend active cooling of thermal burns in cats and dogs by applying cool running tap water for at least 20 min, as soon as possible and within 3 h of injury	Strong	Moderate	FA-05

(Continues)

Treatment recommendations	Strength of recommendation	Quality of evidence	PICO
We suggest active cooling of thermal burns in cats and dogs by alternative techniques (e.g., cool, water-soaked towel; cold pack) for at least 20 min, as soon as possible and within 3 h of injury, if cool running water is unavailable, such as during transport to a veterinary facility	Weak	Moderate	FA-05
In cases where the risk to the first aid provider is believed to be high, we recommend against active cooling for burns in cats and dogs	Strong	Expert opinion	FA-05
Chemical burns			
We recommend performing immediate irrigation with running water in the prehospital setting for as long as possible (minimum 15 min) for cats and dogs with caustic substance exposure to the skin	Strong	Very low	FA-08
We recommend the first aid provider wear personal protective equipment (gloves, long sleeves, face protection, eye protection) while performing water irrigation for caustic substance exposure in dogs and cats	Strong	Expert opinion	FA-08
We recommend against performing water irrigation for dogs and cats with caustic substance exposure if the risk to the first aid provider is high	Strong	Expert opinion	FA-08
Oxygen for respiratory distress or hypoxemia			
We recommend administering oxygen to dogs and cats with signs of difficulty breathing or hypoxemia (i.e., cyanosis, low SpO_2) in the prehospital setting during transport to a veterinary facility	Strong	Expert opinion	FA-03
When such monitoring is available, we recommend titrating oxygen support to SpO_2 95%–97% in the prehospital setting to dogs and cats with signs of difficulty breathing or hypoxemia (i.e., cyanosis, low SpO_2) during transport to a veterinary facility	Strong	Moderate	FA-03
Choking			
In conscious cats and dogs suspected to be choking, we recommend bystander intervention to help clear the airway if the risk to the first aid provider is low	Strong	Very low	FA-09
In conscious dogs and cats in the prehospital setting suspected to be choking, we recommend first administering up to 5 back blows unilaterally or bilaterally over the caudodorsal thorax, lateral to the spine, to help clear the airway	Strong	Very low	FA-09
In conscious cats and dogs in the prehospital setting suspected to be choking, we recommend trying alternative techniques to help clear the airway if 5 back blows are not successful	Strong	Very low	FA-09
In conscious cats and dogs in the prehospital setting suspected to be choking, we recommend against bystander intervention if the risk to the first aid provider is high	Strong	Expert opinion	FA-09
In unconscious dogs and cats in the prehospital setting suspected to have a foreign body airway obstruction, we recommend against blind finger sweeping to attempt to clear the airway.	Strong	Expert opinion	FA-09
In unconscious dogs and cats in the prehospital setting dogs and cats in the prehospital setting suspected to have a foreign body airway obstruction, we recommend immediately starting chest compressions, following the RECOVER Out-of-Hospital CPR Algorithm	Strong	Very low	FA-09
We recommend that any animal having required bystander assistance (e.g., back blows, abdominal thrusts) to clear the airway be evaluated by a veterinarian immediately.	Strong	Very low	FA-09

(Continues)

TABLE 1 | (Continued)

Treatment recommendations	Strength of recommendation	Quality of evidence	PICO
Bystander CPR			
We recommend immediate bystander-performed BLS for out-of-hospital cardiopulmonary arrest in dogs and cats as long as risk to the rescuer is low	Strong	Moderate	FA-10
We recommend transport to the nearest open veterinary clinic as soon as possible for dogs and cats experiencing OHCA	Strong	Moderate	FA-10
We recommend continuous BLS during transport to the nearest open veterinary clinic, with a primary emphasis on rescuer safety while following applicable vehicle passenger safety laws	Strong	Expert opinion	FA-10
Naloxone for suspected opioid exposure			
We recommend administration of naloxone by the intranasal or intramuscular route in the prehospital setting to dogs and cats with altered mentation or a respiratory rate <10 breaths per minute if opioid exposure is suspected	Strong	Low	FA-14
In the prehospital setting, if a dog or cat is unresponsive and agonal, gasping, or apneic, and opioid exposure is suspected, we recommend initiating basic life support per the RECOVER Out-of-Hospital CPR Algorithm and thereafter administering naloxone intranasally or intramuscularly as soon as possible	Strong	Very low	FA-14
We recommend against administration of naloxone to dogs and cats in the prehospital setting if the risk to the first aid provider is high	Strong	Expert opinion	FA-14
We suggest giving naloxone by the intranasal or intramuscular route to dogs and cats with suspected opioid overdose that do not have established vascular access	Weak	Low	FA-14
Tourniquet for severe external limb bleeding			
We suggest prehospital application of a tourniquet in conscious cats and dogs with severe extremity hemorrhage not responsive to application of direct pressure alone	Weak	Very low	FA-04
We recommend prehospital application of a tourniquet in unconscious cats and dogs with severe extremity hemorrhage not responsive to application of direct pressure alone	Strong	Very low	FA-04
In cases where the risk to first aid provider is believed to be high, we recommend against application of a tourniquet in cats and dogs	Strong	Expert opinion	FA-04

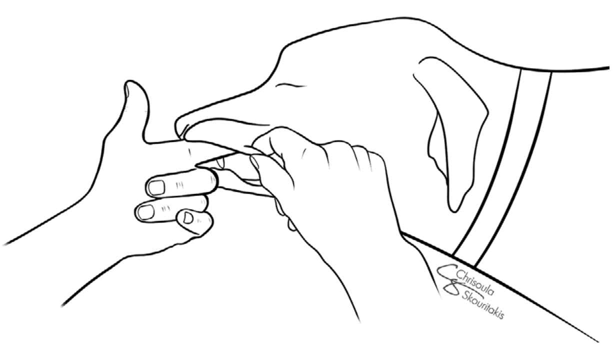

FIGURE 3 | Instructional figure for buccal mucosal application of viscous simple carbohydrate (e.g., corn syrup, dextrose gel, honey).

not perceived to be high, and it does not delay transport to a veterinary care facility (Figure 3). The selected volume should correlate to the animal's size, with the goal of coating a relatively large mucous membrane surface area rather than the animal swallowing the material. Because evidence suggests that the blood glucose concentration (BG) increase associated with oral or mucosal administration of sugar may not be adequate to resolve life-threatening hypoglycemia [33], prehospital treatment should not delay transport to a veterinary facility for intravenous dextrose support, which is more effective. Table 2 provides situation-specific guidance to address hypoglycemia in the prehospital setting.

Given the risks of progressive hypoglycemia in even asymptomatic, hypoglycemic animals receiving insulin, we recommend feeding such animals immediately, followed by transport to a veterinary facility if either clinical signs appear (e.g., lethargy, abnormal mentation, vomiting) or the BG does not achieve, at minimum, normoglycemia within 20 min of feeding. Clients should follow instructions from their veterinarian when hypoglycemic episodes occur.

TABLE 2 | Prehospital hypoglycemia in dogs and cats: Recognizing hypoglycemia and providing first aid.

Situation	Findings	First action	Second action
Low BG on test strip or CGM	Asymptomatic	Feed	Follow long-term veterinarian's care plan
At-risk patient	Lethargy Ataxia Collapse Nonresponsive but breathing	0.2–10 mL (up to ~2 teaspoons, based on patient size) viscous simple carbohydrate	Immediate transport to open veterinary facility
At-risk patient	Active seizures	Follow long-term veterinarian's care plan, if applicable Do not attempt to orally medicate	Immediate transport to open veterinary facility
At-risk patient	Nonresponsive and apneic	Immediate CPR	Immediate transport to open veterinary facility

Abbreviations: BG, blood glucose concentration; CGM, continuous glucose monitor.

3.2.3 | Key Knowledge Gaps

The efficacy of buccally applied, viscous, simple carbohydrate for treating symptomatic hypoglycemia in dogs is unknown, and there is no information at all regarding the efficacy and practicality of buccal sugar administration in cats. Also, the appropriate dose for given degree of hypoglycemia is unknown, and while these guidelines recommend any animal with symptomatic hypoglycemia be evaluated by a veterinary professional, regardless of the outcome of first aid, it is unknown whether animals with mild signs may be able to avoid a veterinary facility visit safely in some situations if BG responds adequately.

3.3 | Non-Caustic Toxin Ingestion (FA-11)

3.3.1 | First Aid Treatment for Non-Caustic Toxin Ingestion in Dogs and Cats

Ingestion of non-caustic toxins is common in dogs and happens occasionally in cats. Gastrointestinal decontamination is one of the mainstays of toxin ingestion management; however, ample, highly consistent evidence in people has shown that prehospital/early induction of emesis following toxin ingestion or drug overdose does not improve survival, severity of clinical signs, or the need for hospitalization/length of hospital stay in people [34–40]. Additionally, emesis induction may delay hospital presentation and thus administration of activated charcoal (AC), reduce patients' willingness to ingest AC, or cause patients to vomit administered AC [35, 37, 38]. Delay in successful AC administration can be deleterious since AC appears to be more effective at gastrointestinal decontamination in alert people than is gastric emptying [38, 41, 42].

In addition to evidence that emesis does not improve outcomes in toxic ingestion, the common prehospital options for effective emesis induction, namely, syrup of ipecac or hydrogen peroxide administration, can be harmful as well. While oral hydrogen peroxide is effective at inducing emesis in dogs [43], there are reports in both dogs and cats of meaningful gastrointestinal injury secondary to oral administration of hydrogen peroxide at doses relevant for emesis induction [43–46]. Syrup of ipecac can cause severe vomiting, diarrhea, sedation, and other adverse effects [40, 47]. Finally, regardless of the emetic drug, emesis induction itself can have adverse effects [48–50]. Given the absence of evidence that emesis induction is helpful in acute toxin ingestion and the potential for risks when inducing emesis in the non-clinical environment, we recommend against routine prehospital emesis induction for acute toxin ingestion in dogs and cats. Instead, providers should present dogs and cats with suspected or known toxin ingestion to a veterinary facility as soon as possible.

However, there may be situations in which the possible benefits of out-of-hospital emesis induction for non-caustic toxin ingestion could outweigh the risks. For example, if a dog ingested a large volume of raisins while camping or a cat living in a remote area ingested an acetaminophen (paracetamol) tablet, and thus timely presentation to a veterinary facility is not feasible, a veterinarian or animal poison control provider may recommend emesis induction in the field. If such a situation arises in which in-person veterinary care is not available and a veterinarian or animal poison control center recommends inducing emesis in a dog or cat outside the clinical setting, we suggest the first aid provider follow that professional's advice. For safety purposes, veterinarians may consider prescribing ropinirole ophthalmic solution for dogs with pica or frequent toxin exposure that spend time in remote settings.

Animals with non-caustic toxin ingestion should be presented for professional veterinary care as soon as possible.

3.3.2 | Key Knowledge Gaps

There are many knowledge gaps surrounding prehospital toxin management in dogs and cats. There are no clinical trials comparing prehospital emesis induction to no prehospital emesis for non-caustic toxin ingestion in dogs and cats as pertains to any clinical outcome. Additionally, and potentially equally relevant, there are no studies to determine whether gastric emptying affects clinical outcomes at any time following acute toxin ingestion in alert dogs and cats.

3.4 | Suspected Heat Injury or Heat Stroke (FA-07)

Heat-related illness is a potentially fatal emergency seen commonly in dogs and less often in cats. Heat-related illness described in people varies from heat stress, described as discomfort and physiological strain associated with warm ambient temperatures, to heat stroke, the most serious and potentially fatal form [51]. Heat stroke results when the heat load from environmental conditions or exertion exceeds the individual's heat dissipating mechanisms, and leads to CNS disturbances; systemic inflammatory response syndrome and multiple organ dysfunction are common sequelae [51]. As in people, heat stroke in dogs can be due to environmental (e.g., being left in a hot car) or exertional (e.g., running or working in warm weather) causes [52, 53], and it is often fatal in dogs [53–57]. Additionally, since dogs depend on evaporation from the respiratory tract for cooling, respiratory disease such as upper airway obstructive disorders may impair the dog's ability to dissipate heat in a way unique to their species [58]. Environmental heat stroke leading to severe clinical signs has been seen in cats associated with enclosure in hot environments such as cars or clothes dryers [59], though reports of heat injury and associated outcomes are less available for cats.

3.4.1 | Recognizing Heat-Related Illness and the Need for Prehospital Cooling in Dogs and Cats

As in people, heat stroke in dogs is characterized by high core body temperature (>41°C; >105.8°F in dogs) in conjunction with CNS dysfunction [53, 60]. Because heat stroke can cause severe morbidity and mortality, and because measuring temperature outside the clinical setting may not be feasible, animal owners, handlers, and paraprofessionals should be educated to recognize signs of earlier heat-related illness to prevent heat stroke altogether.

Both dogs and cats can experience heat-related illness associated with high ambient temperature, even at rest [53, 59]. Heat stroke due to high ambient temperature is *environmental heat stroke*. The most dangerous hot environments are poorly ventilated spaces such as vehicles, closets, and garages. Owners, handlers, and paraprofessionals may be more likely to recognize the potential for heat-related injury in these circumstances because they themselves feel hot in such conditions and because of the emphasis placed on child and elder safety in these circumstances [61, 62]. However, heat stroke can also occur in moderate or even cool environments during activity, including running, playing, hiking, walking, and working; there are many reports of this *exertional heat stroke* in dogs, but none in cats [53, 55]. Recognizing heat-related injury in these circumstances may be more challenging if the bystander has a low index of suspicion. Common signs of heat-related illness in dogs and cats appear in Box 2.

Owners, handlers, and paraprofessionals should have a high index of suspicion for heat-related illness if they note any of these signs in high ambient temperatures or during physical activity (Figure 4). While heat-related illness is most common in summer months, it has been reported year-round in dogs, and case numbers often increase in spring on some of the first warm days of the year [53, 54, 56]. These seasons' earliest cases of heat-related illness may be due in part to lack of induction of heat shock proteins and other annual acclimatization [51].

Animal factors also play a role in predisposing to heat-related illness. Specifically, in dogs, higher body weight, higher body weight for breed/sex, brachycephalic conformation, and increasing age have been associated with higher likelihood of experiencing

BOX 2 | **Common signs of heat-related illness in dogs and cats.**

- Constant panting in dogs; cats may or may not breathe with an open mouth
- Uncharacteristic or abrupt reluctance to play or engage in activity
- Lying down uncharacteristically during activity
- Withdrawal from work
- Anxious expression or restlessness possible in dogs
- Apparent disorientation
- Stumbling
- Excessive salivation, vomiting, or diarrhea
- Collapse

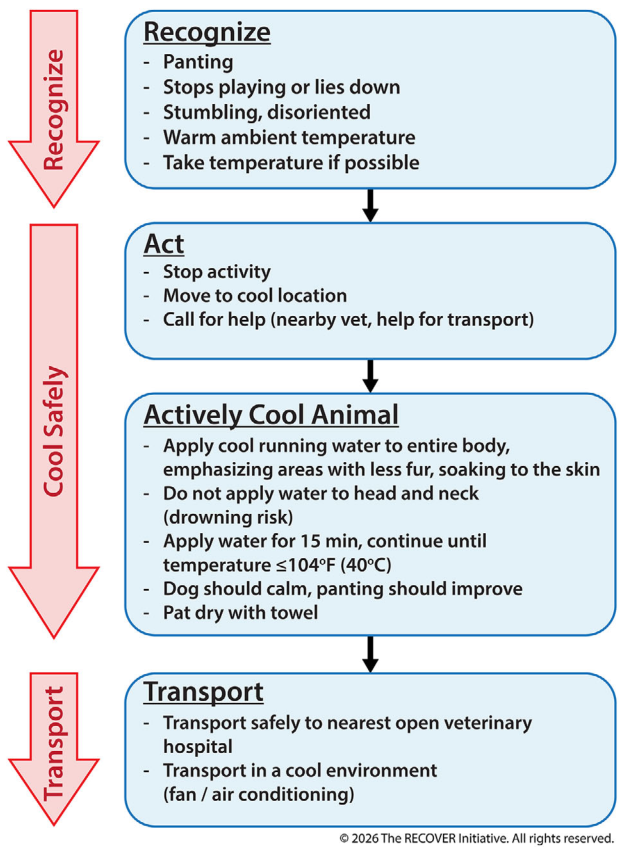

FIGURE 4 | RECOVER First Aid Recognize and Act Algorithm: Heat-Related Illness. The purpose of this algorithm is to help owners, handlers, and paraprofessionals recognize and provide prehospital first aid for heat-related illness and heat stroke in dogs and cats.

FIGURE 5 | Instructional figure depicting options for cooling a dog with heat-related illness: water from a hose in the residential or industrial environment, caudal body submersion in the outdoor recreational or wilderness environment, and ice water from a cooler in the suburban or urban recreational environment. Care must be taken to avoid the face to prevent accidental drowning, and heat dissipation will be most effective when water is applied at the area of thinnest haircoat, soaking to the skin, with running water/repeated dousing if feasible.

heat-related illness [53, 54, 56]. In dogs that experience heat-related illness, obesity has been associated with nonsurvival [53].

To help owners, handlers, and paraprofessionals to recognize heat-related illness and heat stroke in dogs and cats, there is a FARA Algorithm for heat-related illness (Figure 4). The top of the algorithm starts with cues for laypeople to recognize common signs of heat-related illness in dogs, which can be described, emailed, or messaged to worried clients during triage calls or used pre-emptively to educate owners, handlers, and paraprofessionals.

3.4.2 | Prehospital Cooling for Heat-Related Illness and Heat Stroke in Dogs and Cats

First aid guidelines for treatment of heat stroke in people include immediate, on-site cooling prior to transport to a hospital [12, 13]. Available evidence uniformly and strongly supports immediate, active cooling of human heat stroke victims to avoid negative, potentially fatal outcomes [63, 64].

For dogs and cats suspected to have heat-related illness, *passive cooling* by removing the animal from the heat source is recommended. Passive cooling in dogs and cats involves moving the animal from a warm to a cooler environment if possible. Working, running, playing, hiking, walking, or other activity should be stopped immediately. Additionally, evidence shows that *active cooling* measures to remove heat from the body should be undertaken immediately to optimize outcomes and preserve life [63–65]. Because time at temperature is an important factor in injury due to hyperthermia [51], we recommend active cooling on scene, if possible, before transport to a veterinary facility for definitive care, as long as the risk to the first aid provider is not high.

To provide active cooling in dogs and cats, we suggest running cool water over the animal caudal to the neck (for the safety of the pet and the first aid provider), with focus at an anatomic region with relatively less fur, to help facilitate soaking to the level of the skin (Figure 5). Running water is considered superior to a single dousing because when water is stagnant, an insulative thermal plane may develop, which could diminish the cooling rate [66]. Cool running water harnesses conductive, convective, and evaporative heat loss mechanisms simultaneously. While cold water immersion (CWI) of only hands and/or feet performs better than passive cooling alone in people [66], the committee does not recommend active cooling of dogs and cats by active cooling of only the paws, due to paws' smaller relative surface area and different skin characteristics (i.e., thick paw pads) compared to human hands and feet.

A recent topical meta-analysis and human first aid guidelines do not report harm or hypothermia associated with CWI or other active cooling techniques [12, 13, 66]. Despite this, human guidelines recommend discontinuing active cooling measures once rectal temperature reaches 1°C above the high end of the human reference interval (i.e., reaches 39°C). Using an analogous approach, active cooling of hyperthermic dogs and cats should be discontinued when the rectal temperature reaches approximately 40°C/104°F (high-end normal for dogs and cats being 39.1°C). This approach is reasonable for dogs and cats without airway obstruction (i.e., without stertor or stridor), even if the animal is still panting; however, if the animal has audible stertor or stridor, which would hinder its innate ability to dissipate heat [58], continuing to cool until the animal stops panting is reasonable, even if the rectal temperature is normal at that time. Regardless of upper airway noise, active cooling should be discontinued in all cases once the rectal temperature reaches 38.6°C (101.5°F). If rectal temperature measurement is not possible due to out-of-hospital setting, active cooling should be performed for 15 min prior to transport. After on-scene cooling, animals with heat-related injury should be patted dry with a towel and then immediately transported to a veterinary facility.

To help owners, handlers, and paraprofessionals to cool dogs and cats with heat stroke in the prehospital setting, the RECOVER

First Aid Recognize and Act Algorithm: Heat-Related Illness provides instructions to act to passively cool the animal, provide effective active cooling measures, and transport to the nearest open veterinary facility (Figure 4). This FARA algorithm for heat stroke can be described, emailed, or messaged to clients during triage calls or used pre-emptively to educate owners, handlers, and paraprofessionals.

3.4.3 | Key Knowledge Gaps

Neither the optimal method(s) for cooling nor method to determine when to stop cooling has been studied in dogs and cats, and these actions may differ from those preferred in people. These are considered critical knowledge gaps.

3.5 | Thermal Burns (FA-05)

Thermal burns can result from contact with flames, hot liquids or gases, or hot surfaces. Human first aid guidelines recommend the immediate active cooling of thermal burns using cool running water [12]. This section provides first aid treatment recommendations for dogs and cats with thermal injury.

3.5.1 | Preventing Thermal Injury in Dogs and Cats

Owners, handlers, paraprofessionals, and veterinary professionals should be vigilant to avoid burns in dogs and cats in the everyday and professional environment. Common exposures for thermal burns in small animals include hot walking surfaces (streets, sidewalks, rocks) in sunny conditions; water, blow-dryers, and other styling tools used in grooming; active warming devices such as heating pads; and exposure to household or other fires [67–69]. While small animals will prevent being burned by avoiding such contacts when possible, dogs that are being worked or playing exuberantly, animals restrained for grooming, anesthetized or sedated patients in the veterinary facilities, and animals under similar psychological or physical confinement may not be able to avoid exposure. Serious burns can result. Thus, bystander vigilance is imperative to avoid thermal burns when dogs and cats are so confined, by frequent reassessment of applied warm or hot surfaces, liquids, or gases, and removing or reducing exposure if indicated.

3.5.2 | Recognizing Thermal Injury and the Need for First Aid in Dogs and Cats

In order to provide first aid to the small animal with thermal injury, owners, handlers, and paraprofessionals must be able to recognize the burned animal as soon as possible after the burn occurs. Delay to cooling can have serious consequences and lead to meaningful morbidity or even mortality [70–75]. Index of suspicion for thermal burns is high in some circumstances, such as housefires or wildfires. However, thermal burns can occur in many circumstances less obvious than a fire; therefore, owners, handlers, and paraprofessionals should maintain an index of suspicion for thermal burns when the dog or cat has had exposure to relevant surfaces such as hot flooring (e.g., asphalt in summer) or heating pads, or hot liquids or gases (e.g., blow-dryers following grooming).

Recognition is by visual appearance of fur and tissue, or the animal's behavior. Some burns may appear as singed fur or reddened or blackened dermal or subdermal tissues, particularly if the exposure was to flames or a very hot gas or surface. However, burns caused by prolonged exposure to less hot surfaces or liquids may manifest as only erythematous skin covered by normal-appearing fur. Since some serious burns can be less visible, owners, handlers, and paraprofessionals should have a high index of suspicion for thermal injury if the animal seems painful following any exposure to a warm or hot surface, liquid, or gas. Conscious animals with a thermal burn are likely to guard the area and may respond with withdrawal or aggression when the burned area is touched. The main FARA Algorithm suggests evaluation for possible thermal injury in the animal displaying sudden apparent pain (Figure 1).

3.5.3 | Cool Running Water Application for Thermal Burns in Dogs and Cats

There is good evidence to support applying cool running water to thermal burns for 20 min, if performed within 3 h of burn injury [70–74, 76–80]. Such first aid meaningfully decreases morbidity and, in veterinary medicine where costly surgeries for severe injury can lead to euthanasia, probably also reduces mortality. The bystander should apply cool, clean, running water to thermal burns in dogs and cats as soon as possible after the injury in the prehospital setting (Figure 6). If such first aid has not occurred in the prehospital setting, veterinary professionals should apply cool running water to the burned area when the animal arrives at the veterinary facility. Cool water is preferred over ice water, so clean water from a hose or tap is ideal; a stream could be used in a wildlife setting [80, 81]. Water should not be applied near the face in the prehospital setting to avoid drowning risk.

Once the burn has been cooled for at least 20 min under cool running water, the animal should be presented to the nearest open veterinary facility; if the risk to the first aid provider precludes prehospital water application, the animal should be taken directly to a veterinary facility for care as soon as the injury is discovered. If prehospital first aid was not undertaken, veterinary professionals should apply cool running water to the burn for no less than 20 min when the animal arrives at the facility; facial burns could potentially be managed if the animal were anesthetized and intubated.

3.6 | Chemical Burns (FA-08)

Chemical burns usually result from contact with acidic or alkaline substances, and while they are less common than thermal burns, they can cause severe morbidity and mortality [12]. Owing to their dense hair coats, dogs and cats may be somewhat protected from powdered or other dry chemicals but may be at higher risk for chemical burns from liquid exposure if the coat holds the chemical against the skin for a prolonged period. Prompt prehospital first aid consisting of copious flushing with water is the current guideline for chemical exposure to the skin in people

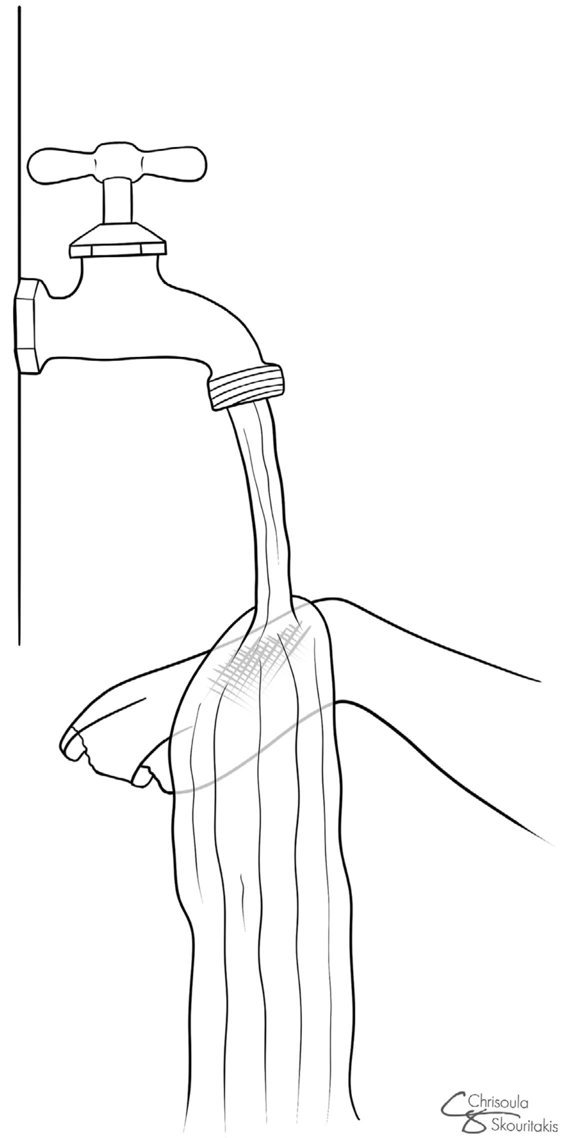

FIGURE 6 | Instructional figure depicting running water over an extremity burn in a dog. Areas with thermal burns should be cooled with cool running water for at least 20 min, as soon as possible after the burn—such treatment has a positive impact for hours after the burn, so it should be pursued before transport if feasible and safe. Areas with chemical burns pose risk to the provider, so the provider should wear gloves and other personal protective equipment when providing first aid in such cases; any bulky or powdery toxin should be brushed safely from the coat, and running water should be applied for at least 15 min before transport if feasible and safe to do so.

[12]. This section provides first aid treatment recommendations for dogs and cats with caustic substance exposure to the skin.

3.6.1 | Recognizing Caustic Substance Skin Exposure and the Need for First Aid in Dogs and Cats

In order to provide first aid to the small animal with skin exposure to a caustic substance, owners, handlers, and paraprofessionals must recognize the exposure as soon as possible. Delay to first aid can have serious consequences and lead to meaningful morbidity or even mortality [82–87]. While there are no known reports of the most common causes of chemical burns in dogs and cats, many such exposures likely happen in the home or residential garage environment, in the form of cleansers, chemicals involved in household projects, and home improvement materials. Animals in the industrial or workplace environment are also at risk. Chemical exposure is probably most likely to be recognized if the animal with potential for exposure displays sudden, apparent pain or excessive attention to the affected anatomic area (Figure 2). If the dog or cat licks the chemical, ptyalism and apparent oral pain may result.

3.6.2 | Water Irrigation for Caustic Substance Skin Exposure in Dogs and Cats

Before providing first aid to the animal with caustic substance exposure, the provider should don protective equipment such as disposable medical or dishwashing gloves, an impenetrable covering such as a modified garbage bag or tarp, and eye protection. Any substantial, removable chemical should be manually removed if it is safe to do so. There is strong evidence that irrigating skin with caustic substance exposure using running water for ≥15 min reduces severity and improves survival outcomes [82–92]. The providers should apply clean, running water to chemically exposed areas in dogs and cats as soon as possible after the exposure in the prehospital setting (Figure 6). Running water should not be applied near the animal's face or mouth to prevent accidental drowning. If the animal attempts to lick the affected area, an Elizabethan collar should be placed, if possible, to prevent oral burns.

Once the area has been irrigated for no less than 15 min under running water, the animal should be presented to the nearest open veterinary facility; if the risk to the first aid provider precludes prehospital water application, the animal should be taken directly to a veterinary facility for care as soon as the exposure is discovered. If at least 15 min of water irrigation has not occurred in the prehospital setting, veterinary professionals should apply running water to the area for no less than 15 min when the animal arrives at the facility.

3.6.3 | Key Knowledge Gaps

The most common topical caustic exposures in dogs and cats are unknown, and further information about exposures may help inform best medical and practical practices.

3.7 | Oxygen for Respiratory Distress or Hypoxemia (FA-03)

Prehospital dyspnea and hypoxemia in people are reliably associated with prehospital [93] and in-hospital [94–96] mortality. Thus, oxygen is commonly administered to people in the prehospital setting during medical transport [12, 13]. Supplemental oxygen is also commonly provided to dogs and cats experiencing respiratory distress in the clinical setting. This section provides first aid recommendations regarding oxygen supplementation in the prehospital setting for dogs and cats in respiratory distress.

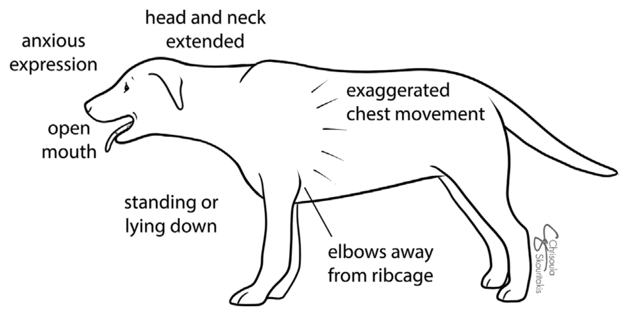

FIGURE 7 | Instructional figure depicting orthopnea in a dog, consistent with respiratory distress. The dog has an anxious expression, head and neck extension, and is breathing with an open mouth with the lips pulled back. Notes indicate elbow abduction ("elbows away from ribcage") as well as exaggerated chest movement. The dog or cat in respiratory distress may be standing or lying down, but until distress is very severe/perimortem, the dog or cat in respiratory distress is generally positioned with the sternum toward the ground and the spine toward the sky (i.e., rarely in lateral recumbency or "on its side").

3.7.1 | Recognizing Respiratory Distress in Dogs and Cats

Respiratory distress is a common emergency presentation in both dogs and cats [97]. Clinical signs may include increased respiratory rate and effort; orthopnea with sternal or standing posture, head and neck extension, and elbow abduction; agitation; increased breathing sounds such as stertor, stridor, or audible wheezing; and cyanosis, among other less common signs. Figure 7 provides an example for client education of a dog with physical characteristics of a dog with respiratory distress.

Animals displaying these clinical signs may benefit from oxygen therapy if it is available on scene or during transport to a veterinary clinic for definitive care. The provision of oxygen to dogs and cats with respiratory distress or suspected or confirmed hypoxemia may improve arterial oxygenation and tissue oxygen delivery. Also, oxygen supplementation may improve feelings of breathlessness in dogs and cats with respiratory distress, as it can in people.

3.7.2 | Prehospital Oxygen Therapy for Dogs and Cats With Respiratory Distress

We recommend administering supplemental oxygen to dogs and cats in respiratory distress in the out-of-hospital setting and during transport for definitive veterinary care. Veterinarians can prescribe medical oxygen for the home setting for animals with chronic respiratory conditions, and oxygen can be delivered by commercially made oxygen tank, home-built oxygen tent, or flow-by administration on an as-needed basis. Clients should ensure adequate ventilation and temperature control if the animal remains in an enclosed space for more than a few minutes. First responders transporting dogs and cats can administer oxygen via flow-by or face mask. Veterinary ambulance services may have additional options, such as oxygen helmets or tracheal intubation under general anesthesia with provision of 100% oxygen and manual ventilatory support.

There is weak evidence that normoxemia may be the preferred target in people with dyspnea or hypoxemia [98], and more evidence that hyperoxemia can be harmful, particularly following a hypoxic state [99, 100]. Therefore, if pulse oximetry is available, it is recommended to titrate oxygen support to achieve a pulse oximetry reading of 95%–97%, consistent with normoxemia.

3.8 | Choking (FA-09)

FBAO is an occasional problem in dogs and is uncommon in cats. Complete airway obstruction, including FBAO, is fatal within only a few minutes; therefore, bystander intervention is crucial to avoid CPA [8–10]. Human first aid guidelines recommend that bystanders attempt to help dislodge the obstructive foreign body when a choking victim is unable to cough productively [13]. This section provides first aid treatment recommendations for dogs and cats with choking due to FBAO.

3.8.1 | Recognizing Choking and the Need for First Aid in Dogs and Cats

Clinical signs of choking in dogs and cats may include agitation, pawing at the face or mouth, head and neck extension, weak or no coughing noise despite apparent attempts to cough or gag, high pitched squeaking noise during attempted breaths, pale or cyanotic mucous membrane color, and ptyalism (Figure 8) [101]. Choking animals may not show all of these signs. Also, animals with upper airway obstruction not due to a foreign body and those with respiratory distress due to other causes may display similar signs. However, given the devastating nature of complete FBAO, owners, handlers, and paraprofessionals should have a high index of suspicion and consider providing first aid for choking when these signs are present, particularly if breathing efforts are silent or "squeaky."

3.8.2 | First Aid Maneuvers to Relieve Choking in Dogs and Cats

The most consistent general finding across studies of FBAO is that rapid bystander intervention to assist choking individuals is crucial to survival [8–10]. While limited evidence comparing different first aid methods to relieve FBAO is available, no technique applicable to dogs and cats was shown to be superior to back blows, and in the only study that directly compared back blows to abdominal thrusts, back blows were approximately twice as likely to be effective compared to abdominal thrusts [10]. Additionally, many complications of abdominal thrusts are reported in people, some of which are fatal, including aortic thrombosis, aortic dissection and rupture, splenic rupture, gastric rupture, and tracheal tear [102–106]. Abdominal thrusts may have even greater potential to injure dogs and cats than people because many are small and there are many different chest and abdominal conformations to consider. Because back blows appear to be more effective in people than abdominal thrusts and because abdominal thrusts appear to have more potential for victim injury, the first aid provider should first administer up to 5 firm "back blows" to conscious dogs or cats with FBAO. Because the canine and feline spine may be more prominent than

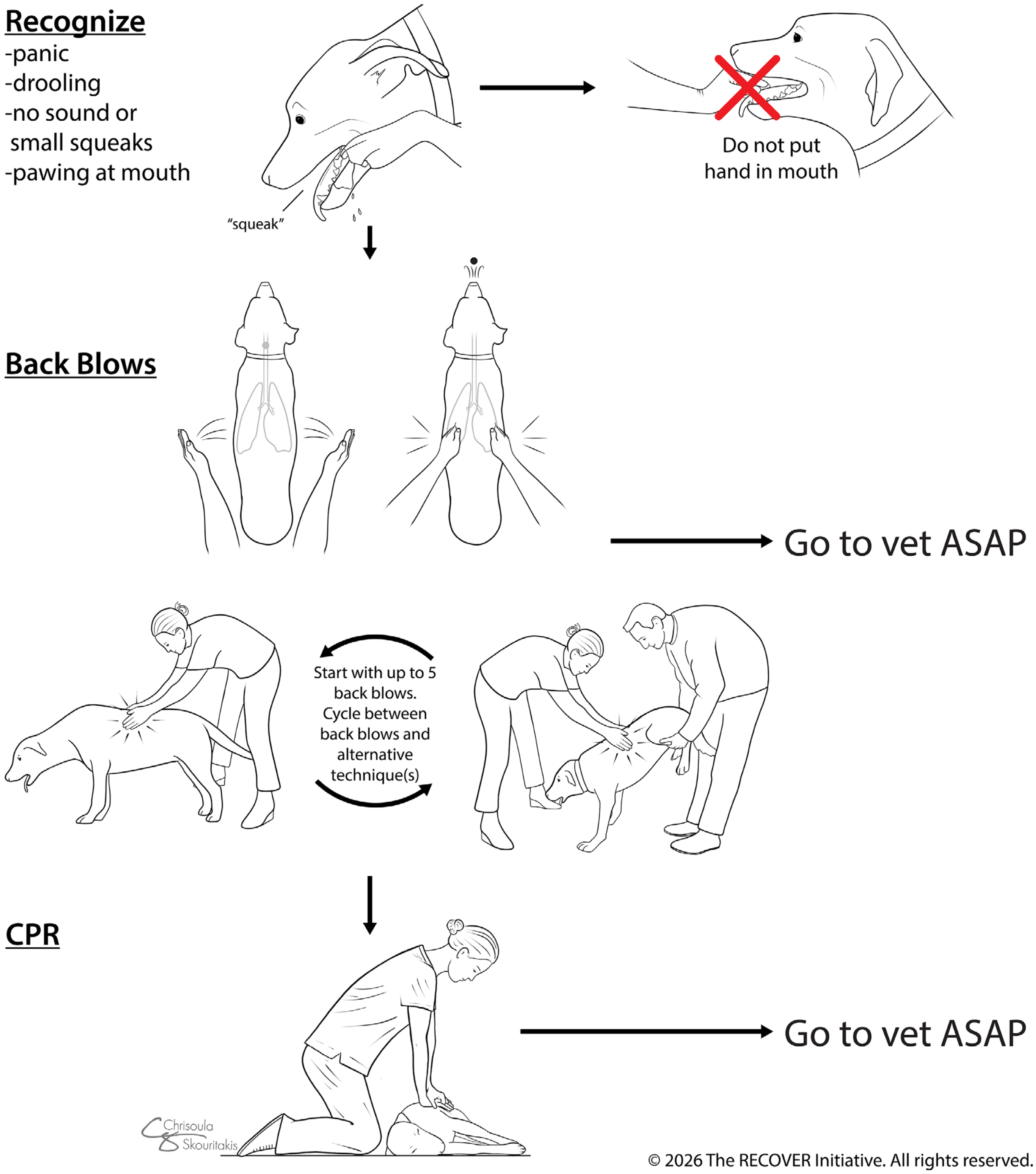

FIGURE 8 | RECOVER First Aid Recognize and Act Algorithm: Choking. The purpose of this algorithm is to help owners, handlers, and paraprofessionals recognize and provide prehospital first aid for foreign body airway obstruction (choking) in dogs and cats. © 2026 The RECOVER Initiative. All rights reserved.

a person's spine, and a direct blow to the spine can cause injury, we suggest delivering "back blows" to dogs and cats unilaterally or bilaterally over the caudodorsal thorax lateral to the spine (Figure 8). If 5 firm back blows fail to dislodge the FBAO, an alternative technique should be attempted [9, 10, 107], returning to back blows if the alternative also fails and repeating the cycle as long as the animal remains conscious. A list of techniques to consider is provided in Box 3; note that some of these techniques may be harmful to certain individuals (e.g., abdominal thrusts in smaller or thin animals, or those with abdominal organomegaly), and care should be taken to avoid injury. The provider should not attempt to reach into the mouth of a conscious dog or cat.

If the animal with FBAO falls unconscious, the provider should begin BLS, starting first with 30 chest compressions at a rate of 100–120/min (Figure 8). There is evidence that chest

BOX 3 | First aid techniques to consider to relieve foreign body airway obstruction in dogs and cats [9, 10, 13, 101, 107, 108].

Conscious dogs and cats

- Back blows—firm, unilateral or bilateral blows to the caudodorsal thorax, lateral to the spine
- Position with head lower than the body ± additional back blows
- Abdominal thrusts
- Chest thrusts
- *Do not* attempt to reach into the conscious animal's mouth

Unconscious dogs and cats

- Once victim falls unconscious, immediately begin chest compressions, which may dislodge the object.
    - Thirty chest compressions at a rate of 100–120/min.
- After 30 chest compressions, if object has not been dislodged, attempt to visualize and remove the object in <10 s. *Do not* perform a blind finger sweep.
- Provide two mouth-to-nose breaths in <5 s.
    - Second rescuer, if present, can continue to attempt object removal, while first rescuer resumes chest compressions.
- Repeat the above steps until object is dislodged or help arrives for transport to the nearest open veterinary clinic

compressions themselves can dislodge FBAO [10, 108], possibly more reliably than attempts to remove the object manually [109]. Thus, compressions should be undertaken in FBAO *before* checking the airway or providing rescue breaths, an approach that matches current recommendations in people [110–112]. After the first 30 chest compressions, the airway should then be assessed and the object physically removed if it is visible, pausing chest compressions for no more than 10 s. Two mouth-to-nose rescue breaths should be provided in <5 s if the animal remains unconscious. This move to compressions first (Compressions—Airway—Breathing) BLS initiation, even when only a single rescuer is available, is an update (i.e., a change) to the RECOVER guidelines for initial assessment and BLS. We recommend *against* performing a blind finger sweep of the airway, as doing this can push an object farther into the airway. If after the first round of 30 chest compressions and 2 rescue breaths, the animal remains unconscious, this cycle (30 compressions–airway check if still indicated–2 rescue breaths) should be repeated either until the FBAO is relieved or help arrives to assist with transport to the nearest open veterinary clinic. Two FARA Algorithms are provided for out-of-hospital CPR for dogs and cats, one intended for first responders who may have manual resuscitators (i.e., bag valve mask) with tight-fitting facemasks for small animal muzzles and one for lay rescuers without such equipment (Figures 9 and 10). There is evidence that abdominal thrusts may not dislodge an FBAO during canine CPA; chest compressions are more likely to be effective once the animal is unconscious [113].

We recommend that any animal that has required first aid for FBAO be evaluated by a veterinarian as soon as possible, even if the obstruction is relieved, since complications of FBAO and of first aid maneuvers occur with some frequency [13, 114].

3.8.3 | Key Knowledge Gaps

There are no studies comparing various methods to relieve FBAO in dogs and cats; considering chest compliance and conformational differences between people and small animals, it is likely that more species- and size-tailored recommendations would be appropriate, and even case reports and case series of effective methods for relieving FBAO (e.g., "pharyngeal flip") would be helpful. Additionally, suction devices[4,5] are becoming more commonplace to treat FBAO on scene in childcare environments and assisted living facilities [8, 11, 115], and the potential to adapt these devices for veterinary use is unknown. Such adapted suction devices or more reliable methods for relieving FBAO could be of great value for boarding facilities and owners of animals with swallowing disorders, and research in this area would be helpful.

3.9 | Bystander CPR for OHCA (FA-10)

Reported incidence of OHCA among dogs and cats with CPA at a veterinary hospital is 8%–37%, reportedly due to trauma, heart disease, or respiratory disease [116, 117]. Some dogs with OHCA have been reported to survive to discharge [117–119]. Theoretically, patients with OHCA due to either a shockable rhythm or a reversible cause have the potential to achieve a good outcome.

Bystander CPR has the potential to save lives [1–7, 120–139]. This section provides first aid recommendations regarding bystander CPR for dogs and cats experiencing CPA in the out-of-hospital setting.

3.9.1 | Recognizing OHCA and the Need for Bystander CPR in Dogs and Cats

Dogs and cats that are unresponsive without consistent breathing may have experienced CPA and should receive immediate CPR, unless the scene is unsafe or the owner has a do-not-resuscitate plan. The bystander encountering a nonresponsive dog or cat should follow the appropriate Out-of-Hospital CPR Algorithm—either for first responders or for lay rescuers (Figures 9 and 10). Once scene safety is confirmed, the lay rescuer algorithm starts with a call for help. People using a mobile phone to call for help should use the phone function on the speaker setting, rather than standard phone (held to ear) or typed messaging; speaker phone keeps the rescuer's hands free to help the animal. If the unrousable animal is not breathing regularly in the prehospital setting, bystander(s) should initiate single- or multi-rescuer BLS, as appropriate, within 10 s.

3.9.2 | Performing BLS for Dogs and Cats With CPA in the Prehospital Setting

If only one rescuer is available to initiate BLS, we recommend that the rescuer initiate chest compressions within 10 s of recognizing unconsciousness and lack of regular breathing, without checking the airway or giving breaths first [10, 109–112]. This move to compressions first (Compressions—Airway—Breathing) BLS initiation, even when only a single rescuer is available, is an update (i.e., a change) to the RECOVER guidelines for initial

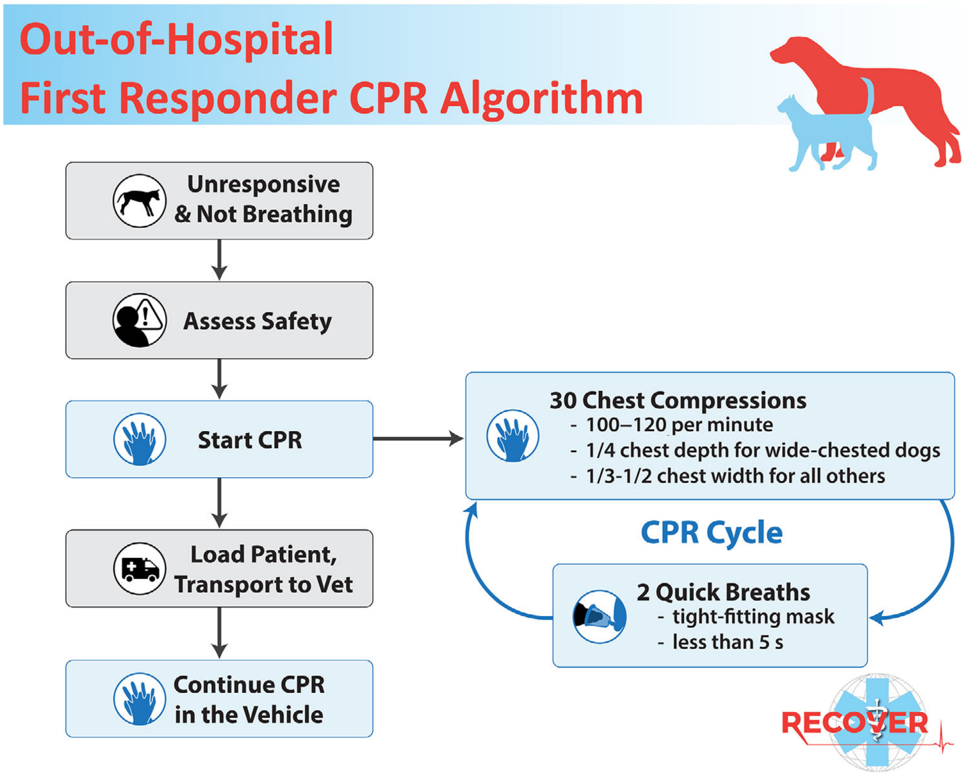

FIGURE 9 | RECOVER First Aid Recognize and Act Algorithm: Out-of-Hospital First Responder CPR Algorithm. The purpose of this algorithm is to help first responders recognize cardiopulmonary arrest and provide prehospital CPR to dogs and cats. © 2026 The RECOVER Initiative. All rights reserved.

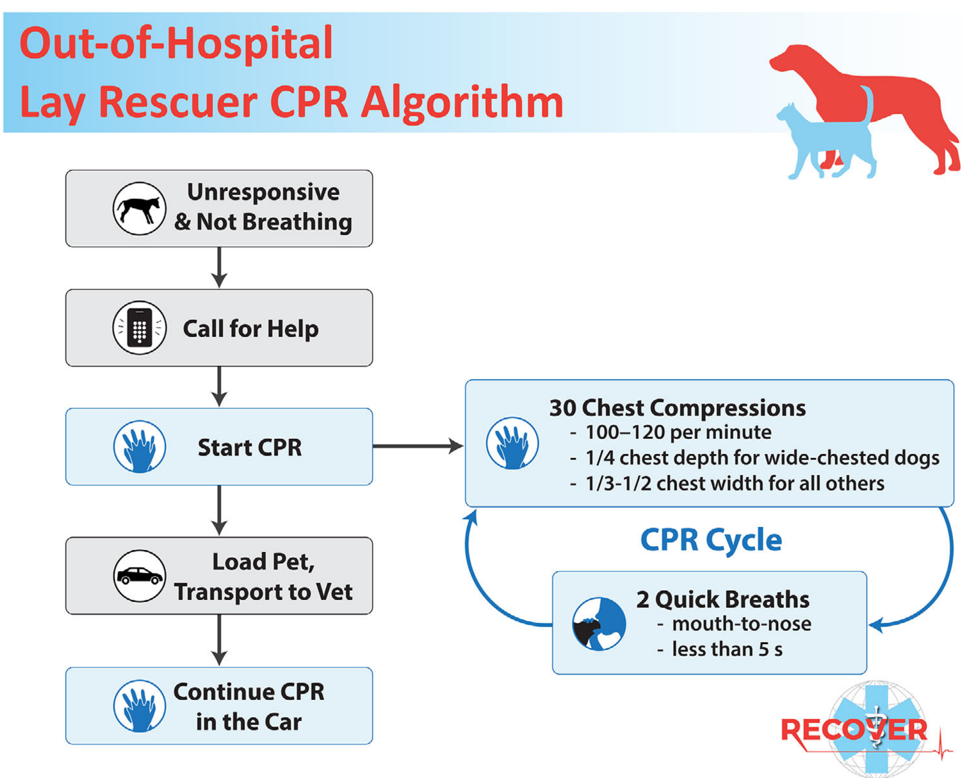

FIGURE 10 | RECOVER First Aid Recognize and Act Algorithm: Out-of-Hospital Lay Rescuer CPR Algorithm. The purpose of this algorithm is to help owners, handlers, and paraprofessionals recognize cardiopulmonary arrest and provide prehospital CPR to dogs and cats. © 2026 The RECOVER Initiative. All rights reserved.

assessment and BLS. During single-rescuer BLS, we recommend a compression-to-ventilation (C:V) ratio of 30 compressions:2 breaths (30:2) (BLS-09). The rescuer delivers 30 chest compressions at a rate of 100–120 per minute, then, during a chest compression pause of no more than a few seconds, delivers 2 breaths within 5 s, and immediately begins another round of 30 chest compressions. This cycle continues until additional rescuers arrive, return of spontaneous circulation (ROSC) occurs, or the resuscitation effort is terminated. Assuming the absence of airway management equipment and expertise in the prehospital setting, we recommend provision of rescue breaths by the mouth-to-nose technique unless there is risk to the rescuer (e.g., zoonotic disease or narcotics overdose) (BLS-10). Rescue breaths should be delivered with the animal's neck and head in alignment with the spine to avoid obstructing the airway. If the rescuer believes there is personal risk involved in providing mouth-to-nose rescue breaths, chest compression-only CPR should be performed (BLS-10) (Figures 9 and 10).

Unless an ambulance option were available for dogs and cats, a provider would either need to achieve ROSC in the field prior to transport or, for most dogs, abandon CPR efforts while transporting the animal to the closest veterinary hospital to ensure provider safety. Discontinuing BLS for transport would decrease the likelihood of a good outcome. For cats or small dogs, a vehicle's seat-belted passenger may be able to continue BLS using a circumferential or one-handed chest compression technique and mouth-to-nose ventilation [140] while another person drives to the closest veterinary hospital; in this scenario, continued BLS cycles during transport may lead to better outcomes. Working dogs (canine officers, operational canines) likely have additional transportation options, in which case BLS cycles should continue, if possible, during rapid transport to a veterinary hospital.

3.9.3 | Key Knowledge Gaps

Whether bystander CPR for OHCA should start with an airway check to relieve possible FBAO or start with chest compressions (which could also relieve an FBAO), as is recommended for people, is unknown. Anatomical differences (i.e., an easier airway to assess) and causes of OHCA (i.e., more likely asphyxial) in dogs and cats versus people could mean that airway assessment and rescue breaths should be performed before chest compressions in these species. However, laypeople may spend precious time attempting to manually dislodge an FBAO that could be better dislodged with chest compressions. Epidemiologic, demographic, and outcome data of canine and feline cases of OHCA may help answer this question.

3.10 | Naloxone for Suspected Opioid Exposure (FA-14)

Prescribed and illegal opioids are widely available and can cause adverse effects as serious as death in exposed dogs and cats. Pets may be accidentally exposed to opioids in the environment. Working dogs, particularly operational canine officers working in the military or law enforcement, are at risk for substantial opioid exposure in the field, whether they work in detection, patrol, search and rescue, tracking, or other specialty [141]. As stated by one prominent researcher on the topic, the use of prehospital naloxone to treat people with opioid intoxication and spontaneous circulation is "uncontroversial" [142]. Based on ample evidence of benefit and very little potential for harm [143–157], we recommend that dogs and cats with altered mentation or bradypnea after known or suspected opioid exposure also receive naloxone in the prehospital setting. This section provides first aid recommendations regarding naloxone administration in the prehospital setting for dogs and cats with accidental opioid exposure.

3.10.1 | Recognizing Opioid Intoxication and the Need for Naloxone First Aid in Dogs and Cats

Opioids are available in many forms including tablets, powder, patches, liquids, among others, and can be found in home, outdoor, or workplace environments. Depending on the specific drug and formulation, opioids can be absorbed through any route, including ingestion, inhalation, transmucosally, transdermally, or by injection. Adverse effects in dogs and cats may include mentation changes from sedation to anesthesia, bradypnea to apnea, and bradycardia and bradyarrhythmias, including asystole and CPA [158, 159]. Clinical signs notable by an owner, handler, or paraprofessional may include ataxia, CNS depression to collapse, miosis in dogs and mydriasis in cats, vomiting, constipation, bradypnea, decreased chest excursions, or apnea. If such signs are noted and opioid exposure is suspected, we recommend administration of naloxone in the prehospital setting.

3.10.2 | Administering Naloxone in the Prehospital Setting to Dogs and Cats With Known or Suspected Opioid Intoxication

In dogs and cats with altered mentation or a respiratory rate <10 breaths per minute, if opioid exposure is suspected, we recommend administration of naloxone by the intranasal (IN) or intramuscular (IM) route in the prehospital setting. IN administration can be accomplished using an atomizer (Figure 11) and may achieve best dispersion across the nasal mucosa if administered while the dog is inhaling. IM administration can be accomplished by injection into the epaxial musculature over the lumbar region or into the lateral aspect of the quadriceps muscle group of a pelvic limb. Caudal thigh or rump administration risks

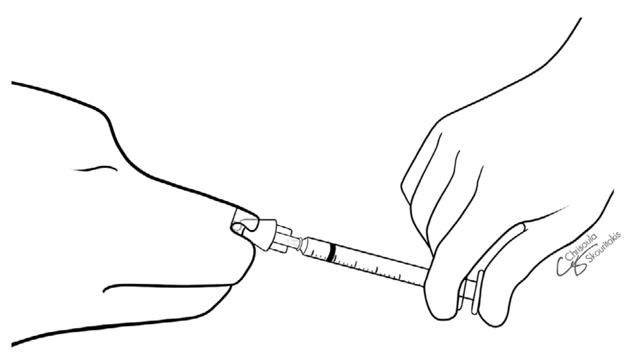

FIGURE 11 | Instructional figure depicting intranasal drug administration to an unresponsive, dolichocephalic dog using an atomizer affixed to a syringe.

sciatic nerve injection, and so should be avoided if possible. While the ideal dose is unknown, doses of 0.1–0.2 mg/kg are reasonable by either the IM or IN route [160, 161].

If a dog or cat is unresponsive and agonal, gasping, or apneic, and opioid exposure is suspected, we recommend initiating BLS per the Lay Rescuer or First Responder Out-of-Hospital CPR Algorithm, depending on the airway management equipment available (Figures 2, 9, and 10) and thereafter administering naloxone IN or IM as soon as possible. There is evidence that naloxone should be the first advanced life support measure provided during CPR for opioid overdose once BLS is established [12, 162]. Animals that have suffered clinical signs from opioid exposure should be evaluated by a veterinarian as soon as possible, even if they respond well to naloxone administration, particularly because re-narcotization can occur and additional support may be needed [148, 163].

3.10.3 | Key Knowledge Gaps

There are no studies of field naloxone use in dogs or cats; the question is particularly pertinent to operational canines/canine officers, and reports describing on-scene techniques and outcomes are lacking. Optimal field dose and administration route for dogs and cats with opioid exposure in the field are unknown, and this should be studied; whether a single "small dog" (e.g., Beagle) versus "large dog" (e.g., Malinois) dose was feasible for field convenience is important to simplify first aid provider procedures and allow for issuance of standardized kits.

3.11 | Tourniquet for Severe Extremity Bleeding (FA-04)

Hemorrhagic shock is a leading cause of early death following trauma. The human literature shows that tourniquets placed in the prehospital setting reduce mortality [164–166], effectively arrest extremity hemorrhage and improve hemodynamic stability [164, 165, 167–172], and likely reduce blood product requirement [166, 171]. The overall rate of complications directly attributable to use of a tourniquet in people is low [164, 165, 170, 171, 173–178], and based on case severity and the effectiveness of tourniquets mentioned above, it is likely that the relatively few patients with tourniquet-related complications would have died without prehospital tourniquet placement. Therefore, in dog and cats with severe extremity hemorrhage not responsive to application of direct pressure alone, we suggest tourniquet placement in the prehospital setting if the animal is conscious and recommend it if the animal is unconscious. This section provides first aid recommendations regarding tourniquet application in the prehospital setting for dogs and cats with severe extremity bleeding not responsive to direct pressure alone.

3.11.1 | Recognizing Severe, Refractory Extremity Bleeding and the Need for Tourniquet Placement in Dogs and Cats

Traumatized dogs and cats should receive professional veterinary care as soon as possible. However, in some cases, severe hemorrhage can cause negative outcomes such as shock, need for blood transfusions, and death more quickly than the traumatized animal can be presented to an open veterinary hospital. Therefore, if the traumatized dog or cat has external arterial spurting or otherwise subjectively severe bleeding, the owner, handler, or paraprofessional should try to stop the bleeding in the prehospital setting by applying direct pressure if it is safe to do so. If the external bleeding is on the head, neck, or trunk, direct pressure and timely transport to the nearest open veterinary clinic are the best options, whether bleeding slows or not. Tourniquets cannot be placed at these anatomic locations. However, if arterial spurting or subjectively severe bleeding from a limb or the tail does not stop or greatly improve with direct pressure, tourniquet placement can be lifesaving and should be pursued, if possible, particularly if it will take a long time to reach the nearest open veterinary clinic or if the animal has fallen unconscious.

3.11.2 | Tourniquet Placement for Severe, Refractory Extremity Bleeding in Dogs and Cats

We suggest prehospital application of a tourniquet in conscious cats and dogs with severe extremity hemorrhage not responsive to application of direct pressure alone and recommend prehospital tourniquet application if the animal has fallen unconscious. The difference in the strength of recommendation is owing to both provider safety and the severity of the animal's condition. Trauma and tourniquet placement are both painful, and there is meaningful provider risk for bite injury in these cases; therefore, we recommend against application of a tourniquet in instances where the risk to the rescuer is perceived to be high.

Tourniquets can be placed only on limbs and the tail; they should not be used on the head (or pinna), neck, or trunk (or genitals). While purpose-made tourniquets are available for use in people[6], they are designed for human limb size and conformation and are unlikely to be available or physically applicable in dogs and cats. Fortunately, evidence suggests that improvised tourniquets applied by bystanders, using materials like scarves and neckties, can still be of benefit if applied properly [170, 179].

To be effective, a tourniquet must be placed proximal to the site of hemorrhage; while this is simple to achieve over the antebrachium, crus, or tail, application proximal to the elbow or stifle may be difficult because of limb shape in these areas. The improvised tourniquet should ideally be ≥5 cm (≥2 inches) in width to reduce the pressure required to stop bleeding, pain associated with application, and tissue trauma [12]. Scarves and neckties are reasonable household choices, and these options may be preferable because they are easier to tie and tighten than, for instance, a leather belt. The tourniquet should be placed circumferentially around the limb proximal to the site of hemorrhage, looped into a simple knot, and pulled tight just until bleeding slows appreciably (Figure 12). If the tourniquet slips distally during tightening, it can be loosened slightly and repositioned more proximally, and the provider can tighten it again until bleeding slows. The tourniquet can be secured by additional knotting, or with duct tape or similar adhesive tape. Even once successful, tourniquet re-tightening may be required during transport if severe hemorrhage recurs. Tourniquets should remain in place throughout transport; veterinary professionals

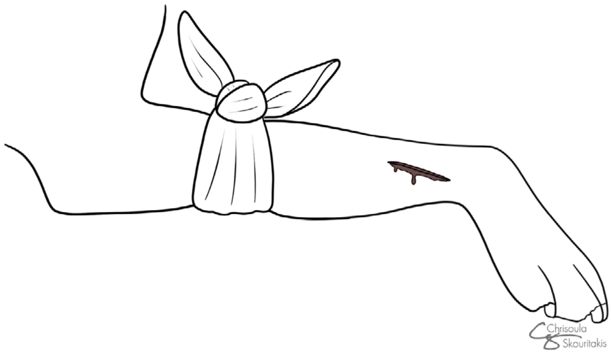

FIGURE 12 | Instructional figure depicting an improvised tourniquet tied firmly in place on a small animal's antebrachium, proximal to a laceration.

should remove the tourniquet after evaluation at the veterinary hospital. Manual digital occlusion of the artery is unlikely to be effective based on studies in human volunteers [12].

3.11.3 | Key Knowledge Gaps

No studies were identified evaluating the use of tourniquets to treat refractory, life-threatening extremity hemorrhage in dogs or cats, and whether such placement improves survival, reduces the severity of illness, or decreases transfusion requirement in small animals. It is unknown whether tourniquets can be placed effectively on canine and feline limbs, particularly proximal to the elbow and knee, by lay people. Finally, studies involving tourniquets in dogs and cats fashioned from household materials, including cloth, woven leather belts, and rubber tubing, are warranted.

4 | Discussion

The 38 treatment recommendations (Table 1), prose, explanations, images, and FARA Algorithms contained in this paper constitute the 2026 RECOVER First Aid Guidelines, a consensus guidelines paper synthesized from exhaustive evaluation, analysis, and summary of evidence relating to prehospital care for specific urgent conditions. Veterinary experts worked together to tailor these recommendations to dogs and cats based on a combination of this evidence evaluation, analysis, and summary and expert opinion where inadequate evidence was available. Treatment recommendations were posted for feedback from the international veterinary community, and feedback was used to refine and finalize these recommendations. As with the 2024 RECOVER CPR Guidelines [15] and 2025 RECOVER Newborn Resuscitation Guidelines [180], we used the GRADE approach for evidence to decision, extended to include experimental animal studies since many of these studies were performed in our species of interest [181].

Evidence was identified for evaluation through extensive, expert medical librarian-directed literature searches as described previously [21, 26]. Additionally, informal bridge literature searches were used in 2025 to reconcile the gap in time between the original 2020 literature searches and the evidence analysis and treatment recommendation processes. Though efforts were made to identify and collect all pertinent literature published between the original and bridge literature searches, some relevant literature could have been missed.

BOX 4 | **The RECOVER Initiative's highest priority knowledge gaps regarding first aid in dogs and cats.**

- The efficacy of specific types and volumes (doses) of buccally applied, viscous, simple carbohydrates for treating symptomatic hypoglycemia in dogs and cats
- A risk/benefit analysis of using non-caustic emetics (e.g., ropinirole) in dogs with non-caustic toxin ingestion in the prehospital setting
- Optimal method(s) for active cooling in heat-related injury in dogs and cats in the prehospital setting
- Optimal method(s) to determine when to discontinue active cooling for heat-related injury in dogs and cats in the prehospital setting
- Most effective and safest method(s) for relieving FBAO in the prehospital setting in dogs of various sizes and conformations
- Feasibility of suction-assisted methods for relieving FBAO in dogs
- Optimal field dose and administration route of naloxone for dogs with opioid exposure in the field, and whether a single "small dog" (e.g., Beagle) versus "large dog" (e.g., Malinois) dose was feasible for field convenience

Most literature identified regarding the first aid topics discussed in this paper took the form of observational studies in people, though limited observational and experimental studies in species of interest were found. Many studies were also indirect in intervention and comparator as well. Most evidence was thus low or very low quality (or "certainty"). Decisions regarding treatment recommendations were based on this evidence in combination with input from subject matter experts and the international veterinary community during the consensus process. Limitations and justifications for each treatment recommendation are discussed fully with each PICO in a companion paper [20].

The extensive literature search and evidence evaluation processes revealed numerous important knowledge gaps in most areas of canine and feline first aid. Moving forward, we intend to update individual first aid treatment recommendations on a continual basis as new questions and evidence arise. Box 4 contains a list of the RECOVER Initiative's highest-priority knowledge gaps as of this writing for first aid in dogs and cats.

We believe that veterinary teams can use the treatment recommendations, FARA Algorithms, and instructional figures contained in these guidelines to educate animal owners, handlers, and paraprofessionals to recognize and treat specific conditions in the prehospital setting. Additionally, we hope these treatment recommendations can be used to provide in-the-moment remote guidance to clients contacting veterinary teams for help. All animals that receive prehospital first aid should be evaluated by a veterinarian as soon as possible after administration of appropriate first aid.

Author Contributions

Deborah C. Mandell: conceptualization, investigation, writing – review and editing, formal analysis. **Vincent J. Thawley**: conceptualization, investigation, writing – review and editing, formal analysis. **Jamie M. Burkitt-Creedon**: investigation, writing – original draft, methodology, writing – review and editing, formal analysis, supervision, conceptualization. **Daniel J. Fletcher**: conceptualization, investigation, writing – review and editing, methodology, formal analysis, supervision. **Manuel Boller**: conceptualization, methodology, writing – review and editing. **Erik Fausak**: resources, methodology.

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Conflicts of Interest

Drs. Boller, Burkitt-Creedon, and Fletcher are Executive Board members of The RECOVER Initiative, a not-for-profit organization. Dr. Burkitt-Creedon is the Chief Editor of the Journal but only participated in the peer review process as an author. The authors declare no other conflicts of interest.

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