REVIEW ARTICLE

ISSN Online 1678-4456

Animal-assisted services dogs in a hospital setting: a literature review

Cães de serviços assistidos por animais em ambiente hospitalar: revisão de literatura

Cristiane Oliveira Fraga Santos[1]; Cristiane Schilbach Pizzutto[1]

[1] Universidade de São Paulo, Faculdade de Medicina Veterinária e Zootecnia, Departamento de Reprodução Animal, São Paulo - SP, Brazil

ABSTRACT

Animal-assisted intervention (AAI) was used as an umbrella term encompassing various forms of animal-involved practices until the end of 2024, including animal-assisted therapy (AAT), animal-assisted activities (AAA), and animal-assisted education (AAE). More recently, this terminology has been updated and replaced by animal-assisted services (AAS). When this review was conducted, the term animal-assisted services (AAS) had not yet been proposed and formally accepted. Therefore, this review used the umbrella term animal-assisted interventions (AAI). The incorporation of AAI into the healthcare setting began in the eighteenth century and has accelerated in the last decade. To better understand the participation of dogs in AAI in a hospital setting, we searched in four databases (Scopus, PubMed, CABI and Web of Science) for the keywords ((“animal assisted intervention” OR “pet therapy” OR AAI OR “animal assisted activity” OR AAA OR “animal assisted therapy” OR AAT) AND (dog) AND (hospital)) in English, Portuguese, and Spanish. PRISMA guidelines were partially adhered to. We initially identified 412 papers, excluded duplicates, and selected the remaining papers based on the inclusion and exclusion criteria, ultimately retaining 120 suitable papers published between 1993 and 2022. The papers were categorized into seven groups according to subject similarity: Autism Spectrum Disorder, Heart Disease, Oncology, Psychosocial, Physiological, both Psychosocial and Physiological, and Miscellaneous. We found significant variation across papers regarding the purpose of the program, the hospital departments in which the interventions took place, session duration, recipients’ physical and mental health status, as well as additional people benefiting from AAS apart from its direct recipients. This highlights the existence of numerous approaches to delivering AAS, creating many possibilities for future research.

Keywords: Animal-assisted services. Animal-assisted intervention. Therapy dog. Pet therapy. Hospital setting.

RESUMO

O termo Intervenção Assistida por Animais (IAA) foi utilizado como um termo guarda-chuva para designar diversas práticas envolvendo a participação de animais até o final de 2024, incluindo a Terapia Assistida por Animais (TAA), as Atividades Assistidas por Animais (AAA) e a Educação Assistida por Animais (EAA). Mais recentemente, essa terminologia foi atualizada e substituída por Serviços Assistidos por Animais (SAA). Quando esta revisão foi realizada, o termo Serviços Assistidos por Animais (SAA) ainda não havia sido proposto nem formalmente aceito, razão pela qual foi utilizada a terminologia relacionada à Intervenção Assistida por Animais (IAA). A incorporação das IAAs no contexto da saúde teve início no século XVIII e apresentou um crescimento acelerado na última década. Com o objetivo de compreender melhor a participação de cães em programas de IAA no ambiente hospitalar, realizamos uma busca em quatro bases de dados (Scopus, PubMed, CABI e Web of Science) utilizando os seguintes termos-chave: (“animal assisted intervention” OR “pet therapy” OR AAI OR “animal assisted activity” OR AAA OR “animal assisted therapy” OR AAT) AND (dog) AND (hospital), nos idiomas inglês, português e espanhol. As diretrizes do protocolo PRISMA foram parcialmente seguidas. Inicialmente, identificamos 412 artigos; após a exclusão de estudos duplicados e a aplicação dos critérios de inclusão e exclusão, obtivemos um total de 120 estudos adequados, publicados entre 1993 e 2022. Os artigos foram organizados em sete categorias, de acordo com a similaridade dos temas abordados: Transtorno do Espectro Autista, Doenças Cardiovasculares, Oncologia, Psicossocial, Fisiológico, Psicossocial/Fisiológico e Diversos. Observamos uma variação significativa entre os estudos quanto aos objetivos do programa, aos departamentos hospitalares em que as intervenções foram realizadas, à duração das sessões, ao estado de saúde física e mental dos participantes, bem como à presença de outros indivíduos beneficiados indiretamente pelos SAA. Esses achados evidenciam a diversidade de abordagens na implementação dos SAA no ambiente hospitalar, demonstrando a amplitude das possibilidades para investigações futuras.

Palavras-chave: Serviços assistidos por animais. Intervenção assistida por animais. Cão terapeuta. Pet terapia. Ambiente hospitalar.

Correspondence to:
Cristiane Oliveira Fraga Santos
Universidade de São Paulo, Faculdade de Medicina Veterinária e Zootecnia, Departamento de Reprodução Animal
Av. Prof. Dr. Orlando Marques de Paiva, 87, Cidade Universitária "Armando Salles de Oliveira"
CEP: 05508-270, São Paulo – SP, Brazil
e-mail: crisfragasantos@hotmail.com

Received: August 13, 2024
Approved: June 30, 2025

How to cite: Santos COF, Pizzutto CS. Animal-assisted services dogs in a hospital setting: a literature review. Braz J Vet Res Anim Sci. 2025;62:e235093. https://doi.org/10.11606/issn.1678-4456.bjvras.2025.235093.

Introduction

Over the years, programs commonly referred to as animal-assisted interventions (AAIs) have faced persistent challenges related to inconsistency and ambiguity in their taxonomy, terminology, and definitions. This lack of standardization has hindered the proper delineation of professional roles, reduced understanding among recipients, and complicated the preparation, training, and setting of expectations regarding the animals involved. Furthermore, it has limited the development of a robust scientific evidence base, as inconsistent terminology in research impairs the reliability of search results and prevents effective comparisons between protocols due to conceptual discrepancies (Binder et al., 2024).

In this context, the development and adoption of a standardized, internationally recognized taxonomy and set of definitions have become essential. Binder et al. (2024) proposed the use of the umbrella term animal-assisted services (AAS), replacing the previously used animal-assisted intervention (AAI). AAS is defined as practices, programs, and human services mediated, guided, or facilitator-led by trained professionals who incorporate qualified animals into therapeutic, educational, supportive, and/or ameliorative processes to promote human wellbeing, while simultaneously ensuring the welfare of the animals involved. The authors emphasize the importance of professionals knowing animal behavior and communication to ensure both animal welfare and recipient safety.

Animal-assisted services are further categorized into three modalities: animal-assisted support programs (AASP), animal-assisted treatment (AATx), and animal-assisted education (AAE). The terms AASP and AATx, respectively, replace those previously used by IAHAIO (International Association of Human-Animal Interaction Organizations, 2018), as animal-assisted activities (AAA) and animal-assisted therapy (AAT). Animal-assisted education has retained its original term, but the definition of AAE has changed.

Animal-assisted support programs (AASP) refer exclusively to initiatives in which animals are directly or indirectly involved for motivational, social, or recreational purposes, without specific therapeutic or educational goals. These programs are designed, for example, to enhance motivation, provide emotional comfort, and reduce feelings of isolation. Animal-assisted treatment (AATx) refers to a range of therapeutic modalities led by physical or mental health professionals, in which the direct or indirect integration of animals constitutes a fundamental component of the therapeutic approach. Animal-assisted education (AAE) encompasses educational programs in which animals are directly or indirectly incorporated as a central element within a structured and continuous learning process.

In this literature review, we chose to use the original terminologies retrieved in the studies identified, as the database searches were conducted using the terms AAI, AAT, and AAA prior to the proposal of the new terminology. This decision was made to preserve the conceptual integrity of each study included in the review.

Despite being considered contemporary, the earliest known use of AAT for therapeutic benefits occurred in 1792 at a Quaker psychiatric retreat in York, England (Connor & Miller, 2000). In 1867, animals were employed in the treatment of epileptic patients in Germany. The first documented use in the United States took place at an Air Force convalescent hospital in the city of Pawling (New York State, USA) in 1942. In 1948, Green Chimneys, a children's home in Brewster (New York State, USA), began using animals as positive reinforcement for children's good behavior (Golin & Walsh, 1994, cited in Connor & Miller, 2000). However, it is the American psychologist Boris Levinson who is considered the "father of AAT". In 1962, the professional noticed, by accident, that his dog, Jingle, helped a child communicate during their therapy session (Levinson, 1962, cited in Grandgeorge & Hausberger, 2011).

Being hospitalized means staying far away from home and family (including any pets) and living temporarily in a different environment for an unpredictable period of time. Furthermore, Barker & Gee (2021) pointed out that hospitalized patients also face the challenges of their medical conditions and treatments. In this way, the patient can experience a mix of feelings such as pain, anxiety, fatigue, loneliness, uncertainty, fear, and stress.

Numerous studies mention the human emotional and physical health benefits from AAI, and the improvement in human well being (Chan & Tapia Rico, 2019). Over the past two decades, AAIs have been employed in healthcare settings as complementary, nonpharmacologic, "no-tech", low-cost interventions to standard therapies to provide the best possible patient well being during hospitalization (McCullough et al., 2018) in various medical and psychiatric settings. Pets are increasingly included in the therapeutic approach to mental health problems and chronic diseases (Friedmann & Son, 2009). Moreover, Bert et al. (2016) reported that dogs seem to be the most frequently employed animal in AAI. Dogs are easy to train, and are a sociable species (Jofré, 2005), and have the ability for human communicative behavior (Hare & Tomasello, 2005). Dogs also share a close relationship (Udell, et al., 2010) and an evolutionary connection (Peralta & Fine, 2021), as well as cognitive and emotional capacities, with humans. Likewise, dog-human interactions have numerous psychological and physiological benefits for both species (Cirulli et al., 2011).

Thus, several studies have been published to evaluate whether AAI could successfully promote patient well being in a hospital setting. Most of previous reviews and meta-analyses about dogs in a hospital setting focused on specific inclusion criteria involving, for instance, medical conditions and/or age of the recipients (Feng et al., 2021; Correale et al., 2022), hospital department where the sessions took place (Fiore et al., 2023), types of study design (Feng et al., 2021; Correale et al., 2022, Fiore, et al., 2023), risks of hospital-based AAI programs (Dalton et al., 2020), outcomes (Feng et al., 2021; Correale et al., 2022), and/or year of publication (Bert et al., 2016).

On the other hand, this literature review aimed to develop a broader view of research done over the years on the presence of dogs in hospital settings. The primary focus was on studies involving dogs performing AAI, but it also included research on dogs in other related roles, such as patient service dogs and facility dogs. We therefore decided to avoid conditions that would exclude published papers on this topic in order to consider all available information on the format of sessions, traits of participating dogs and recipients, and outcomes of the interventions. This review can therefore be a starting point for other reviews that also aim to develop a wider view of the field.

Material and Methods

This literature review was based on the main steps of "The Preferred Reporting Items for Systematic reviews and Meta-Analyses" (PRISMA) statement (Page et al., 2021).

Search terms

This review focused on dogs in hospitals performing AAIs. Keyword search terms were: ("animal-assisted intervention" OR "pet therapy" OR AAI OR "animal-assisted activity" OR AAA OR "animal-assisted therapy" OR AAT) AND (dog) AND (hospital). Note that we have not considered the terms "animal-assisted education" or "animal-assisted coaching" in this review.

Search strategy

Four databases were searched in February 2022 by one of the authors. They were searched in the following order: Scopus, PubMed, CABI, and Web of Science. After obtaining Scopus results, PubMed was searched, and duplicated papers were excluded (so only one version and source of each article was included in the results). This was also done for CABI and Web of Science. The suitable papers found across the four databases were then evaluated against the inclusion and exclusion criteria discussed below.

Inclusion and exclusion criteria

We considered trials selected according to the keyword search terms and that were carried out (entirely or partly) within hospital facilities, including medical centers, long-term acute care facilities, and burn centers. Additionally, we included studies conducted in psychiatric facilities if the patients were admitted through a hospital department, as well as studies carried out with residents inside a school of medicine.

We included all studies in which the dog was at least one of the species involved during the AAI session. Quantitative and qualitative studies were considered, for instance, letters to the editor, reviews, and case studies. We also included all types of patients' medical conditions (including both physical and mental impairment), the ages of the recipients, and the years of publication. Furthermore, we sought detailed information regarding the dogs' (breed, sex, weight, age, if neutered or not) and recipients' (number, age, sex) characteristics, as well as AAI session length, frequency, type (individual or in group), outcomes, and nationality/professional background of the first author.

Papers named "not suitable" and not considered in this review included those written in any language other than English, Portuguese, or Spanish, those that only had a summary available, and those that had different and unrelated meanings for the acronyms AAI, AAA, and AAT. Papers we could not access were also not considered in the review.

We want to highlight other meanings for the AAI, AAA, and AAT acronyms. They respectively stand for: "Atlantoaxial Instability", "Abdominal Aortic Aneurysm", "Aspartate Aminotransferase". We recommend excluding these terms in future AAI papers that use the Boolean search process.

Groups and subgroups

The remaining papers found were diverse and therefore required grouping. This diversity was a result of the broader inclusion and exclusion criteria used, which can be contrasted to those used by previous reviews such as medical conditions and/or age of the recipients (Feng et al., 2021; Correale et al., 2022), hospital department where the session took place (Fiore et al., 2023), type of study design (Feng et al., 2021; Correale et al., 2022; Fiore et al., 2023), risks of hospital-based AAI programs (Dalton et al., 2020), outcomes (Feng et al., 2021; Correale et al., 2022), and/or year of publication (Bert et al., 2016).

To gain a better understanding of them, we grouped the papers into seven categories: Autism Spectrum Disorder (ASD), Heart Disease, Oncology, Psychosocial, both Psychosocial and Physiological, Physiological, and Miscellaneous. The Oncology, Psychosocial, and Miscellaneous groups were also divided into subgroups to facilitate their analysis. The papers were then outlined and described in a narrative format. The term 'psychosocial' describes a combination of social, emotional, and mental health needs, as well as the care provided to address them.

Although ASD and oncology studies also worked with patients with psychological and physiological symptoms, we considered them as separate groups due to the importance of AAI in these branches of medicine.

Results

We obtained 412 results in the literature search across the databases: Scopus (136 results), PubMed (155 results), CABI (44 results), and Web of Science (77 results). We identified 168 results as duplicated, 73 as not suitable, and 51 as not accessible. The remaining 120 papers were considered suitable for inclusion in this review. The paper selection process, as well as the results' classification into seven groups, are represented in Figure 1.

The papers suitable for this review were published from 1993 to 2022. The cumulative percentage of papers published according to the year of publication is summarized in Figure 2. Note that almost 57% of the papers were published from 2017 to March 2022.

The first authors were from a range of countries, with more than half from North America (77), also represented in

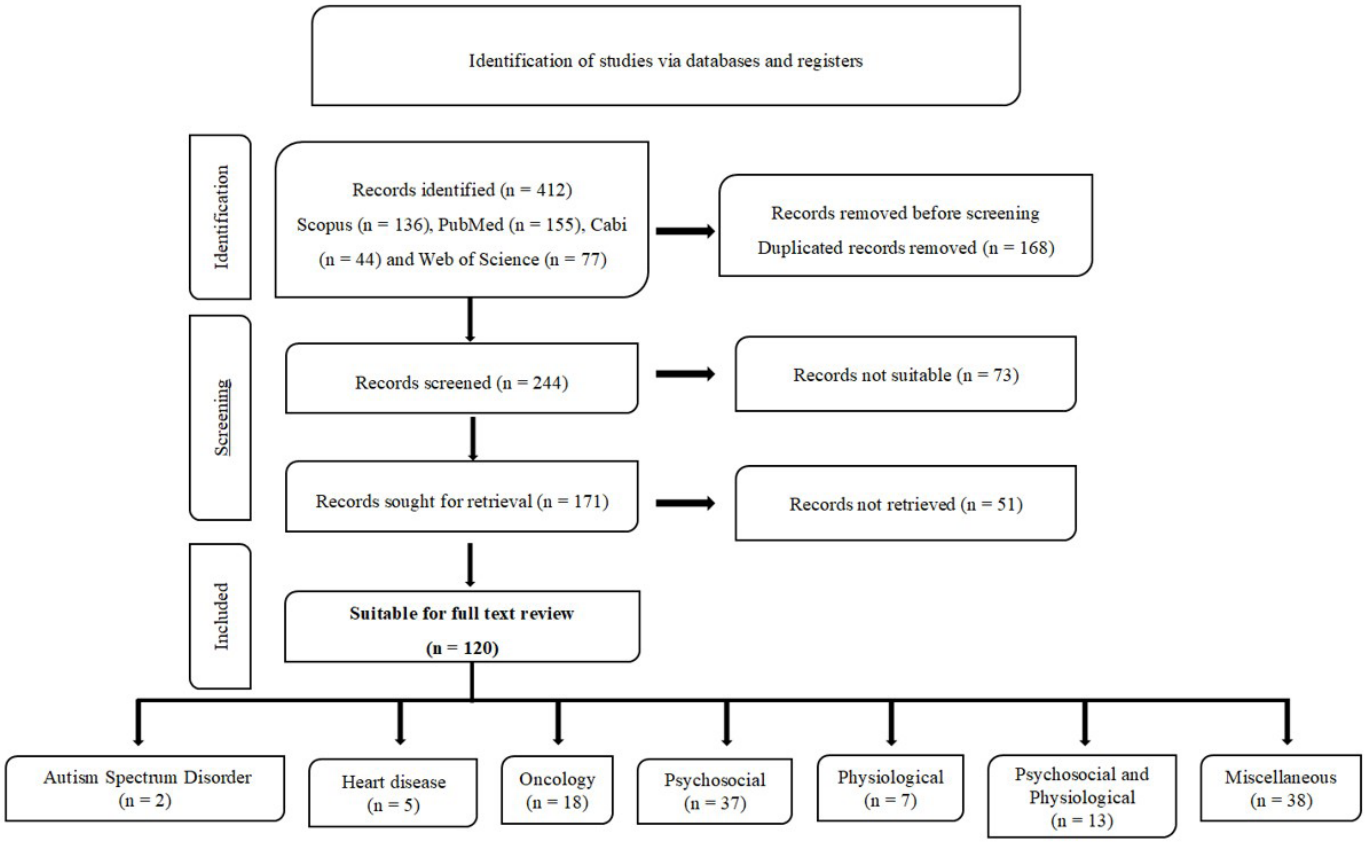

Figure 1 – PRISMA Flow Chart. Source: author

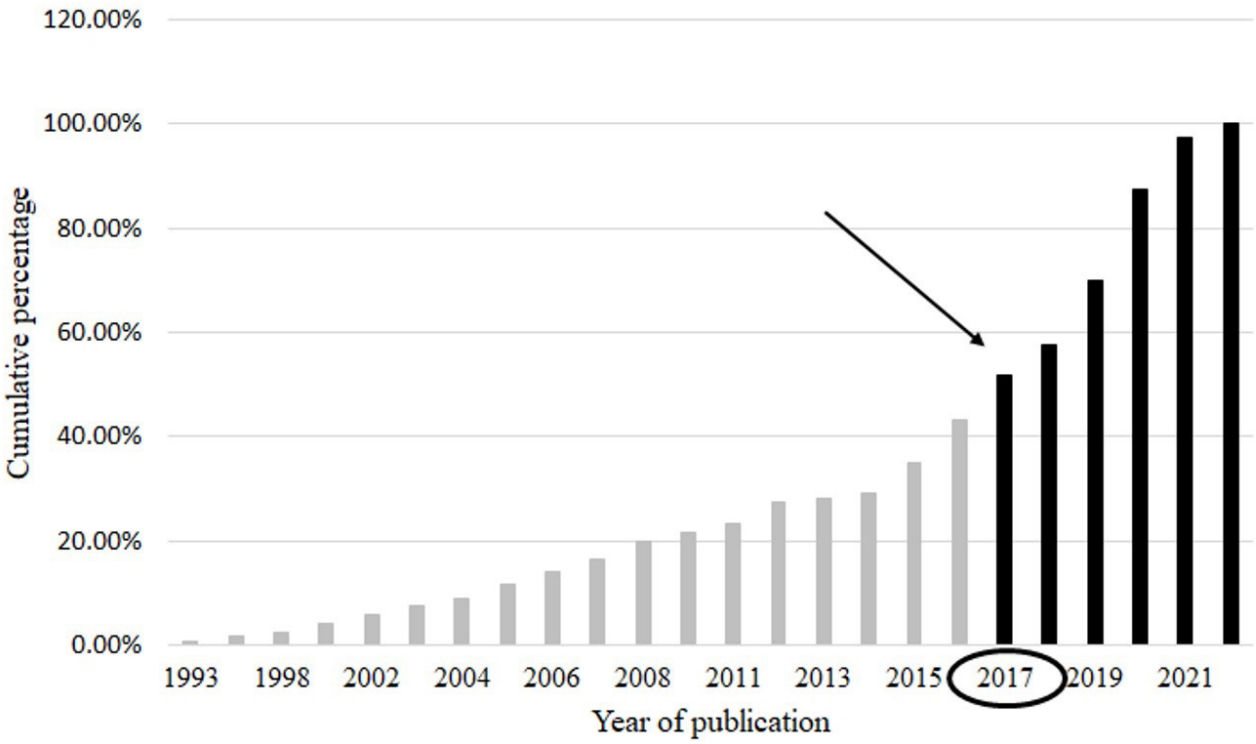

Figure 2 – Cumulative percentage of papers based on year of publication. 57% of papers were published from 2017 onwards, as indicated by the arrow in the graph. Source: author.

Europe (29), South America (7), Oceania (5), and Asia (2). The first authors also had diverse academic and professional backgrounds. They were affiliated with various faculties, including medicine, nursing, psychology, and occupational therapy schools. There were a few articles conducted by veterinarians or with the assistance of veterinary schools that were associated with the researchers' affiliation (Waltner-Toews, 1993; Lefebvre et al., 2006a; Lefebvre et al., 2006b; Johnson et al., 2008; Lefebvre et al., 2008; Linder et al., 2017a; Linder et al., 2017b; Foster et al., 2018; Pérez-Camargo & Creagan, 2018; Santaniello et al., 2020; Jensen et al., 2021; Rodriguez et al., 2022).

Autism Spectrum Disorder

Two papers were published recently focusing on Autism Spectrum Disorder (ASD) and social skills in young children. Germone et al. (2019) investigated video images to study participants' behavioral data using the Observation of Human-Animal Interaction for Research (OHAIRE). They used a total of six dog-handler teams in 10-15 min of free interaction sessions with 2 to 4 participants and one dog-handler team. Children in the AAA group displayed more social conditions, such as positive emotional facial expressions, talking, use of gestures, and looking at both adults and colleagues, as well as a higher frequency of constant motion in relation to the control group. However, Ávila-Álvarez et al. (2020a) used other instruments for pointing out the impact of therapy dogs on communication and social interaction skills. They employed the Assessment of Communication and Interaction Skills (ACIS) and the animal-assisted therapy flow sheet. The sessions were individual in nature, lasted about 20 min, and were held one day a week for at least 5 weeks. The authors obtained significant improvement of communication and social interaction skills, and in most of the items that evaluate the frequency of child–dog social relationships as well as in the child-therapist relationships.

Heart disease

Between 2003 and 2020, we collected five articles on heart diseases. Miller et al. (2003) investigated whether the presence of a therapy animal during discharge teaching affected retention of teaching for post-cardiac surgery patients. The experimental group had a therapy dog present during the 10-min filmed discharge teaching. The control group scored higher on the post-test than the experimental group, suggesting that the presence of a therapy animal may not be helpful. On the other hand, Cole et al. (2007) studied 76 patients with advanced heart failure and 14 dogs of 10 different breeds. The therapy dog group showed lower cardiopulmonary pressures, neurohormone levels, and anxiety than the other two groups. Abate et al. (2011) used canine-assisted ambulation to encourage hospitalized patients to walk.

Hospitalized heart failure patients walked significantly more when accompanied by a therapy dog. The prospective paper of Snipelisky et al. (2016) evaluated the feasibility of canine-assisted therapy (CAT) in 11 pre-heart transplant patients. Each patient had an average of 13.3 visits, with an average duration of 14.7 min. The study found that CAT among hospitalized pre-heart transplant patients was feasible and was a welcome adjunct to usual medical care. Apart from ambulation, Walden et al. (2020) examined the impact of AAI on pediatric patients hospitalized for heart transplants. Patients were more motivated to participate in therapeutic ambulation when walking with a dog.

Oncology

We retrieved 18 articles that evaluated the employment of AAI in oncological settings. They were published from 2003 to 2021. Three papers examined responses from surveys regarding the mental states associated with the disease (psychosocial aspects) as well as patient physiological parameters. Orlandi et al. (2007) studied the effects of AAA on adults undergoing chemotherapy. The researchers concluded that AAA reduced depression and increased the arterial oxygen saturation of the patients. McCullough et al. (2018) evaluated the effect of AAA on anxiety and stress in pediatric patients and their parents. There was a significant reduction in parental stress in the intervention group. Although the authors report that there were no other significant differences between the two groups, they describe a significant increase in the blood pressure and heart rate of the children in the intervention group due to increased engagement or even stress during the experiment. On the other hand, Foster et al. (2018) studied the development of wireless sensor systems to detect both behavioral and physiological parameters of humans and animals during interaction.

Only one article came out concerning both microorganisms and oncology. Dalton et al. (2021) studied microbial sharing between therapy dogs and patients. The use of topical chlorhexidine reduced microbial sharing between patients and therapy dogs. However, it did not significantly affect sharing among patients. The authors concluded that therapy dogs were not the only source of and a vehicle for transferring microorganisms to patients. There may be other potential sources, such as the hospital environment and interactions with other patients. The review of Chan & Tapia Rico (2019) found evidence of the benefits of AAT for patients undergoing chemotherapy and palliative care. One interesting subject was the use of virtual AAT letter-writing programs. Gillespie & Neu (2020) studied a virtual letter-writing program for children and adolescents with cancer. Writing letters with a dog or cat that shares medical experiences offers the opportunity to develop an ongoing friendship and emotional rewards.

We identified 12 articles addressing various oncology themes, most of which focused on the benefits of AAI and participants' perceptions. We first described the papers involving recipients who were adults/seniors and then children/teenagers. Johnson et al. (2003) investigated the use of Complementary/Alternative Medicine (CAM) techniques in adult cancer patients. AAA and AAT were considered a form of CAM. Johnson et al. (2008) carried out an experiment evaluating mood, fatigue, self-perceived health, and sense of coherence in adult patients undergoing radiotherapy. There were no statistical differences, but patients from AAA noticed their health improved compared to others of their age. Ginex et al. (2018) evaluated the effects of an animal-facilitated therapy (AFT) program on patients and staff in a surgical oncology unit. AFT improved patients' quality of life and staff satisfaction. Relatives/legal guardians and nurses' perceptions in a pediatric oncology department were studied by Moreira et al. (2016) studied the perceptions of patient companions and nurses in a pediatric oncology department. Although the participants did not realize the therapeutic aim of AAI, they could observe something distracting and entertaining. Smith et al. (2020) studied anxiety in hospitalized older adults recruited from medical surgical/oncology units. Interaction with therapy dogs reduced patients' self-reported anxiety.

On the other hand, regarding studies with children/teenagers, Bouchard et al. (2004) conducted a pilot study with children undergoing cancer treatment. All children described the experience as favorable. Parents recommended a visiting dog. Nurses reported that the dogs' visits aided in the children's recovery after chemotherapy or surgery, and they approved the relationship between kids and dogs as a therapeutic tool within an intervention process. At the end of the project, the program was officially recognized by the Centre Hospitalier Universitaire de Québec board of directors. The same Canadian group of researchers cited above and two other colleagues, Gagnon et al. (2004), established a descriptive study of a hospital-based animal therapy program for children with cancer. However, this time, they used a private room entirely dedicated to the animal therapy program. They concluded that dog-assisted therapy may contribute to relieving psychological distress in children and parents, contribute to their adaptation to the therapeutic process, and promote their well being while hospitalized.

Cowfer et al. (2021) explored the perspectives of children with advanced cancer and their parents on AAIs. Five themes emerged: positive aspects in 95% of the participants (enjoying AAI sessions), negative aspects (too little time with the dog), preferred changes (more time with the dog for therapeutic benefit), pet ownership (intervention impact on desire for a pet), and value of the study (benefit of therapy dogs to ill children). Another group of researchers, Chubak et al. (2017)I worked with children, but also engaged young adults. They evaluated the feasibility of studying AAA in a pediatric oncology setting and collected data on potential benefits. The results support the feasibility of AAA in pediatric oncology. Bussotti et al. (2005) conducted a case study on the perceptions of a teenager and her mother about the visit of their pet dog during hospitalization. They found beneficial effects of the therapeutic action and concluded that AAT has an important psychological therapeutic potential. Beyond the papers exploring participants' perceptions and AAI program implementation, papers also explored other themes such as AAA practices and policy descriptions in pediatric oncology hospitals. Chubak & Hawkes (2016) surveyed the top 20 pediatric oncology hospitals in the USA. They found that all of them offered AAA policies and required hand sanitizer after visits, and most took dogs as the chosen animal for participating in AAA. Moreover, the invited commentary of Marcus (2012) just commented about the benefits of therapy dog visits on oncological patients.

Psychosocial

From 1997 to 2022, 37 articles were published on psychosocial topics, categorized by measurement outcomes and recipient status (patients with or without mental disorders). Disorders included schizophrenia, acute mental disorder, Fetal Alcohol Spectrum Disorder, eating disorder, mood disorder, and Post-Traumatic Stress Disorder (PTSD).

Measurements (subgroups) were divided into perceptions concerning AAI, clinical outcome improvement, anxiety, mood, depression, violence, psychiatric symptoms/perceived stress/work and social life/therapeutic relationship, behavioral problems/distress, and agitation (Table 1). Clinical outcome improvement referred to disorders with specific evaluations, such as schizophrenia (Villalta-Gil et al., 2009; Chen et al., 2021), acute mental disorder (Stefanini et al., 2015), Fetal Alcohol Spectrum Disorder (Vidal et al., 2020), and eating disorder (Lavín-Pérez et al., 2021).

Table 1 – Articles classified according to measurement outcomes and recipient status

	RECIPIENT STATUS	
	Neurological impairment or psychiatric patients	**Patients without any mental disorder**
People's perceptions about AAI	Bardill & Hutchinson (1997)[11]; Yap et al. (2017); Brown et al. (2020)[4]; Hediger et al. (2020)[5]; Nilsson et al. (2020)[4]; Sikstrom et al. (2020)	Moody et al. (2002); Caprilli & Messeri (2006); Hastings et al. (2008)[1]; Nahm et al. (2012)[2]; Abrahamson et al. (2016); Ladd & Barker (2017); Linder et al. (2017a); Schmitz et al., (2017); Stevens et al. (2017)[3]; Uglow (2019); Ávila-Álvarez et al. (2020b); Brown et al. (2020)[4]; Etingen et al. (2020), Nilsson et al. (2020)[4]; Reddekopp et al. (2020)[2]; Jensen et al. (2021)
Clinical outcome improvement	Villalta-Gil et al. (2009)[6]; Stefanini et al. (2015)[7]; Vidal et al. (2020)[8]; Chen et al. (2021)[6]; Lavín-Pérez et al. (2021)[9]	
Anxiety	Barker & Dawson (1998)	Crossman et al. (2015); Hinic et al. (2019); Perez et al. (2019)[4]; Kowalski et al. (2021); Mulvaney-Roth et al. (2022)
Mood	Brown et al. (2020)[4]]	Crossman et al. (2015), Brown et al. (2020)[4]; Nilsson et al. (2020)[4]
Depression	Sockalingam et al. (2008)[10]	
Violence	Marques et al. (2015); Nurenberg et al. (2015)[11]	
Psychiatric symptoms, perceived stress, work and social life, and the therapeutic relationship	Beetz et al. (2019)[12]	
Behavioral problems/distresse	Fodstad et al. (2019)	
Agitation	Krüger et al. (2021)	

[1] patients with burn injuries; [2] emergency department patients; [3] trauma patients; [4] patients with and without mental disorders; [5] neurological impairment patients; [6] patients with schizophrenia; [7] acute mental disorder patients; [8] Fetal Alcohol Spectrum Disorder (FASD); [9] eating disorder patients; [10] patient with mood disorder; [11] some patients with schizophrenia; [12] Post-Traumatic Stress Disorder (PTSD)

Source: author.

Participants with mental problems could also have other medical conditions (Perez et al., 2019; Nilsson et al., 2020).

Distress can be evaluated through anxiety, mood changes, and cortisol levels. We categorized these papers into the psychosocial group and the physiological group, respectively.

Several papers in the psychosocial group had findings demonstrating a positive impact on hospital staff/parents' experiences and on psychiatric patients (children, adolescents, adults, and seniors) with a variety of psychiatric diagnoses (such as schizophrenia, PTSD, mood states). These findings were particularly observed regarding anxiety levels. Additional details concerning this group section are included in the Supplementary material.

Physiological

The seven papers in this group were published between 2013 and 2020 and are listed below in chronological order. Four studies included salivary cortisol as one of the evaluated measures (Krause-Parello et al., 2018; Machová et al., 2019c; Clark et al., 2020; Kline et al., 2020) and three considered pain (Engelman, 2013; Harper et al., 2015; Ichitani & Cunha, 2016). We consider pain as a physiological parameter because it triggers physiological changes, which in turn lead to behavioral changes, as evidenced by specific animal pain postures.

Krause-Parello et al. (2018) examined the effects of AAI on stress indicators in 25 veterans who were 33 to 86 years old. The participants were divided into two groups with the presence of a clinical psychologist who was also the handler: the experimental condition with the therapy dog and the handler, and another group without the therapy dog (control condition). Parameters measured included blood pressure, heart rate, salivary cortisol, immunoglobulin A, and α-amylase. Significant decreases in cortisol and heart rate were observed in both groups, suggesting that a therapy dog paired with a psychologist had a measurable impact on veterans' salivary cortisol levels and heart rates.

In the following year, the paper of Machová et al. (2019c) also studied stress in 22 female nurses (mean age 30) by measuring salivary cortisol in three conditions: everyday work without a break, with a break, and with a break including a therapy dog. Only nurses from internal medicine and long-term care showed decreased cortisol levels with the dog present.

In 2020, we found two articles concerning AAI and physiological parameters. Both studied salivary cortisol. Kline et al. (2020) investigated cognitive stress, but in 122 physicians and residents, comparing interactions with therapy dogs, coloring mandalas, and no intervention (control). Salivary cortisol and self-reported stress were measured. A 5-min interaction with a therapy dog reduced stress in emergency department staff. Clark et al. (2020) assessed therapy dogs' and handlers' behavior and salivary cortisol during hospital visits. The aim was to investigate whether the handler can observe the dog's body language and associate it with stress. Although dogs displayed mixed stress behaviors, salivary cortisol results suggested that the therapy dog team maintained their well being during the visits.

Engelman (2013) evaluated AAT's impact on pain in palliative care patients, noting that interactions with a therapy dog helped patients relax and distract from pain, while also reducing staff stress. Harper et al. (2015) studied 72 patients' post-joint arthroplasty, finding that 15-min sessions with a therapy dog had a positive effect on the patients' level of pain and satisfaction with their hospital stay after total joint replacement. Ichitani & Cunha (2016) examined the impact of AAA on the expression and quality of self-reported pain in 17 hospitalized children and adolescents, reporting a decrease in self-reported pain after 5–10-min interactions with therapy dogs.

Psychosocial and physiological

This group includes 13 articles from 2009 to 2021 that examined psychosocial and physiological measures. Pain was considered a physiological parameter, as we commented previously in the physiological group, and was associated with or not with anxiety, distress, fatigue, depression, and/or other physiological parameters. Barker et al. (2015) measured pain and anxiety in 40 children in both AAI and control groups working with a puzzle in a pre-and post-condition using various scales. The authors found a significant post-condition difference between groups for anxiety, with the AAI group having lower anxiety scores. However, they found no significant differences in pain or anxiety within or between groups. In the same year, Vagnoli et al. (2015) investigated the effectiveness of AAI in reducing children's pain and distress before, during, and after a blood collection procedure in 50 children, finding lower distress and cortisol levels in the experimental group. However, there were no significant differences in pain ratings and in the level of parental anxiety. In the trial of Phung et al. (2017), nursing students collaborated to conduct a quasi-experimental design with a pre-and post-intervention survey to understand the effects of AAT in 128 adults, finding reduced pain, anxiety, and fatigue after AAT. Kline et al. (2019) analyzed whether AAT reduced anxiety in adults and senior patients in an emergency department, noting significant anxiety reduction.

Pruskowski et al. (2020) measured inpatient pain and anxiety as well as staff perceptions about the therapy program, demonstrating the viability, acceptability, and desirability of AAA and AAT programs at a burn center. Levels of pain and perception of positive and negative affect analysis were investigated in the study of Antonelli et al. (2016) compared the efficacy of clowns, dogs, and musicians in reducing pain and enhancing positive affect in 105 children and their parents in the short-stay observation unit. The three interventions influenced children's well being differently and appeared to empower positive aspects in children. There were no notable differences in pain between experimental and control groups across sex and age. Moreover, Coakley & Mahoney (2009) also studied pain, but in conjunction with mood and other physiological parameters, investigating the effects of pet therapy on vital signs (blood pressure, pulse, and respirations), pain, energy, and mood in 59 hospitalized subjects. The findings included decreased tension and anxiety, as well as fatigue and inertia, along with improved mood.

Calvo et al. (2016) assessed AAT's impact on cortisol levels and quality of life in 22 patients with schizophrenia, noting a significant decrease in patients' cortisol levels, which could indicate that interaction with therapy dogs reduced stress.

Branson et al. (2017) studied the effectiveness of AAA on biobehavioral stress responses in 48 children. There were no statistically significant differences in pre-and post-intervention related to the positive and negative effects, neither in salivary cortisol nor C-reactive protein. Scores on the Pet Attitude Scale were high but were not correlated with changes in anxiety, positive affect, negative affect, or stress biomarkers. The authors concluded that although alterations were in the expected direction, the magnitude of the effect was small.

Branson et al. (2020) explored AAA's feasibility in intensive care unit (ICU) patients, reporting decreased anxiety and stress levels. Biomarkers' results were variable and revealed no specific tendencies associated with stress outcomes.

In 2019, the Kristýna Machová group carried out two experiments involving AAT, both of which analyzed the Barthel index, mood (Likert scale), blood pressure, and heart rate (pressure gauge) in adult patients. In the study by Machová et al. (2019a), the researchers explored whether AAT had a positive effect on inpatients who had diseases like stroke, mild dementia, mild cognitive disease, and cancer in the long term care unit. In the Machová et al. (2019b) study, the AAT was employed as complementary rehabilitation for patients who had a stroke. In the first cited study, no changes were observed in physiological parameters or the Barthel index. However, a significant influence was noted in the assessment of mood. In the second cited trial, changes in heart rate and blood pressure levels were insignificant. However, a statistically significant aspect of the research referred to the patients who confirmed that they felt better after the AAT sessions.

Recently, the trial of Coakley et al. (2021) explored the effects of AAT on physiological measures of discomfort and anxiety (respiratory and heart rates, salivary cortisol levels) in individuals from the acute care inpatient surgical oncology unit and from two general surgical units, finding reduced heart and respiratory rates, decreased anxiety, and improved comfort and well being.

Miscellaneous

This category encompasses 38 articles from 1993 to 2022 that did not fit into previous categories.

One of the topics for AAI included in this category was guidelines. Jofré (2005) described AAT recommendations that focus on zoonotic transmission, patient and animal evaluations, and veterinary care. Likewise, Silveira et al. (2011) described the AAA protocol implementation, while Lefebvre et al. (2008) focused on infection control and prevention policies. Barker & Gee (2021) discussed challenges and best practices for safe and effective canine-assisted intervention programs, prioritizing canine welfare. The letter to the editor of Enoch et al. (2005) addressed methicillin-resistant *Staphylococcus aureus* (MRSA) contamination in a UK hospital. It proposed AAI guidelines to prevent its spread from pet therapy dogs.

Likewise, microorganisms were also included in this category. Waltner-Toews (1993) reported zoonotic disease transmission in the USA and Canada. Brodie et al. (2002) described some zoonoses risks in animals, including dogs. The Canadian study of Lefebvre et al. (2006b) assessed zoonotic pathogen prevalence in 102 therapy dogs in Ontario. In the same way, Aguiar et al. (2021) investigated the prevalence of multidrug-resistant bacteria in 10 dogs performing AAT in Brazil. Edner et al. (2021) evaluated bacterial transmission of two dogs with different hygienic conditions interacting with 20 children.

AAI reviews were published between 2012 and 2020. Knisely et al. (2012) summarized the AAA and AAT benefits for hospitalized patients with medical disorders, psychiatric patients, and elderly home residents. Chur-Hansen et al. (2014) reported an extensive text about AAI in hospitalized children. Bert et al. (2016) carried out a

systematic review of AAI benefits and risks. Rumayor & Thrasher (2017) discussed AAI in the military, including benefits, trends, and animal welfare considerations. Other reviews covered dementia (Klimova et al., 2019), AAI risks (Dalton et al., 2020), and the prevalence of the ESKAPE (*Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa, Enterobacter spp*) bacteria group and the related zoonotic risk in AAA and AAT in the health context (Santaniello et al., 2020). Zeblisky & Jennings (2016) reviewed the involvement of the medical librarian and the AAT program coordinator for literature searches to develop a quantitative study concerning the effects of an AAT program on children's physiological parameters and stress biomarkers.

Connor & Miller (2000) and Barchas et al. (2020) provided overviews of AAI in hospital settings, including planning pet visits, AAI program implementation, and potential risks to humans and animals. Wells (2007) examined the bond between dogs and human psychological health in institutional settings such as hospitals, residential homes, and prisons.

An interest in the distribution of AAI programs in Canada led Lefebvre et al. (2006a) to describe the spreading of canine visitation programs in Ontario. Alers & Simpson (2012) and Yaeger & Irwin (2012) discussed AAT programs for soldiers at Walter Reed National Military Medical Center. Vitztum & Urbanik (2016) analyzed dogs' attributes and roles in AAT. Linder et al. (2017b) surveyed hospitals, eldercare facilities, and animal therapy organizations about AAI policies and procedures.

Cavalli et al. (2018) compared the performance of AAA dogs and non-AAA pet dogs that lived in the same household in terms of sociability, learning about how to communicate using gazing at the human face to ask for inaccessible food, and self-control in a social context. Reid (2019) provided fictitious examples of her experiences with her therapy dog, Millie, in hospitals and nursing homes. The paper illustrated the impact of therapy dogs on residents and inpatients in reducing symptoms generated by hospitalization and nursing home stay. Hartwig & Binfet (2019) identified canine skills, screening criteria, and research information, and investigated published online information for canine-assisted intervention programs and agencies. Eaton-Stull et al. (2020) surveyed social service agencies regarding AAI use, participants' training, implementation barriers, type of assistance received from AAI, and benefits from the intervention. Miller & Ingram (2000) discussed AAT benefits for patients and staff, as well as relatives' experiences. Reilly (2020) provided examples of pet therapy for patient comfort in health care environments. A peculiar study was carried out by Pérez-Camargo & Creagan (2018) in building a facility primarily for connecting companion animals with hospitalized patients.

Multiple articles across the groups mentioned facility dogs performing AAI, evaluating their effects on a variety of recipients, including patients (Ginex et al., 2018; Krause-Parello et al., 2018; Krüger et al., 2021); healthcare professionals (Ginex et al., 2018; Jensen et al., 2021); patient, staff, and family (Rodriguez et al., 2022); and palliative care teams (Holman et al., 2018).

We also found papers that did not use the term "therapy dogs" for AAI dogs. Ben-Sefer & Shields (2021) defined the scope of the following terms: "service", "assistance", "guide", "therapy", and "comfort" or "support" animals, discussing who the people are that are benefited by them and why each type of these animals is needed. Nielson & Lowe (2019) reported the perceptions of emergency department nurses regarding service dogs from patients. We considered this article because the authors commented that service dogs can provide mental health benefits to patients, which is one of the objectives of AAI. Bardill & Hutchinson (1997) commented on a 24-h resident dog in an inpatient psychiatric unit that was not defined as a facility dog. On the other hand, the study of Decina et al. (2022) commented on the first-person perspectives about training and skills of Pender, the facility dog, and his handler, as well as AAA's and AAT's importance and benefits in an inpatient rehabilitation hospital. Similarly, Rodriguez et al. (2022) conducted a survey involving patients, families, and hospital staff to explore the impact of facility dogs on their lives. In addition, Holman et al. (2018) discussed the lessons for the loss of a facility dog.

Supplementary material is available, containing the main features of the studies (authors, year of publication, study design, group, sample characteristics, measures, and key findings), as well as details regarding the sessions (dog characteristics, interaction details, AAI type, and session length/frequency). Note that the miscellaneous group did not contain most of the information about the sessions, except for the article on Edner et al. (2021). Similarly, there were no session details in the review of Chan & Tapia Rico (2019), in the study on AAI practices and policies (Chubak & Hawkes, 2016), virtual AAI (Gillespie & Neu, 2020), and AAI program analysis (Moody et al., 2002; Marcus, 2012; Ladd & Barker, 2017; Linder et al., 2017a; Yap et al., 2017; Reddekopp et al., 2020).

Discussion

The majority of first authors' affiliations were in North America, highlighting an opportunity for researchers in other continents to explore this emerging field. Despite diverse backgrounds, few authors had academic or professional roles in animal science. This indicates that professionals from veterinary schools have an excellent opportunity to expand research on AAI, especially concerning animal welfare. Although we have been publishing articles since 1993, most articles related to AAT and AAA were published between 2017 and March 2022, confirming that AAI research has become more widespread in the last decade, especially in the last five years.

This review primarily investigated animal-assisted intervention (AAI) performed with dogs in hospital settings. The papers discussed were diverse. They covered many different health conditions and ages of recipients, parameters evaluated, type of intervention, number of animals employed, interaction duration, and hospital department where the interaction took place. Moreover, numerous papers found indirect benefits of AAIs in hospital settings for hospital staff (Moody et al., 2002; Abrahamson et al., 2016; Machová et al., 2019c; Etingen et al., 2020; Kline et al., 2020; Jensen et al., 2021); for both staff and family members (Moreira et al., 2016); for both patients and staff (Nahm et al., 2012; Engelman, 2013; Ginex et al., 2018; Fodstad et al., 2019; Uglow, 2019; Brown et al., 2020; Pruskowski et al., 2020); for both patient and parents (Vagnoli et al., 2015; Ávila-Álvarez et al., 2020b); or for family, patient, and staff (Bouchard et al., 2004; Caprilli & Messeri, 2006; Hastings et al., 2008). Overall, although AAIs are primarily intended to benefit the patient, they also provide indirect benefits to family members and healthcare professionals. These advantages encompass reduced stress levels, enhanced emotional well being, and a more positive and productive work environment for healthcare staff. In addition, as Acquadro Maran et al. (2022) recently pointed out in their systematic literature review, AAI programs are accepted by healthcare workers due to their notable psychological benefits.

Regarding the recipients' ages, for classification proposals, we considered the following age groups: children (under 12 years old), adolescents (13-18 years old), adults (19-60 years old), and seniors (over 60 years old). The recipients' ages were closely linked to their medical conditions. For instance, papers in the ASD group only included children, and within the heart disease group, participants were mostly adults and seniors. However, the study of Walden et al. (2020) included 5 patients aged between six and 19. Studies in the oncology group employed children, adolescents, adults, and seniors. In the psychosocial group, most samples consisted of adults. In the physiological group, stress and pain were more studied in adults/seniors, although only one paper employed children and adolescents (Ichitani & Cunha, 2016). In the psychosocial/physiological group, most of the studies were carried out with adults and/or seniors. The age of participants varied according to the aim of the studies. The articles cited above include a wide age range, each group having specific therapeutic goals. For instance, children may participate in activities that enhance emotional and social development. At the same time, adults and seniors may seek benefits such as stress reduction and improvements in physical and mental health. However, the sample age was not always cited. (Abrahamson et al., 2016; Ladd & Barker, 2017; Clark et al., 2020; Pruskowski et al., 2020), nor the maximum age (Nahm et al., 2012; Brown et al., 2020). Moreover, Etingen et al. (2020) stated that the sample was aged 49 or younger and 50 or older, without mentioning the minimum or maximum age, and Coakley & Mahoney (2009) did not mention the maximum age of the participants. There were studies in which the sample consisted of children or adolescents, but the instruments were surveys that adults, such as family members and staff, answered (Gagnon et al., 2004; Moreira et al., 2016; Yap et al., 2017).

We verified different nomenclature concerning the umbrella term AAI, some examples include: dog-assisted therapy (Villalta-Gil et al., 2009; Hediger et al., 2020; Vidal et al., 2020; Krüger et al., 2021; Lavín-Pérez et al., 2021), dog-assisted intervention (Beetz et al., 2019), animal visitation programs (Crossman et al., 2015), animal therapy program (Gagnon et al., 2004), canine-assisted therapy (Yap et al., 2017), canine-assisted ambulation (Abate et al., 2011), and canine-assisted intervention (Sikstrom et al., 2020). Although Winkle & Linder (2018) stated that the term "therapy dog" could refer to any dog performing within AAI and should be avoided, Hartwig & Binfet (2019) stated that the term "therapy" was still used, even though literature in AAI emphasizes the terms "interventions" or "activities" for volunteer teams. In this review, the term "pet therapy" was cited in numerous papers, including those by Orlandi et al. (2007), Coakley & Mahoney (2009), Fodstad et al. (2019), Hinic et al. (2019), Sikstrom et al. (2020), and Mulvaney-Roth et al. (2022). Even if not present in the text, this term was still found to be part of the keywords recommended to search for literature. This variation underscores the importance of establishing standard terms for AAI, which could lead to more accurate results in research.

Recent recommendations concerning terminology, taxonomy, and definitions on AAI, as well as the new proposal for the umbrella term animal-assisted services (AAS), can be found in the article by Binder et al. (2024).

The dogs were from or were certified by various organizations such as Pet Partners, Therapy Dogs International, Alliance of Therapy Dogs, Canine Assistants, Delta Society, and others. However, Bussotti et al. (2005) employed the patient's pet dog instead of a certified therapy dog, Beetz et al. (2019) employed dogs from soldiers (service dog, or their own pet dog). Moreover, Lavín-Pérez et al. (2021) and Mulvaney-Roth et al. (2022) did not specify where the dogs in their study originated.

The number of dogs participating throughout the experiments varied from only one to several dogs from various organizations. The following authors justified the number of dogs used: Abate et al. (2011) preferred using only one therapy dog to minimize potential bias associated with dog size or breed. Ichitani & Cunha (2016) employed two dogs, allowing them to take turns with the patients and ensuring the animals' well being. However, we also found papers that did not specify the number of dogs involved (Miller et al., 2003; Abrahamson et al., 2016; Antonelli et al., 2016; Snipelisky et al., 2016; Ginex et al., 2018; McCullough et al., 2018; Brown et al., 2020; Kline et al., 2020; Smith et al., 2020; Walden et al., 2020; Coakley et al., 2021; Cowfer et al., 2021; Jensen et al., 2021; Kowalski et al., 2021; Lavín-Pérez et al., 2021).

Some studies commented on dogs' breed, sex, and age (Clark et al., 2020), weight (Engelman, 2013; Krause-Parello et al., 2018; Krüger et al., 2021), if the dog was neutered or not (Ichitani & Cunha, 2016). However, most of them did not cite more details regarding dogs' demographics.

The trials involved only one dog-handler team per interaction, delivering AAI with only one patient (individual session) or with more than one patient (group sessions). However, two dogs interacted simultaneously with children in the trial of Caprilli & Messeri (2006). A different way of interaction was carried out by Gillespie & Neu (2020), in which the AAT program was implemented using virtual visits with animals that interacted with children and adolescents through letter writing and picture exchange. We would like to highlight that Chen et al. (2021) commented that previous studies suggested using a small group size for AAT sessions to ensure quality. Furthermore, Johnson et al. (2008) observed more benefits of a consistent pattern of visits from the same dog-handler team. Likewise, Hinic et al. (2019) mentioned the importance of the consistency of dog-handler teams.

Some procedures were not clearly specified. For example, Orlandi et al. (2007) employed two dogs in their trial, but it was unknown if the animals performed at the same time in the chemotherapy room. In the same way, it was not clear if different dog-handler teams performed all the visits in the study of Cowfer et al. (2021). However, some authors reported detailed information regarding the exact location where the animal was situated during interactions, specifically at the bedside (Walden et al., 2020; Kowalski et al., 2021; Mulvaney-Roth et al., 2022), on the sofa (Johnson et al., 2008), the distance between the dog and the patients' heads (Cole et al., 2007; Harper et al., 2015), and the dogs' leash length from the patient (Kline et al., 2020).

Details regarding therapy-dog interactions were described, such as combing, petting, playing, and talking with the dog. Johnson et al. (2008); walking, brushing, combing, and talking to the dog (Caprilli & Messeri, 2006); walking, different play, and grooming activities (Beetz et al., 2019); petting and talking to the dog (Harper et al., 2015); having the dog perform basic commands, such as "sit" and "down" (Brown et al., 2020); walking, handling, feeding, grooming, dressing, and doing exercises with the therapy dog (Chen et al., 2021); petting and touching (Smith et al., 2020); play activities, physical contact, grooming, cleaning, basic obedience commands, walking, and agility routes (Stefanini et al., 2015). Moreover, Marques et al. (2015) used balls, dolls, a brush, and a clicker to energize the sessions. Clark et al. (2020) commented that no treats were allowed during patient-dog interaction, on the contrary, in the paper of Cowfer et al. (2021), treats could be allowed in the AAI sessions. Detailing the objects used in interactions with AAI dogs is essential for several reasons. It facilitates a standardized methodology, allowing for the consistent measurement and replication of results across various studies and settings. The objects used can also influence the behavior and responses of both the dogs and the participants, thereby impacting the overall effectiveness of the intervention. Careful documentation of these objects enables researchers to control variables better and identify which elements most significantly enhance the success of the interaction.

The duration of AAI sessions varied from 5 min (Caprilli & Messeri, 2006; Mulvaney-Roth et al., 2022) to some hours (Beetz et al., 2019), or the whole day (Gagnon et al., 2004). There was even a resident dog living in the psychiatric unit 24 h a day (Bardill & Hutchinson, 1997) However, the authors did not mention the AAI session duration. Moreover, Nahm et al. (2012); Antonelli et al. (2016),

Ladd & Barker (2017); Brown et al. (2020); Nilsson et al. (2020); Jensen et al. (2021) did not mention how long the interactions lasted. Long interaction time was cited by Bouchard et al. (2004), with the dog spending 8 h at the child's bedside without its owner. In the case study of Sockalingam et al. (2008), the patient, named Ruby, spent several hours daily with a golden retriever named Rover for three weeks. In the trial of Krüger et al. (2021), the interaction took place on several occasions for a short period of time during the day. In the study of Chubak et al. (2017), no minimum session duration was required in order to allow for multiple visits in the one-day experiment. Long periods of interaction must be given attention to avoid compromising the dog's well being. Barker et al. (2019) recommend no longer than 2 h visit a day, with a break after one hour. The frequency of the sessions also ranged from one-time visits (Branson et al., 2017; Chubak et al., 2017; Fodstad et al., 2019; Branson et al., 2020; Smith et al., 2020; Kowalski et al., 2021), every 2 to 4 weeks (Nahm et al., 2012), once or twice a week (Abrahamson et al., 2016), to 3 times a week (Johnson et al., 2008). Furthermore, there were one-time visits with multiple visits a day (Chubak et al., 2017) or daily basis visits (Sockalingam et al., 2008) (see supplementary material). Understanding the duration and frequency of AAI sessions is essential because they directly influence the outcomes of the intervention. Different levels of exposure can lead to varying degrees of benefit for participants, as well as affect the well being of the dogs involved. These factors are essential for minimizing potential stress or fatigue for both participants and the dogs.

Therapy dogs could perform off-leash freely in the room (Hediger et al., 2020) or were released from the leash under some conditions (Ichitani & Cunha, 2016). The dogs could also interact with the recipients attached to the leash (Crossman et al., 2015; Perez et al., 2019; Kline et al., 2020). However, most of the papers did not include this information.

The number of dogs participating in the experiments ranged from only one to several. Some authors justified working with multiple dogs to remove potential biases linked to dog size and breed, or to promote dogs' well being by allowing them to take turns in the interventions. Moreover, we also found papers that did not specify the number of dogs. Most of the studies did not include details regarding the participating dogs' features, such as breed, sex, weight, and age.

There were few studies concerning zoonotic infections (Waltner-Toews, 1993; Brodie et al., 2002; Lefebvre et al., 2006b; Santaniello et al., 2020). Veterinarians must play an active role in AAI programs to minimize the risks of pathogen transmission from animals to participants and the hospital environment. Additionally, it is also important to consider the transmission of pathogens from participants and the hospital environment to the animals, as the people involved could also harm the animals' physical health. To mitigate these risks when introducing animals into a hospital facility, it is recommended that some practices be implemented. These include the implementation of simple hygiene protocols, such as the use of masks and proper hand sanitizer use, and ensuring that therapy animals are up to date with their vaccinations and undergo regular fecal examinations. The literature suggests that the benefits could outweigh the risks (Dalton et al., 2020). The implementation of the One Health approach is also suggested (Santaniello et al., 2020).

The variability in sample characteristics, dog demographics, interaction details, session duration, and frequency highlights the need for standardized reporting in AAI studies. Consistency in dog-handler teams and session structure appears beneficial, emphasizing the importance of detailed methodological descriptions to ensure replicability and validity in future research. The implementation of standard protocols is crucial for safeguarding the physical and emotional well being of all individuals involved in AAI programs.

Conclusion

We found significant variation across numerous themes regarding the involvement of AAS dogs in a hospital setting, including recipients' physical and mental health status, the hospital departments in which sessions took place, the primary objectives for intervention, sessions' characteristics, and people who benefited from the interactions (staff, family, and visitors). AAS dogs can help improve the well being of hospitalized patients with a wide range of medical and/or mental conditions. We found strong evidence that it can play a role in reducing stress, fear, loneliness, anxiety, and depression levels; enhancing mood and social behavior; as well as decreasing physiological parameters such as pain, heart rate, blood pressure, and cortisol levels. Based on the keywords used, we only expected to retrieve papers involving AAS dogs in hospital settings. However, we also found papers showing how service dogs can promote human well being. This review regarding AAS dogs in healthcare facilities is relevant because it summarizes, in a single paper, all

related studies found in four databases, covering nearly 30 years of research on the topic. A possible limitation of this review relates to variations in nomenclature used in the past regarding AAS. The search criteria focused on nomenclature presently used in this area, which, although effective in finding relevant studies, may have excluded papers with terminology no longer in use. Future studies should consider standardizing the methodology used in AAS programs, including session length and number of dogs. They should also provide more details on the characteristics and handling of the animals. These measures would help ensure that future research in this growing field is standardized, replicable, and high-quality.

Conflict of Interest

The authors declare no financial, consultant, or institutional conflicts of interest.

Acknowledgements

We want to thank Camila Molgara Gamba of the Faculty of Veterinary Medicine of the University of São Paulo for her patience and help, and Matheus Gagliardi. G. F. Santos for the English revision of the text. This review was conducted with financial support from the National Council for Scientific and Technological Development (CNPq), under process 140700/2021-8.

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Financial Support: This review was conducted with financial support from the National Council for Scientific and Technological Development (CNPq), under process 140700/2021-8.

Supplementary Material

Supplementary material accompanies this paper.

Summary of the retrieved studies including authors, year of publication, study design, article group, sample characteristics, measures, dog characteristics (number, breed, age, and source), intervention features (interaction details, AAI type, duration, and frequency) and main findings.

This material is available as part of the online article from https://doi.org/10.11606/issn.1678-4456.bjvras.2025.235093.

Suplementary material for the article: Santos COF, Pizzutto CS. Animal-assisted services dogs in a hospital setting: a literature review. Braz J Vet Res Anim Sci. 2025;62:e235093. https://doi.org/10.11606/issn.1678-4456.bjvras.2025.235093.

Author	Year	Study design	Group	Sample (n)	Measures	Dogs (n)	Interaction	Type of AAI (Individual or group)	Duration / frequency AAI session	Key findings
ABATE et al.	2011	Prospective study utilizing historical comparison and random selection in data analysis	Heart disease	69 inpatients. Experimental group (39-95 years old), historical group (41-101 years old)	Walking distance	1 therapy dog, to eliminate potential for bias related to size or breed of dog. Gypsy was a 7 years old retired racing greyhound, had been a registered and working therapy dog for 2 years at the time the study began also holds an advanced certification in obedience	For safety purposes, the patient did not control the dog' lead. The patient walked accompanied by the therapy dog and its handler	Individual	12-minute visit from a therapy dog and volunteer team	Positive impact on the ambulation in hospitalized heart failure patients
ABRAHAMSON et al.	2016	Exploratory pilot	Psychosocial	4 staff nurses, 3 support staff members, and 2 hospital volunteers	Five themes emerged from the respondent interviews: descriptions of the therapy dogs; contacts with the dogs at work; connection with the dogs outside of work; benefits; drawbacks	Not cited. Dogs from Therapy Dogs International	Animals provided services in reception areas, surgical waiting rooms, the emergency department, and medical/surgical units (including paediatrics) as requested by staff members and patients. Most respondents noted they had contact with the dogs once or twice a week and that Individual time spent with the animals was generally under 15 min per visit	Individual	Animal rounds occurred mostly during daytime hours, and at least weekly but not daily. Schedules were established to match handler availability	Abundantly positive hospital staff experiences

ALERS AND SIMPSON	2012	Report	Miscellaneous	Soldiers at Walter Reed National Military Medical Center	Canine positive reinforcement training to dogs awaiting adoption	---	---	---	---	Soldiers benefit by developing new skills, forming positive bonds with the dogs, and continuing to serve their community
ANTONELLI et al.	2016	Randomized study	Psychosocial and Physiological	105 children (3-16 years old)	Pain, positive/negative affect, parent/professional evaluations	24 dogs	During data collection, they (AAI, clown or musicians) were present one at a time, and they interacted with children and parents	Group	The professionals determined the type and timing of their activities based on their experience	Empower positive affect, no influence on self-reported pain
ÁVILA-ÁLVAREZ et al.	2020a	A within-subject quasi-experimental longitudinal design	Autism Spectrum Disorder (ASD)	19 children (mean age 3.85 years old)	Communication and social interaction skills	5 dogs (1 per interaction). 5 therapy dogs (4 males and 1 female), with mean age of 4 years	The sessions were individual in nature to promote animal welfare	Individual	They were held 1 day a week, an approximate duration of 20 min	Substantial improvement in most of the communication and social interaction skills in children with ASD
ÁVILA-ÁLVAREZ et al.	2020b	Intra-subject quasi-experimental longitudinal design	Psychosocial	55 children (2-16 years old) and parents	Perceptions of its outcomes by children and parents/guardians	3 dogs (1 per interaction). 2 females and 1 male. Their average age was 4.3 years. 2 labrador retrievers and 1 golden retriever	Each day with 3 patients. Presence of the participant, a therapy dog, a therapist and at least one of the father, mother or legal guardians	Individual	Single AAI session 20–30 min session before undergoing the medical procedure,1 day per week, for 6 consecutive months	Statistically significant improvement in emotional state after the session
BARCHAS et al.	2020	Overview	Miscellaneous	not applicable	AAI in hospital setting. Description about personal pets and therapy Animals in the hospital setting	---	---	---	---	AAI programs should implement specific policies and guidelines to minimize potential risks
BARDILL; HUTCHINSON	1997	Data analysis	Psychosocial	30 teenagers (11-18 years old)	Feelings and experience about the dog	A dog residing on an inpatient psychiatric unit. Graham, a 2-year-old cocker spaniel, 24-hour-a-day resident of the unit since he was 8 months old. Staff was responsible for his daily care that included feeding, exercise, and grooming. Nurses provided patients opportunities to participate in care activities	The dog had free run of the unit except for the kitchen, eating area, and medicine room	Individual	Not mentioned	Positive response to the presence of the dog

BARKER AND GEE	2021	Guidelines	Miscellaneous	not applicable	Challenges and best practices for Canine-Assisted Intervention (CAI) programs	---	---	---	---	CAI has the potential to complement traditional medical treatments
BARKER et al.	2015	Randomized controlled trial (RCT)	Psychosocial and Physiological	40 children (8-18 years old)	Pain, anxiety, attachment, family life space	7 dogs' members of the hospital' therapy dog program. Visit by one of the owners–dog teams	Children interact with the dogs in their rooms	Individual	10-minute AAI	A significant post-condition difference was found between groups for anxiety, with the AAI group having lower anxiety scores. No significant within- or between-group pre-post changes in either pain or anxiety
BARKER; DAWSON	1998	Pre-and post-treatment crossover design	Psychosocial	230 patients	Anxiety	2 female owners of therapy dogs volunteered to provide the animal-assisted therapy sessions. The first volunteer provided the therapy for the initial four months of the study. The second volunteer agreed to continue the study following the same format used by the first volunteer. Her participation required reversing the days that the animal-assisted therapy session and the therapeutic recreation session were offered	The animal-assisted therapy session consisted of about 30 minutes of group interaction with a therapy dog and the dog' owner	Group	30 min semi structured one single session, which was held once a week, sessions was shared by 3 recreational therapists	Statistically significant reductions in anxiety scores. No statistically significant differences in the reduction of anxiety

BEETZ et al.	2019	Controlled trial	Psychosocial	60 soldiers (38±7 years old)	Data on psychiatric symptoms, perceived stress, work and social life, and the therapeutic relationship were collected. Only the intervention group also answered a questionnaire on trauma confrontation, consumption of alcohol/drugs, mental wellness, and perceived stress	18 dogs-handlers with their own dogs (either military service dog or privately owned)	The dog-assisted intervention sessions included a walk, different play and grooming activities and just relaxing together toward the end	Group	3h once a week-four sessions. 10 patients at a time	Significant trend toward better values in the intervention group. Mental wellness improved in soldiers with Post-Traumatic Stress Disorder
BEN-SEFER AND SHIELDS	2021	Report	Miscellaneous	not applicable	Definitions of service, assistance, guide, therapy, comfort, and support animals	---	---	---	---	Defined scope and benefits of various types of animals
BERT et al.	2016	Review	Miscellaneous	not applicable	Systematic review. AAI benefits and risks	---	---	---	---	This review examined the use of animal programs for hospitalized patients and its potential risks
BOUCHARD et al.	2004	Pilot study	Oncology	27 children (3-16 years old)	Perceptions of therapy dog visits	12 dogs, 1 per interaction	At the child' bedside, without its master, for an eight-hour	Individual	53 visits (0 to three visits per week) for 12 months	Favourable experience, program officially recognized by hospital board
BRANSON et al.	2017	Randomized controlled trial (RCT)	Psychosocial and Physiological	48 children (7–17 years old)	Anxiety, positive/negative affect, cortisol, C-reactive protein	9 dogs (1 per interaction)	In the patient' private room	Individual	One-time 10-minute AAA with a dog and handler. The study was conducted during the regularly scheduled AAA, which occurred twice per month between 10 a.m. and 1 p.m.; data were collected over 10 months	No significant differences in stress biomarkers
BRANSON et al.	2020	Two-group randomized, repeated measures (pre/post) study design	Psychosocial and Physiological	10 patients (≥ 60 years old)	Stress, anxiety, cortisol, C-reactive protein, interleukin-1b	1	Participants were recruited during regularly scheduled AAA visits on 2 days per month	Individual	One-time 10-min AAA with a dog and animal handler	Decreased anxiety and stress levels, variable biomarker results in Intensive Care Unit (ICU) patients
BRODIE et al.	2002	Review	Miscellaneous	not applicable	Review of zoonoses risks in animals	---	---	---	---	In a controlled health care environment with responsible human behavior, the potential benefits either at home or hospital, far outweigh the apparently insignificant risks

BROWN et al.	2020	Quasi-experimental pre-post-test design	Psychosocial	84 adults (≥ 18 years old), 63 adolescents (12 -17 years old)	Patients and staff mood states and feelings	Dogs from AAA organization in a circle of chairs	Participants during regularly scheduled AAA visits on 2 days	Group	Once a week	Changes in mood states and feelings
BUSSOTTI et al.	2005	Case study	Oncology	13 years old teenager suffering from recurrent acute lymphocytic leukaemia and her mother	Perceptions of pet dog visit during hospitalization	1 (her pet dog)	Per month	Individual	1 hour	Important therapeutic potential regarding to the psychological aspects
CALVO et al.	2016	Randomized controlled trial (RCT)	Psychosocial and Physiological	22 adult (mean age 47.8 years old)	Cortisol, symptomatology, quality of life	4-5 dogs. 1 dog for 2 patients	During an AAT session 4 of the 5 therapy dogs were always present to interact with the patients. At the beginning of each session, participants were asked to work in pairs. Each working pair was assigned a dog, which they worked with for the remaining hour of the session. During the program there was a rotation between the 3 types of sessions (emotional bonding, dog walking, and dog training with play)	Group	1h twice-weekly session for 6 months - total of 40 AAT sessions	Significant improvement in negative symptomatology, significantly higher adherence to the AAT-treatment, cortisol level was significantly reduced in patients with schizophrenia
CAPRILLI AND MESSERI	2006	Randomized controlled trial (RCT)	Psychosocial	138 children (average age 3.5 years)	Parents and staff levels of satisfaction	4 dogs, 3 female labradors (aged 3, 6 and 8 years) and a 5-year-old mixed-breed male dog	2 animals at a time. 2h of activity involving walking, brushing, and combing the dog	Group	2h from 9 a.m. to 11 a.m. in different indoor and outdoor wards allowed to interact with hospitalized children once a week for 20 weeks. The children would interact with animals for at least 5 min	Participation of hospitalized patients, satisfaction of parents and medical staff were assessed. The hospital infection rate did not change, and no new infections occurred after the introduction of dogs
CAVALLI et al.	2018	Research study	Miscellaneous	9 AAA dogs and 8 non-AAA pet dogs (1-10 years old), 9 males and 8 females	Gazing behavior, response to human cues, and persistence in learned tasks	---	---	---	---	Therapy dogs have better skills compared to pet dogs

				or various breeds and mixes						
CHAN AND TAPIA RICO	2019	Review	Oncology	Oncology patients undergoing chemotherapy and palliative care	Review of existing literature on AAT benefits	---	---	---	---	Evidence of benefits of AAT for chemotherapy and palliative care patients
CHEN et al.	2021	Randomized controlled trial (RCT)	Psychosocial	40 patients (40-71 years old)	Positive and Negative Syndrome Scale (PANSS), Depression Anxiety Stress Scales (DASS), and Chinese Happiness Inventory (CHI) assessments	4 (1 dog for a group of participants). the therapy dogs, including Corgi, Labrador Retriever, Maltese, and Shiba Inu, passed the therapy dog test to ensures that they could remain calm in difficult, distracting, and stressful situations	Each AAT session was conducted by an animal-assisted therapist, an occupational therapist, and a dog-handler pair (breeder)	Group	15-min warm-up, 45-min therapeutic activities, and 5-min feedback every week for 12 weeks	Greater improvements in PANSS and DASS-stress scores. AAT effective in reducing psychiatric symptoms and stress in middle-aged and older patients with schizophrenia
CHUBAK AND HAWKES	2016	Epidemiological retrospective cohort study, survey review	Oncology	Top 20 paediatric oncology hospitals in the USA	AAA practices and policies	---	---	---	---	All hospitals offered AAA policies, hand sanitizer required after visits, dogs most chosen animal for AAA
CHUBAK et al.	2017	Epidemiological retrospective cohort study and survey review	Oncology	19 patients (7-25 years old)	Feasibility of AAA	1 dog	A single handler-dog team conducted all visits	Individual	One-time visit, 20 minutes maximum, multiple visits per day. But no minimum duration was required. We implemented this time restriction to allow for multiple visits per day	Patients experienced reduced distress and significant decreases in worry, tiredness, fear, sadness, and pain. Supported feasibility of AAA in paediatric oncology
CHUR-HANSEN et al.	2014	Review	Miscellaneous	not applicable	Hospitalized children, methodological considerations	---	---	---	---	Methodological considerations used for AAI implementation
CLARK et al.	2020	Pilot study	Physiological	9 dogs and their handlers	Behavior and salivary cortisol during hospital visits	9 therapy dog teams from Mayo Clinic, Rochester' Caring Canine Program. The average age for the dogs was 3.7 SD ± 2.2 years. No treats allowed	The dog and handler would enter a hospital room where the patient would be either in his or her bed or sitting in the hospital chair	Individual	For each visit, the therapy dogs were at the hospital on average 47 min and visited with 9 people. Visits consisted of inpatient and outpatient scenarios and were kept under an hour	Mixed stress behaviors in dogs, salivary cortisol suggested therapy dog team maintained wellbeing during visits

COAKLEY et al.	2021	A single group pre-post quasi-experimental design	Psychosocial and Physiological	59 oncology patients (21-80 years old)	Heart/respiratory rates, cortisol, comfort, wellbeing, anxiety	Dogs, handlers (more than 1?)	The AAT visit usually include the patient and family petting the dog, talking about the dog or their own pets. Dogs can sit and be petted for the entire visit by the patient	Individual	About 15 min one time AAT visit/intervention from a dog for a six-month period	Reduced anxiety, decreased heart and respiratory rates, improved subjective measures of comfort and wellbeing
COAKLEY AND MAHONEY	2009	A single group pre–post-quasi–experimental design with mixed methods	Psychosocial and Physiological	59 patients (≥ 18 years old)	Vital signs, pain, energy, mood	1	No details	Individual	Pet therapy interventions lasted on average of 10 min with each subject at the bedside. 2 days per week (isn't clear if was the same patient twice a week)	Significant decreases in pain, respiratory rate and negative mood state and a significant increase in perceived energy level
COLE et al.	2007	Randomized controlled trial (RCT)	Heart disease	76 patients (mean age 57 years old)	Cardiopulmonary pressures, neurohormone and anxiety levels	14 dogs (1 per interaction) included 1 extra-large dog, 6 large dogs, 5 medium dogs, and 2 small dogs, 10 different breeds	Dog lied on the bed with its head within 0.6 m (2 ft) of the patient' head on a clean sheet used as a barrier to the patient' bed, (4) patients may pet the dog and talk to the dog and volunteer	Individual	12-minute visit from a volunteer and dog	Lower cardiopulmonary pressures, reduced neurohormone levels, and decreased anxiety in patients with advanced heart failure
CONNOR AND MILLER	2000	Overview	Miscellaneous	not applicable	AAT history, goals, and applications	---	---	---	---	AAT recommended for critical care patients
COWFER et al.	2021	A single group pre–post-quasi–experimental design. A cross-sectional qualitative study	Oncology	9 children (5 -17 years old) and their parents (n = 12)	Perspectives on AAI	Visits from a registered canine and handler who were in good standing with Pet Partners. Not clear if different dog-handler in all visits	Occurred during the child' routine clinic visits or hospitalizations. During each visit, participants were allowed to pick activities to engage in with the dog, such as petting the dog, talking to the dog, or having the dog do tricks and feeding the dog treats	Individual	Visits were 15 minutes in duration and occurred during the child' routine clinic visits or hospitalizations over a period of up to 12 weeks as often as weekly. Each child had between 2 and 11 AAI sessions (median 6) over the 12-week period	95% of participants shared positive aspects of AAIs. The only negative aspect reported was too little time with the dog. Impact on desire for a pet. Benefit of therapy dogs to ill children

CROSSMAN et al.	2015	Randomized controlled trial (RCT)	Psychosocial	67 students (22 -37 years old)	Anxiety, positive and negative mood	1 (same dog for all interactions), the “therapy dog” at the School of Medicine where the study was conducted. The dog was a grey, 32-kilogram, three-year-old, male, mixed-breed dog	Participants were permitted to interact freely with the dog, including petting and playing with the dog. All interactions were supervised by the dog’ handler (the third author of the present study), who kept the dog on a loose leash during the interactions. Each participant in the experimental condition completed a single one-on-one interaction with a dog	Individual	7-10 min single, brief interaction with a dog	Students and medical residents experienced reduced anxiety and negative mood, and increased positive mood
DALTON et al.	2020	Review	Miscellaneous	not applicable	Review about AAI risks	---	---	---	---	Heterogeneity in infection control
DALTON et al.	2021	Pilot study	Oncology	49 study participants (mean age 11.7 years old)	Microbial sharing, use of topical chlorhexidine	4 dogs, 1 per interaction	Multiple patients interacted with the dog at the same time. 2–4 visits per dog team. Each therapy visit had a mean of 3.8 participants	Group	1 hour	Reduced microbial sharing between patients and therapy dogs with topical chlorhexidine, therapy dogs not the only source of microorganisms
DE AGUIAR et al.	2021	Letter to the editor	Miscellaneous	10 dogs	Prevalence of Multidrug-Resistant Bacteria (MDR) in therapy dogs	---	---	---	---	Therapy dogs should be tested for MDR
DECINA et al.	2022	Research study	Miscellaneous	not applicable	First-person reports of 3 professionals about AAI in an inpatient rehabilitation hospital	---	---	---	---	Discussed training, skills, and benefits of facility dog
EATON-STULL et al.	2020	An Exploratory Study	Miscellaneous	not applicable	Surveyed social service agencies about AAI use, training, barriers, and benefits	---	---	---	---	Increased social interaction, decreased stress and depression
EDNER et al.	2021	Descriptive study	Miscellaneous	20 children and 2 dogs	Bacterial transmission between patients and dogs, hygienic conditions	2 dogs (1 per interaction)	During the first study period at patient’ room. During the second study period, visits occurred in a room outside the ward close to where the	Individual	The interaction started with 10 min of quiet, followed by 15-20 min of activity and 10-15 min of relaxation on the bed	Simple infection control measures can reduce bacterial transmission between dogs and children

							dog was stationed			
ENGELMAN	2013	Anecdotal clinical vignette	Physiological	19 patients	Pain levels, staff stress	Lizzy, the therapy dog, 8-year-old white bichon frisé, weighing about 13 pounds	At patient´s room. Observations of staff reactions to the therapy dog being on the floor were also made	Individual	Not mentioned	Interactions with therapy dog helped patients relax and distract from pain, reduced palliative care staff stress
ENOCH et al.	2005	Letter to the editor: case report. Guidelines	Miscellaneous	1 dog	MRSA dog contamination, AAI guidelines	---	---	---	---	Proposed AAI guidelines to prevent MRSA spread from pet therapy dogs
ETINGEN et al.	2020	A mixed-methods intervention pilot study using an explanatory sequential approach (collecting and analyzing quantitative followed by qualitative data)	Psychosocial	22 healthcare employees (pre-implementation survey), 16 healthcare employees (post-implementation survey)	Healthcare employee well-being	Not mentioned	Employees participated in the sessions as their schedule allowed; without standardizing how long they were able to interact with the dogs nor what activities they engaged in with the dogs	Individual and/or group	Each session approximately 1h long, the program included 20 sessions over 3 months	Animal-assisted programs could boost mood and decrease burnout in healthcare employees
FODSTAD et al.	2019	A simple within case pre-post-design	Psychosocial	94 patients (8–17 years old)	Distress	1	The same dog, handler, and assistant team conducted all visits. 1-3 patients per visit. The interaction between the pet therapy team and the patient occurred either in a private consultation room or in a quiet area in the general milieu when a consultation room was not available	Individual and/or group	At least 10 min one-time visit. Average length 11.5 min. 1-3 patients at once	Subjective distress decreased in patients and unit staff

FOSTER et al.	2018	Not mentioned	Oncology	Humans and therapy animals	Behavioral and physiological parameters using wireless sensor systems	1	Next to/over patients' bed	Individual	5-10 minutes interaction	Preliminary findings to set up a data collection system to analyze the interaction between a therapy dog and a human patient in a clinical AAT environment
GAGNON et al.	2004	Descriptive study	Oncology	16 parents of children (> 2 years old), 12 nurses	Psychological distress, adaptation to therapeutic process, wellbeing	1	Sessions took place in the room specially organized for this purpose. The child received his nursing and medical care there while being able to interact and play with the dog. Not clear if the handler was present	Individual	Each child spends an entire day (8-16h) in the company of a dog	Contributed to relieve psychological distress, promoted adaptation to the therapeutic process and to wellbeing in children and parents
GERMONE et al.	2019	Pilot study. Crossover design, participants served as their own control	Autism Spectrum Disorder (ASD)	47 youth (6-8 years old)	Social-communication behaviors	Sessions included a dog and handler brought into the small group setting for free interaction time. Dogs were all females, recruited from the hospital' volunteer assistance animal program. 6 dog handler teams participated in this study and the ages of the dogs ranged from 7 to 13 years, with an average age of 9 years	2 to 4 participants. An experimental dog and handler interaction (animal-assisted activities) and a novel toy and handler control (control)	Group	Two 10-min conditions. Each session occurred on a consistent day of the week and was separated by a minimum 2-day wash-out period. Each volunteer dog visits the hospital approximately every 2weeks and may spend up to 10 or 15 min with each patient, depending on the child' needs. The total time at the hospital on visiting days averages between 2 and 3h	AAA with a dog may promote social-communication behaviors in psychiatrically hospitalized youth with ASD
GILLESPIE AND NEU	2020	Qualitative descriptive study	Oncology	Children and adolescents with cancer	Virtual letter-writing program	---	---	---	---	Development of ongoing friendship and emotional rewards through letter writing with therapy animals

GINEX et al.	2018	Quasi experimental design was used for the patient group, and a pre-post-test design was used for the staff group	Oncology	100 patients (>21 years old). 41 staff members	Quality of life, staff satisfaction	Not mentioned. Dogs from Caring Canines program	Staff had the opportunity to interact with the dogs either directly (spending some time with them when they were on the unit) or indirectly (seeing them visit with patients even if they did not have direct contact with them)		Patient-one visit daily. Staff-Tuesday to Friday weekly. Volunteers and dogs from the Caring Canines program visited the surgical unit 4 days a week during the study period	Improved patients' quality of life, and the level of energy was significantly higher. Compassion satisfaction was high, and burnout was low for staff
HARPER et al.	2015	Prospective randomized controlled study	Physiological	72 patients. 67±10 years old (treatment), 66 ±11 years old (control)	Pain levels, satisfaction with hospital stay	The same dog and handler were used for all interactions	The handler sat in a chair or stood approximately 1.2 m (4 feet) from the patient' head. The dog sat by the patient' bed or chair with its head within reach; and patients were permitted to pet the dog and talk to the dog and the volunteer	Individual	About 15-minute visitation with a therapy dog before physical therapy or standard postoperative physical therapy regimens. Three visitations with the therapy dog for a total of 108 visits	15-minute sessions with therapy dog positively affected pain levels and satisfaction after total joint replacement
HARTWIG AND BINFET	2019	Research study	Miscellaneous	Agencies/programs	Online information about Canine-Assisted Intervention (CAI) to understand program standards	---	---	---	---	Best practices recommendations for CAI
HASTINGS et al.	2008	Descriptive study	Psychosocial	2 children (11 years old boy, and 6 years old girl)	Burn Intensive and Care Units patients' experiences	1	Zip is transported in a pushcart resembling a serving cart. This permits Zip to be at the same level as our patients' beds, enabling patients to reach out, stroke, brush, and love on Zip	Individual	Bi-weekly visitation	Potential benefits of sharing lives with companion animals within a hospital

HEDIGER et al.	2020	Retrospective analysis	Psychosocial	196 children and adolescents	Analysis of Dog-Assisted Therapy (DAT) sessions	2 dogs per day (1 per interaction). 16 dogs in total from 2010 to 2017	At therapy room. The dog is off-leash and allowed to move freely in the room during the therapy session with the aim of spontaneous positive interactions between child and dog	Individual	Therapy sessions took place once a week. Each dog works only once a week with a maximum of 2 children per day to avoid stress in the animals. Patients received an average of 4.34 therapy sessions	DAT facilitates emotional, social, and psychological goals for children and adolescents with severe neurological impairment
HINIC et al.	2019	Quasi-experimental study	Psychosocial	93 children (6-17 years old)	Anxiety	2 dog-handler teams (labrador and a golden retriever)	Not mentioned	Individual	8 to 10-minute visit	Reduction in anxiety among hospitalized children and increased satisfaction among parents
HOLMAN et al.	2018	Letter	Miscellaneous	not applicable	Lessons from loss of facility dog	---	---	---	---	Discussed lessons from the loss of facility dog from palliative care team
ICHITANI AND CUNHA	2016	Qualitative intervention. Descriptive paper	Physiological	17 hospitalized children/adolescents (7-17 years old)	Self-reported pain	2 dogs to allow the dogs to take turns with the patients, which ensured the animals' well-being during the data collection period. 1 dog per interaction. Two therapy dogs participated in the study—Bruce, an 8-year-old Old English Sheepdog (large breed), and Sheep, a 6-year-old Shih-Tzu (small breed). Both dogs were neutered and underwent constant behavioral and health assessments for their own safety and the safety of the subjects	The dog' leash was removed during all interventions under the following conditions: the complexity of the patient was low, the environment was highly controlled regarding noise and the circulation of people or equipment, and the dog had plenty of experience with AAI, which made it safe for all the parties involved	Individual	Between 5 and 10 min. The therapy shifts were conducted twice a week, one with each dog	Decreased self-reported pain

JENSEN et al.	2021	Cross-sectional design	Psychosocial	130 paediatric healthcare professionals (mean age 37 years old)	The impact of facility dogs on paediatric healthcare professionals' work-related burnout, job perceptions, and mental health	The number of dogs was not mentioned. All facility dogs were raised, trained and placed by the organisation Canine Assistants, were bred on-site at Canine Assistants and included golden retrievers, labrador retrievers, goldendoodles, and mixes of the three. After an average of 18 months spent learning their specific skill sets, facility dogs were eligible to be partnered with paediatric healthcare professionals	Not mentioned	Not mentioned	Facility dog, no details	Working with a facility dog may contribute to various benefits for healthcare professionals, including reduced work-related burnout, improved job perceptions, and enhanced mental health
JOFRÉ	2005	Guidelines	Miscellaneous	not applicable	Patient and animal evaluations, veterinary care, zoonotic diseases, and dog visit rules	---	---	---	---	Continuous updating of AAT guidelines
JOHNSON et al.	2003	Quasi-experimental design	Oncology	30 patients (>18 years old),	Use of Complementary/Alternative Medicine (CAM) techniques	A trained, certified visitor dog and its handler	1 (not explicity stated in the article)	Individual	15-min visit sessions (dog visit session, friendly human visit session and quiet reading session)	AAA and AAT considered a form of CAM for nonpalliative cancer treatment patients
JOHNSON et al.	2008	Longitudinal, randomized pretest/post-test design	Oncology	30 adult patients	Mood, fatigue, self-perceived health, sense of coherence	2 dogs (1 or 2 per group interaction). 2 female visitor dogs—a long-haired dachshund and a whippet	Participant-dog-handler. Rooms adjacent to the radiation therapy departments. The dogs sat on the sofa with the participant. During the sessions, participants combed, petted, played, and talked with the dog	Individual and/or group	Participants participated in 15-minute sessions 3 times per week for 4 weeks with 1 or 2 visitor dogs and their handlers (n = 10). The protocol ensured that each dog participated in no more than 6 visits per day	No statistically significant differences, but patients undergoing radiotherapy noticed health improvement compared to others of their age

KLIMOVA et al.	2019	Review	Miscellaneous	not applicable	Review of AAI benefits for dementia patients (Alzheimer' disease)	---	---	---	---	More research is needed to improve cognitive functions
KLINE et al.	2019	Prospective controlled trial	Psychosocial and Physiological	80 patients (adults and seniors)	Anxiety, pain, depression, pain medication frequency	17 dogs and handlers' teams from several certified organizations. 1 per interaction	Patient room	Individual	15 minutes. One patient at time	Significant anxiety reduction in emergency department patients
KLINE et al.	2020	A single-center, prospective controlled trial	Physiological	122 physicians, residents and nurses	Salivary cortisol, self-reported stress	Dogs and handlers from several certified organizations. 1 per interaction	In a designed room. Dogs remained on a 5-foot-long leash held by the handler during the entire encounter. Providers were freely able to touch or pet the dog if they wished	Individual	5 minutes while on emergency department shift	5-minute interaction with a therapy dog reduced stress in emergency department staff
KNISELY et al.	2012	Review	Miscellaneous	Hospitalized patients with medical disorders, psychiatric patients, elderly home residents of nursing homes and long-term facilities	AAA and AAT benefits	---	---	---	---	Benefits for civillian population, but few studies for military personnel
KOWALSKI et al.	2021	Multicenter, interventional, comparative, pre-post design	Psychosocial	141 participants (median age 75 years old)	Anxiety	Several dogs, 1 per interaction	Interaction between the human-animal team and the participant at the bedside. petting and talking to the dog with the handler present	Individual	One-time visit, 10-18 min. Visit in the participant' hospital room	AAA significantly reduced anxiety in older adults with mild anxiety during their inpatient hospitalization
KRAUSE-PARELLO et al.	2018	Crossover repeated-measures study	Physiological	25 veterans (33-86 years old)	Blood pressure, heart rate, salivary cortisol, immunoglobulin A, alpha-amylase	1 certified facility dog. Waffle, a 4 years old, 60-lbs, labrador/golden retriever crossbreed	Each session was held in the veteran' room or location of their choosing. In the 20-minute treatment condition (also held in the veteran' room), the veteran had a visit from the facility dog and the dog' handler, who is also a clinical psychologist	Individual	20 minutes	Significant decreases on salivary cortisol levels and heart rate in veterans

KRÜGER et al.	2021	Prospective, investigator-blind intervention study	Psychosocial	26 patients (66-95 years old)	Agitation	1 (facility dog), named Odin, a bernese mountain dog (weighing 50 kg) and was 4 years old at the beginning of data collection. His owner works as a physician on the ward. Odin absolved his education to a therapy dog in the “Dog School Berlin-Brandenburg”	The dog interacted with patients for several short periods of time throughout the day	Individual and/or group	Maximum 20 minutes total several occasions for a short amount of time throughout the day	Reduced symptoms of agitation in patients with dementia
LADD AND BARKER	2017	Case study	Psychosocial	Number of participants in the lectures varied over the years	Therapy dog programs evaluation	---	---	---	---	Programs positively evaluated among participants
LAVÍN-PÉREZ et al.	2021	Parallel-group non-randomized clinical trial	Psychosocial	32 adolescents (<18 years old)	Eating disorder symptoms, health-related quality of life, adolescent character and behavior, patient strength, Body Mass Index, and treatment satisfaction	Not mentioned	Small groups composed of 4 patients	Group	50 min session, once per week, total of 7 sessions in 7 weeks	The study will be the first to evaluate the effects of dog-assisted therapy on the physical and psychological well-being of adolescents suffering from eating disorders
LEFEBVRE et al.	2006a	A cross-sectional survey	Miscellaneous	231 hospitals and 90 dog owners	Distribution of canine visitation programs in Ontario	---	---	---	---	Communication among all involved parties to minimize risks
LEFEBVRE et al.	2006b	Cross-sectional study	Miscellaneous	102 therapy dogs	Owners' interviews, dog physical examination, and dog swab analysis	---	---	---	---	Assessed zoonotic pathogen prevalence in therapy dogs
LEFEBVRE et al.	2008	Guidelines	Miscellaneous	not applicable	Infection control and prevention policies	---	---	---	---	AAI guidelines in health care facilities
LINDER et al.	2017a	Multiple-choice survey	Psychosocial	91 first-year veterinary students	Student perceptions on health and safety of AAA/AAT	---	---	---	---	AAI programs need to review their policies to address recent AAI guidelines, ensuring the safety of both animals and humans involved
LINDER et al.	2017b	Cross-sectional telephone/e-mail survey	Miscellaneous	Forty-five eldercare facilities, 45 hospitals, and 27 therapy animal organizations	Survey on AAI policies and procedures	---	---	---	---	Information for veterinarians on safe and effective AAA/AAT programs
MACHOVÁ et al.	2019a	Pilot study	Psychosocial and Physiological	72 patients (51-100 years old)	Mood, blood pressure, heart rate, Barthel index	1	Mia (the dog) accompanied clients on outdoor walks, played fetch with a ball, or did short obedience exercises. The dog with 1	Individual and/or group	20 min outdoor session. Once a week over a period of 12 weeks	Significant psychosocial well-being improvements, no changes in physiological parameters

							Individual per session			
MACHOVÁ et al.	2019b	Exploratory data analysis	Psychosocial and Physiological	15 patients (43-87 years old)	Mood, blood pressure, heart rate	1	The dog with 1 Individual per session	Individual	About 20 minutes twice a week with everyone per session for 6 weeks	Patients felt better after the AAT sessions (statistically significant). Changes in the values for heart rate and blood pressure were insignificant
MACHOVÁ et al.	2019c	Exploratory data analysis	Physiological	22 nurses (mean age 30 years old)	Salivary cortisol in 3 conditions: normal work without a break, with a break, and with a break including a therapy dog	The therapy dog was a female border collie, Mia, who had been working regularly in the hospital for 3 years	Only the observed Individual, the dog, and its handler were present in a quiet room reserved for this study	Individual	20 min in a quiet room	Decreased cortisol levels in nurses from internal medicine and long-term care with the presence of the dog
MARCUS	2012	Invited commentary	Oncology	Oncological patients	Commentary on therapy dog benefits	---	---	---	---	Benefits from therapy dog visits on oncological patients
MARQUES et al.	2015	Quasi-experimental study	Psychosocial	52 patients (18-65 years old)	Violence prevention	1 (no more details)	Each group of 2 patients was visited by the dog. Used balls, dolls, brush, and the clicker to energize the sessions	Group	15 min session, twice a week, in a total of 6 sessions over the course of 3 weeks	Decreased frequency and severity of aggressive behaviors, along with reduced psychotropic medication use in acute psychiatric patients
MCCULLOUGH et al.	2018	Multicenter, parallel-group, randomized trial	Oncology	106 patients (3-17 years old) and their parents	Anxiety and stress levels (blood pressure, heart rate)	1 (1 per interaction from certified dogs, various therapy dog-handler team)	Children received visits from the same therapy dog team each week. AAI visits occasionally took place in an inpatient room	Individual	Sessions were prescribed to last 10 to 20 minutes. Therapy dog interactions occurred approximately once per week over 4 months, depending on the child' treatment schedule	Significant reduction in parental stress. Significant increase in blood pressure and heart rate in children
MILLER AND INGRAM	2000	Report	Miscellaneous	not applicable	Review of AAT benefits for patients and staff, relatives' experiences	---	---	---	---	AAT program incorporated as a treatment modality by nurses
MILLER et al.	2003	Quasi-experimental, non-equivalent, before after design	Heart disease	60 open-heart patients (48-88 years old)	Retention of teaching	1 per interaction. Therapy dogs certified by Therapet Animal Assisted Therapy Foundation	Interaction included petting and stroking the animal	Individual	Watching the 10- minute videotape while interacting with the therapy dog	Presence of therapy animal may not be helpful for retention of teaching

MOODY et al.	2002	Two cross-sectional surveys	Psychosocial	244 hospital staff before program implementation and 195 hospital staff after implementation	Staff perception surveys of pet visitation programs	---	---	---	---	Health related and non-clinical staff had a more favourable view of the program regarding ward atmosphere and acceptance compared to doctors and nurses
MOREIRA et al.	2016	Qualitative study	Oncology	16 participants (relatives/legal guardians), all female (20-45 years old), children and adolescents (4-6 years old)	Perceptions of AAI	1 (no more details)	In the playroom of the hospital. During the dog' visit, besides patients themselves, were also in the room: managers, health professionals, the dog' tutor, and researchers. The participation of legal guardians and the nursing staff	Individual	1h - 4 dog visits. 4 direct visits with the dog with a duration of approximately 1 hour each	Observed as distracting and entertaining, but therapeutic aim not realized
MULVANEY-ROTH et al.	2022	Experimental quantitative research study	Psychosocial	60 adults (mean age 46 years old), children (mean age 10 years old)	Anxiety	1 (no more details)	For Behavioral Health Unit (BHU), dog visits were held in the Television Room reserved for that purpose. Only the patient, dog handler, research member, and the dog were present. For Paediatrics unit (PEDS), dog visits were conducted at the child' bedside. Only the patient, dog handler, research member, and the dog were present	Individual	The BHU group mean time spent with the dog was 9.5 minutes, with a minimum of 5 minutes and a maximum of 15 minutes. The PEDS group spent a mean time of 13.3 minutes with the dog, with a minimum of 5 minutes and a maximum of 30 minutes	Decrease in patients' anxiety levels
NAHM et al.	2012	Survey	Psychosocial	125 patients and 105 staff members (≥ 18 years old)	Acceptance of therapy dogs in the emergency department by staff and patients	2 therapy dogs, both were a mixed breed labrador retriever (Quincy) and a bernese	In the patients and their visitors' room. People could pet the dog, have the dog do tricks, talk about the dog,	Individual	6 times. Therapy dog visited the emergency department every 2 to 4 weeks	Both patients and staff approved AAT in the emergency department

						mountain dog (Brinkley).	and sometimes throw a treat to the dog			
NIELSON AND LOWE	2019	Report	Miscellaneous	4 nurses	Perceptions of service dogs	---	---	---	---	Reported perceptions and mental health benefits of service dogs in emergency department
NILSSON et al.	2020	Qualitative and quantitative data	Psychosocial	50 children (3-18 years old)	Experiences and feelings of well-being during the hospital stay	A female labradoodle aged 6 at the start of the study	The interaction started with a calm period and after that an active period with dog tricks guided by the handler. The dog handler was informed about the children' condition in advance and guided to interact by taking in account the child' health status	Individual and/or group	Not mentioned	Positive self-reported feeling of well-being
NURENBERG et al.	2015	Randomized controlled trial (RCT)	Psychosocial	90 patients (18-65 years old)	Violent behavior	3 certified therapist-and-dog teams. Maybe 1 dog per interaction	Groups of up to 10 members at cottage of hospital ground. Structured group therapy, with animal greeting, discussion, and exercises, such as grooming, leading, and directing the dogs	Group	40 to 60 min weekly group sessions up to 10 members	AAT could be an effective therapeutic type for long-term psychiatric patients at risk of violence
ORLANDI et al.	2007	Randomized controlled trial (RCT)	Oncology	89 patients. Median age experimental group 64.5, control group 63.8 years old	Depression, arterial oxygen saturation	2 dogs were used: an 8 years old male border collie and a 9 years old female shetland sheepdog	In a room equipped with armchairs, where the 8 patients underwent chemotherapy together	Group 8 patients, 1 or 2 dogs together	3 phases of 20 minutes each, once a week, 25 weeks of the research	Reduced patients' depression, increased their arterial oxygen saturation during chemotherapy

PEREZ et al.	2019	Prospective study	Psychosocial	21 patients (≥ 4 years old, median 8 years old)	Changes in patient emotion before and after the intervention	A 10-year-old female labrador retriever with 3 years of experience as an accredited therapy dog, including more than 1 year in paediatrics. The decision not to keep her in the room during the MRI was due to the risks posed by the noise exposure of the MRI. Care was also taken with patient selection to best ensure that the dog could not contract methicillin-resistant Staphylococcus aureus (MRSA) or become a vector for infection	Interaction in MRI department in the waiting room and accompanied the patient into the MRI preparation area and escorted the patient into the scan room during patient positioning on the MRI table. The dog was always kept on a loose leash	Individual	Between 20 and 60 min with the therapy dog before the scan, with interaction time during and after the scan more variable based on scan length	Positive effect on patients' emotional state, reducing anxiety before MRI scans
PÉREZ-CAMARGO AND CREAGAN	2018	Peer-reviewed research	Miscellaneous	not applicable	not applicable	---	---	---	---	Suggestions for building a facility to connect companion animals with patients
PHUNG et al.	2017	Quasi-experimental design with a pre- and post-intervention	Psychosocial and Physiological	128 adults (> 18 years old)	Pain, anxiety, fatigue	2 dogs. Toby, a young black labrador, and Diesel, an older giant cockapoo (1 per interaction)	During the session, the patient would talk to the dog or handler, touch or hug the dog, and have conversations or questions answered by the handler	Individual	5 to 10 minutes	Reduced pain, anxiety, and fatigue
PRUSKOWSKI et al.	2020	Not mentioned	Psychosocial and Physiological	14 patients and 23 staff	Pain, anxiety, staff satisfaction	3 therapy dogs (1 great pyrenees, 1 shetland sheepdog, and 1 collie), on a rotating schedule from several therapy organizations	Therapy dogs would not be allowed in patient rooms. Most activities occurred in our burn center' inpatient or outpatient rehabilitation gyms	Individual and/or group	Most therapy dogs and handlers were limited to working no more than 2h per day	Viability and acceptability of AAA and AAT programs in a Burn Center

REDDEKOPP et al.	2020	Cross-sectional survey	Psychosocial	100 adult patients (21-80 years old)	Patients' opinions on receiving visits from a therapy dog	---	---	---	---	Most respondents indicated they wanted a visit by a therapy dog in the emergency department at Royal University Hospital
REID	2019	Report	Miscellaneous	not applicable	Author' experiences in hospitals and nursing homes	---	---	---	---	AAI effects in patients and residents
REILLY	2020	Report	Miscellaneous	not applicable	Examples of pet therapy for patient comfort, characteristics of therapy dogs	---	---	---	---	AAT benefits for children, families, staff, and visitors
RODRIGUEZ et al.	2022	Qualitative study	Miscellaneous	73 paediatric healthcare professionals	Online survey on the role that facility dogs play in the lives of patients, families, and hospital staff	---	---	---	---	Facility dog programs were found to be a promising complementary intervention
RUMAYOR AND THRASHER	2017	Review	Miscellaneous	not applicable	Characteristics of AAI in a military context	---	---	---	---	Discussed AAI in the military
SANTANIELLO et al.	2020	Review	Miscellaneous	not applicable	Prevalence of ESKAPE bacteria group, zoonotic risks	---	---	---	---	Reviewed prevalence and zoonotic risk of ESKAPE bacteria in health context
SCHMITZ et al.	2017	Retrospective analysis	Psychosocial	52 patients (28-90 years old)	Analysis of AAT on palliative care patients	2 trained and certified Dog Assistant Therapy Teams (DATT)	Performed in the palliative care unit. During each session the therapist applied 3 main strategies: free interaction (e.g. playing with the dog), directed interaction (e.g. observation task) and ritualised interaction (e.g. signal response)	Individual	The median was 30 min. Most of the patients received a single intervention	Facilitated communication, positive emotional responses, enhanced physical relaxation, and motivation for physical activation
SIKSTROM et al.	2020	Exploratory patient engagement project	Psychosocial	38 participants (18-88 years old)	Gorup discussion on pet therapy (patients with depression, schizophrenia and dementia)	7 handlers. One dog-handler team at time	Each Focus Group Discussion (FGD) was held in a private activity room on each clinical unit and co-facilitated by a medical anthropologist and a volunteer handler	Group	To co-creating pet therapy activities, it was formed focus group discussions with dog-handler team, patient, medical anthropologist, and sometimes the presence of recreational therapist. They were held in a private activity room, lasted between 50–90 minutes and	Therapy dogs could be used effectively to engage participants in research about their treatment and care in a diverse range of medical settings

									they were audio recorded and transcribed	
SILVEIRA et al.	2011	Guidelines	Miscellaneous	not applicable	Review of AAA protocol implementation	---	---	---	---	Described AAA protocol implementation
SMITH et al.	2020	Single group repeated-measure design	Oncology	60 older adults (> 65 years old, mean age 79 years old)	Anxiety levels	1 per visit. Several different types of certified pet therapy dogs were utilized, varying in size	Only the patient, the dog, and the handler were present during the intervention. There was a medium-size mixed breed black dog and a small black Chihuahua that were used most often (> 50%) throughout the intervention. The certified pet therapy volunteer dog handlers were all women over age 40. Throughout the 12-20-min intervention, patients were engaged in pleasant conversation with the pet handler, while petting, touching, or interacting with the dog	Individual	One-time, 12-20 min intervention	Reduced self-reported anxiety

SNIPELISKY et al.	2016	Prospective feasibility study	Heart disease	11 patients (average age 51.1 years old)	Number and duration of the visits	Dogs of all sizes. Not mentioned how many dog (no more details)	Caring Canine volunteer service visited each enrolled patient on all days except for holidays and weekends. The volunteer was instructed to interact with the patient based on each patient' goal for the visit, and the time spent with each patient was based on the Individual encounter rather than a defined time allotment. Patients would decide how long the therapy would last and would decide how much interaction would take place	Individual	14.7 min average visit time. Each patient had an average of 13.3 visits. 146 total visit number. A 12-month prospective pilot study. The total average time of all visits spent per patient was 247.1 minutes	Canine-Assisted Therapy is feasible, and it is a welcomed adjunct to usual medical care in hospitalized pre-heart transplant patients
SOCKALINGAM et al.	2008	Case study	Psychosocial	1 adult (43 years old)	Effectiveness of AAT in the psychiatric rehabilitation of an assault victim with mood disorder	1 golden retriever female named “Ruby"	While Mr. X' interaction with Ruby involved spending time caring for her and walking her. While his time spent with Ruby was relatively unstructured, Mr. X was instructed to care for the dog, including taking her for walks. Emphasis was placed on the idea that Ruby was Mr. X' responsibility during their time together	Individual	Patient spent several hours with the dog on a daily basis over a three-week period	Improvement in the patients' level of functioning

STEFANINI et al.	2015	Pre-post experimental design with randomized controlled trials	Psychosocial	34 children and adolescents (11-17 years old)	Improvement in clinical status	More than 1 dog. Appropriate animal and patient couple that remained stable until the end of the treatment	The AAT was conducted in the hospital' garden or in an activity room when weather was bad. Each session which participants interacted with a dog and its handler	Group	45 min weekly sessions for about 3 months. Each session was videotaped	Significant positive effects on therapeutic progress and the recovery process at the psychiatry hospital for acute mental disorders
STEVENS et al.	2017	Quasi-experimental study	Psychosocial	150 patients (18-93 years old)	Physician satisfaction scores evaluated by the patients in the trauma service	1 dog and handler team, 6 years old male mixed breed, who had been a volunteer at the hospital for 5 years	Took place in the patient room with permission whether the patient and/or family would like a visit. Talking between patient and dog/handler team	Individual	Visits ranged from approximately 10 min to more than 30 min	Patients more satisfied with their trauma physicians
UGLOW	2019	Two separate online surveys	Psychosocial	118 parents and 83 staff	Effect of an AAI service at a UK children' university teaching hospital	3 volunteer handlers and 5 dogs. The dogs are golden retrievers who have been specifically tested to ensure that they enjoy interaction with children	Visits involve walking around the children' wards providing casual AAA, as well as more specific interventions. Areas visited include surgical, medical, high dependency, intensive care and the day ward	Individual and group	Not applicable	Parents and staff have notably supported the use of AAI in an acute children' hospital setting
VAGNOLI et al.	2015	Randomized controlled trial (RCT)	Psychosocial and Physiological	50 children (4-11 years old)	Pain, distress, cortisol, parental anxiety	4 dogs, 1 dog each hour	Interaction among AAI expert, dog, parent and child have started at waiting room and after it in the procedure room	Individual	The blood test procedure generally took 15 minutes in presence of a dog. The AAIs, during data collection, were repeated twice a week for 2 hours (usually from 8 to 10 a.m.) with the participation of multidisciplinary staff	Lower distress and cortisol, no significant pain or parental anxiety differences

VIDAL et al.	2020	Randomized, rater-blinded, controlled pilot trial	Psychosocial	33 patients (6-18 years old)	Efficacy of Dog-Assisted Therapy (DAT) associated with pharmacological treatment	Sessions included the participation of 2 certified therapy dogs, 2 DAT professionals and a psychologist. Groups were formed by 3–4 patients	The DAT program comprised 12 manualized sessions and included 2 phases: (1) Individual intervention (6 sessions) and (2) group activity (6 sessions)	Group	45 min, weekly sessions for about 3 months	Significant improvements in social skills, reductions in externalizing symptoms, and lower severity scores for Fetal Alcohol Spectrum Disorder
VILLALTA-GIL et al.	2009	Randomized, controlled study with blind assessment of outcome	Psychosocial	21 patients (39-58 years old)	Effectiveness of Dog-Assisted Therapy	The intervention group (IG+D) with therapy dog, was directed by the psychologist, who was assisted by a 2 years old female labrador, certified as a therapy dog. The dog was accompanied by her handler	The IG+D group was divided into 3 groups of four people each	Group	25 sessions of 45 minutes each; 2 sessions per week	Some positive outcomes in patients with chronic schizophrenia
VITZTUM AND URBANIK	2016	Theoretical analysis	Miscellaneous	not applicable	Dogs' attributes and roles in AAT	---	---	---	---	Analyzed the impact of animal subjectivity in AAT
WALDEN et al.	2020	Two-period, two-sequence cross-over design	Heart disease	5 participants (6- 19 years old)	Ambulation, physiologic stability, patient satisfaction, and perceived benefit	All dogs certified through Pet Partners®	Walking and activities at the bedside	Individual	30-min AAI session for 1 week	Adolescent heart transplant patients were more motivated to participate in therapeutic ambulation when walking with a dog
WALTNER-TOEWS	1993	Cross-sectional survey	Miscellaneous	150 US animal care agencies and 74 Canadian humane agencies	AAT program prevalence, zoonotic diseases control in hospitals in USA and Canada	---	---	---	---	More studies about AAT are needed. Veterinarians should have an active role in AAT programs
WELLS	2007	Overview	Miscellaneous	not applicable	Bond between dogs and human psychological health	---	---	---	---	Examined bond in hospitals, residential nursing homes, and prisons
YAGER AND IRWIN	2012	Report	Miscellaneous	Soldiers at Walter Reed National Military Medical Center	Canine programs description	---	---	---	---	Positive impact of animal therapy in the military needs to be more recognized
YAP et al.	2017	Survey design	Psychosocial	128 staff members	Staff opinions about inclusion of AAT	---	---	---	---	Potential incorporation of AAT as a hospital-based intervention
ZEBLISKY AND JENNINGS	2016	Review	Miscellaneous	not applicable	Quantitative effects of AAT programs	---	---	---	---	Reviewed involvement in literature searches and study development