

# Measuring the Benefits

Companion Animals and the Health of Older Persons  
Full Report



# Contents

- 4. **Executive Summary**
- 5. **Overview**
- 6. **Definition of Terms**
- 8. **The Human-Animal Relationship**
  - Animals as Pets*
  - Animals used in AAA and AAT Studies*
- 10. **Research Findings: Positive Indicators**
  - Physical Health*
  - Mental / Psychological Health*
  - Emotional Health and Well-being*
  - Social and Community Health*
  - Economic Health*
- 15. **Research Findings: Equivocal and Negative Indicators**
  - Physical Health*
  - Mental and Psychological Health*
  - Emotional Health and Well-being*
- 17. **Limitations and Gaps in Current Research Methodologies**
- 19. **Investigator Recommendations for Improvement**
- 21. **Discussion**
  - Recommendations of this Review*
  - Conclusion*
- 24 **References**

*Given that nearly two billion people over the age of 60 will live on the earth by 2050, the challenge to governments and local communities to create age-friendly societies is real and imminent. Continuing research in human-companion animal interactions reveals both the extensive and therapeutic benefits to elderly people provided by pets and companion animals, and the associated positive social and economic influences for local communities and society as a whole.*



# Companion Animals and the Health of Older Persons

## Full Report

### Executive Summary

This review synthesises a wide body of literature concerning research into companion animals and the health of older persons. It is informed by a widely-held conviction among investigators that this research field has important implications for the future of societies and individuals. The human subjects of the research studies include older persons living independently and those in long-term care facilities, incorporating dementia sufferers and those with a psychiatric illness. Research foci include the physical, mental, emotional and social health of older people, as well as the role of animals in older people's perceptions of inclusion in their community, and the economic impact of animals interacting with older citizens. The animals used in these studies range from domestic pets (most commonly dogs and cats but including other mammals as well as aquatic life and birds) to those introduced into residential care facilities for animal-assisted activities or therapy. The studies are of definitively narrow scope or in the nature of a meta-analysis or review of current literature for the chosen research focus, such as dementia and depression.

*Researchers in this field have found a significant number of positive indicators for benefits to humans brought about by contact with animals, which are summarised in this review.*

The Overview establishes the review's aim and scope, and the Definition of Terms clarifies the framework of the report foci. After considering the historical human-animal relationship and the place of animals in present-day society, the review explores the gaps and limitations in current research and provides a summary of researcher recommendations for improvements in methodologies, to allow for more exact, verifiable and useful conclusions.

Notwithstanding the imperfections in the current body of research resulting from a paucity of well-constructed and precisely-controlled studies, researchers in this field have found a significant number of positive indicators for benefits to humans brought about by contact with animals, which are summarised in this review. These are balanced by consideration of the equivocal and negative findings of other research studies. The Discussion examines the way forward in this burgeoning research field, which has important implications for the health of older persons both at the individual level and in communities and societies facing a future of ever increasing numbers of older people. Recommendations of this review are included in the Discussion. The review concludes with a listing of References.



## Overview

The relationship between humans and animals has been documented throughout history, across cultures and around the globe. A growing body of literature involving human-animal studies highlights the importance of the human-animal bond and the increasing evidence of the health and social benefits of companion animals. Much of the research in this area focuses on specific age groups, such as children, or on specific conditions like diabetes and dementia. It also considers the effects of companion animals on young adults, families, prisoners, homeless people, people with HIV and people with mental health disorders, among others. The focus of this review in particular is companion animals and their effect on the health of older persons.

The global share of older people (aged 60 years and over) increased from 9.2 per cent in 1990 to 11.7 per cent in 2013 and will continue to grow as a large proportion of the world population, reaching 21.1 per cent by 2050. Globally, the number of older persons is expected to more than double, from 841 million people in 2013 to more than 2 billion in 2050 (UNDP, 2013). In light of these projections, there is a clear need for communities and governments to focus not only on policies of health and active ageing but also on creating environments that enable older people to remain in the community and to live healthier lives. In this context, companion animals and their impact on the health of older persons is a highly significant area of study.

The research area of therapeutic benefits of companion animals is attracting greater interest among health and social science

professionals (Fine, 2010; Baun & Johnson, 2011; Risley-Curtiss, 2010), and research and education programs at universities are developing, mainly in the United States. However, to date there appears to be little or no evaluation of such programs, as indicated in the literature.

A review of the research literature on companion animals and older people from 1980 to 2013 was conducted with a twofold aim: firstly, to summarise the health, social and economic benefits of companion animals and animal-assisted activities during interventions in the care of older adults as determined through research; and secondly, to use this summary to inform not only future research in the field but also aged care planning at local and national levels. It is hoped that this review may be of value to health and social system planners in government departments and local communities, as well as stimulating future research among animal health and human health care practitioners including veterinarians, doctors, nurses, gerontologists and social workers.

The review highlights both the perceived positive and negative aspects of human-animal interactions, specifically in the context of research about older adults. It considers research conducted among individual older people who live in their own homes and may or may not own a pet; older people living in residential aged care homes and long-term medical care facilities, both with or without a diagnosis of dementia, psychiatric disorder and/or depression; and older people admitted to hospitals or hospices for acute and chronic medical management.



This is an immensely large area of research, so it has been necessary to refine the focus of this review to include the influence of companion animals upon older people's physical, psychological and emotional health, sense of well-being, self-worth and purpose, social interactions and sense of belonging in the community, as well as other potential benefits to society such as 'social capital' and the economic impact on local and wider communities.

In this context, veterinary care for animals living with older people is of great importance in order to assure healthy pets and avoid pathogen transmission, thus ensuring mutual benefits for human and animal companions without a risk to the health of either one. The concept of 'one health' or 'one medicine' is significant in this context – see Definition of Terms.

## Definition of Terms

**Animal Welfare:** "An animal is in a good state of welfare if (as indicated by scientific evidence) it is healthy, comfortable, well-nourished, safe, able to express innate behaviour, and not suffering from unpleasant states such as pain, fear and distress. Ensuring animal welfare is a human responsibility that includes consideration for all aspects of animal well-being, including proper housing, management, nutrition, disease prevention and veterinary treatment, responsible care, humane handling and, when necessary, humane euthanasia" (American Veterinary Medical Association, 2014).

**Companion Animal:** coined from the animal welfare and veterinarian sector, refers to the co-dependent relationship of humans and other animals, and is variously defined as "mutuality of the human-animal relationship" (Walsh, 2009); "any non-human animal that shares its life with a human caregiver" (Chur-Hansen et al, 2010); "any domesticated, domestic-bred or wild-caught animals, permanently living in a community and kept by people for company, amusement, work (e.g. support for blind or deaf people, police or military dogs) or psychological support including dogs, cats, horses, rabbits, ferrets, guinea pigs, reptiles, birds and ornamental fish" (Companion Animals multisectorial interprofessional interdisciplinary strategic think tank on zoonoses [CALLISTO], 2014).



## **Health:**

**a) Human Health:** in the context of this review, the health of humans includes physical, psychological, emotional and social, and accords with the World Health Organization definition: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (World Health Organization [WHO], 1948).

**b) Animal Health:** the health of animals – in this context, companion animals – is defined by the term 'animal welfare' [above], and is especially determined by their physical – and emotional health, overseen by veterinary and pet owner care to assure the animal's good state of welfare.

**Older Person:** as noted in the Overview, broadly this term refers to people aged 65 years and older. However, some studies include people aged 60 years and over. It also needs to be considered that dementia sufferers living in long-term care facilities who have been participants in research studies may be slightly younger than 60 years of age.

**Animal-assisted Activities (AAA) and Animal-assisted Therapy (AAT):** a range of terms is used to describe these interventions, including pet therapy, pet-facilitated therapy, pet-assisted therapy, animal-facilitated therapy and animal visitation (Connor & Miller, 2000). Definitions for AAA and AAT provided by Pet Partners, USA are given here:

"AAA provide opportunities for motivational, educational, recreational, and/or therapeutic benefits to enhance quality of life.

AAA are delivered in a variety of environments by specially trained professionals, paraprofessionals, and/or volunteers, in association with animals that meet specific criteria."

"AAT is a goal-directed intervention in which an animal that meets specific criteria is an integral part of the treatment process. AAT is directed and/or delivered by a health/human service provider working within the scope of practice of his/her profession. AAT is designed to promote improvement in human physical, social, emotional, and/or cognitive functioning. AAT is provided in a variety of settings and may be group or individual in nature. This process is documented and evaluated."

AAT studies typically have explored the physiological, behavioural and/or psychosocial effects on individuals or groups of older people, of either adopting or being temporarily exposed to a pet. Souter and Miller (2007) note that while AAA and AAT are defined separately, their usage in practice often causes overlap between the two.

**Animal-assisted Interventions (AAI):** this term refers to any intervention in which an animal is deliberately integrated as part of a therapeutic or generally beneficial process in relation to a human being. AAI activities are usually non-specific; they include spontaneous or casual occasions when animals are brought to visit older people by relatives, friends or carers. The term also covers service animals, which have been trained to assist people with various aspects of functional living – such as 'seeing eye' dogs, and dogs or horses for people with a disability (Stern et al, 2011).

**Human-animal Bond:** also referred to as the ‘human-animal relationship’, defined as: “The human-animal bond is a mutually beneficial and dynamic relationship between people and animals that is influenced by behaviors considered essential to the health and well-being of both. The bond includes, but is not limited to emotional, psychological and physical interactions of people, animals and the environment. The veterinarian’s role in the human-animal bond is to maximize the potential of this relationship between people and animals and specifically to promote the health and well-being of both” (American Veterinary Medical Association [AVMA], 2014).

**One Health:** also referred to as ‘one medicine’, this concept “proposes the unification of the medical and veterinary professions with the establishment of collaborative ventures in clinical care, surveillance and control of cross-species disease, education, and research into disease pathogenesis, diagnosis, therapy and vaccination” (Committee on One Health, World Small Animal Veterinary Association [WSAVA], 2013).



## The Human-Animal Relationship

Researchers note that archaeological and genetic evidence suggests the existence of dogs and cats with humans as far back as 14,000 years ago, concurrent with the first permanent human settlements. While this early companion human-animal relationship is thought to have been a purely practical one – such as herding, control of rodents and other pests, and protection of the humans – it is thought that animal behavioural traits were selective determinants of breeding practices in order to promote human-animal companionship and attachment bonds (Virués-Ortega et al, 2012).

In modern times, the continuation of this companionship between humans and animals is clearly evident. In 2001 researchers noted that around half of British households own pets (Nafsted et al, 2001). In 2009, 172 million dogs and cats as pets were recorded in the USA (American Pet Products Association, 2009). In the same year, more than two-thirds of Australian households had a pet (Wood [ed], 2009). All sources note that most pet owners considered their pet to be an important member of the family. While the numbers of companion animals in different countries are generally incomplete, in 2008 researchers formed an estimate of 704 million companion animals – 432 million dogs and 272 million cats – worldwide (Batson, 2008).

Animal and bird species introduced into AALs with older people include dogs, cats, rabbits, aquatic life, birds and horses. Dogs and cats tend to be the most common, particularly the former, for reasons which shall be explored in the review.



### ***Animals as pets***

Studies have been conducted on the comparative health of pet owners and non-pet owners, both in relation to physical health and to their own perception of personal health and well-being (Headey, 1999; Pachana et al, 2005; Raina et al, 1999; reported in Virués-Ortega et al, 2012).

*In line with the growing momentum in some parts of the developed world to help older people live independently, volunteer and other community support programs have been introduced to assist with the care of the older person's pet or pets.*

Pets are also studied for their perceived companionship, physical contact and amelioration of stress and bereavement for older people (Raina et al, 1999). However, their owners may sometimes struggle to meet the pet's needs or access timely veterinary assistance. In line with the growing momentum in some parts of the developed world to help older people live independently, volunteer and other community support programs have been introduced to assist with the care of the older person's pet or pets. These programs play a significant role through cross-sectoral partnerships including geriatric services, animal welfare services, government agencies, recreational services, community support services and acute and long-term care facilities.

A study from the University of Western Australia (UWA) found that more than half of all dog owners and just under half of pet owners in general confirm that they meet people in their neighbourhood as a result of their pet; and more than 80 percent of dog owners talk to other people when out walking their dogs (Wood et al, 2005).


Referred to as 'social capital', this connectivity is shown to have positive effects on the community's sense of its own health as well as the fiscal health of a society (Australian Companion Animal Council, 2009). Based on this study, the Petcare Information and Advisory Services of Australia (PIAS) (2009) developed a handbook to assist communities to tap into the 'power of pets', describing this as an important role in plugging people back into the community through volunteering, exercising, and socially interacting with pets and people. PIAS used this handbook and other associated studies in a submission to review the Residential Tenancies Act (1995) by the Government of South Australia (2012), calling for changes to the Act which would prevent discrimination against tenants with socially responsible managed pets.

Aside from household pets, animals and humans enjoy relationships of mutual benefit – such as animals trained to assist farmers, people with a disability, the military and customs officers, as well as for hobby activities with children and adults alike. These, however, are not a focus of this study.

### ***Animals used in AAA and AAT studies***

Various animals have been introduced into residential care facilities for older people, either as residents or as regular visitors. These commonly include dogs, cats, rabbits, small rodents, birds and fish. Regular animal visitors to these facilities tend to be dogs, cats and rabbits, while some institutions have acquired them as residents (Baun & Johnson, 2010). Dogs are most commonly used as companion animals in this setting. This is thought to be because of their trainability, domestication from a young age, accessibility and predominantly friendly temperament (JBI, 2011). Studies in Japan and the USA on the effect of robotic and plush toy pet substitutes on dementia sufferers found that participants engaged more readily with the toy cat and dog than with the robotic pets, although the latter did cause a degree of positive response (Banks et al, 2008; Tamura et al, 2004).

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## **Research Findings: Positive Indicators**

Researchers in this field note the limitations to many studies resulting from weak designs with imprecise controls, and have articulated a number of gaps in the research. These factors will be discussed later in this review. Despite the limitations, a significant number of positive indicators exist, as summarised here:

### ***Physical health***

Friedmann et al (1980) found that outpatients of a cardiac care unit who were pet owners lived longer than non-pet owners. This pivotal research influenced a series of other health-related studies (Allen et al, 2001; Anderson et al, 1992; Friedmann et al, 1995; Garrity & Stallones, 1998; Koivusilta & Ojanlatva, 2006; Parker et al, 2010; Parslow & Jorm, 2003a, 2003b) with varying qualitative evidence to support the notion of positive benefits arising from companion animals.

*An Australian study on walkability reported that dog owners were more likely to achieve the recommended level of physical activity for their age group.*

The Anderson et al (1992) study of 5,741 participants attending a free screening clinic found that pet owners had significantly lower cholesterol and blood pressure levels than non-pet owners. Allen et al (2001) some ten years later conducted a randomised control study of stockbrokers with hypertension who adopted either a cat, dog or had no pet. The pet owners were found to experience less stress-related increase in blood pressure than non-pet owners.

A study from Canada found that older adults who were pet owners reported a slower deterioration of their ability to perform activities of daily living when compared with non-pet owners over a one-year period. Older adult pet owners also reported that their pets – particularly dogs – helped them stay active, as well as provided a structure and sense of purpose to their days (Raina et al, 1999).

Epidemiological studies comparing aspects of the health of pet owners and non-pet owners suggest that pet owners have better well-being and self-reported health; they visit the doctor less often and have less pharmaceutical expenditure (Headey, 1999; Pachana et al, 2005; Raina et al, 1999).

An Australian study on walkability reported that dog owners were more likely to achieve the recommended level of physical activity for their age group. Dog owners reported that their walking increased from 22 to 31 minutes per week after acquiring a dog (Cutt et al, 2008). Owning a dog does not always result in increased physical activity – Latino older people with a strong attachment to their pet dog do not necessarily take their pet out for walks (Johnson & Meadows, 2002). However, dogs have been shown to have a positive effect on owners' belief about walking, providing the motivation to increase physical activity (Rhodes et al, 2012).

An AAT research study conducted in the USA introduced fish tanks into the dining rooms of specialised Alzheimer's Disease (AD) units within residential care facilities, and 62 individuals with AD were monitored for nutritional intake over a 16-week period.

Subjects' nutritional intake increased significantly when the aquaria were introduced and continued to increase during the study, with a concomitant increase in their weight. Participants also required less nutritional supplementation, resulting in health care cost savings (Edwards & Beck, 2002). Reviewers conclude that this study indicates a potential for improving the physical health of residents with dementia as well as enabling financial savings in the longer term (Filan & Llewellyn-Jones, 2006).

### ***Mental / Psychological health***

Two literature reviews, one meta-analysis and one matched case-control trial of animal-assisted interventions for individuals living with dementia were of note (Filan & Llewellyn-Jones, 2006; Perkins et al, 2008; Virués-Ortega et al, 2012; Majíc et al, 2013) and represented common themes.

Filan and Llewellyn-Jones (2006) identified 11 studies that met their inclusion criteria for investigating the positive effect of AAT on people living with dementia and more specifically on the behavioural and psychological symptoms of dementia (BPSD). Six studies showed a marked reduction in agitation and aggression; four studies observed a positive impact on social behaviour; and one study examined the impact of AAs on the nutrition of older people. An additional two studies related to robots and substitutes for animals other than cats and dogs (Filan & Llewellyn-Jones, 2006).

The review conducted by Perkins et al (2008) critiqued and summarised nine studies focused on dog-assisted therapy for older adults with dementia in residential programs, six of which overlapped with the Filan and Llewellyn-Jones (2006) study. The programs reviewed primarily related to visiting animals, while one program concerned resident animals and another involved both resident and visiting animals. The most common observed effect of visiting animals was a decrease in agitation and aggressive behaviour and an increase in pro-social behaviour, such as alertness, increased frequency of touch, verbalisation and smiles. Each of these behaviours was observed to improve over time.

The meta-analysis conducted by Virués-Ortega et al (2012) compared the impact of AAT on older residents with and without cognitive impairments, such as dementia, as well as older residents of a psychiatric facility. Twenty-one studies were identified as meeting the inclusion criteria, ten studies related to older adults, five focused on older adults with dementia, and six studies involved psychiatric patients. Seven studies assessing social functioning found a largely beneficial effect of AAT, as well as statistically significant moderate improvements in disorders such as depression, anxiety and other behavioural disturbances.

*Higher rates of social contact were also noted among older people who were institutionalised.*

While little or no effect was observed for loneliness, daily living skills and cognitive ability, decreases in behavioural volatility and depression were observed in individuals suffering from dementia and/or depression and schizophrenia. Higher rates of social contact were also noted among older people who were institutionalised (Bernstein et al, 2000; Motomura et al, 2004; reported in Virués-Ortega, 2012). The matched case-control trial conducted by Majić et al (2013) in Germany among 75 patients from 18 nursing homes with severe or very severe dementia provided each participant in the intervention group with AAT with a dog once a week for up to 45 minutes. Results showed that symptoms of agitation or aggression and depression in the participants remained constant when AAT was combined with treatment as usual (TAU), but these same levels increased over time with TAU alone. The researchers concluded that although long-term effects could be difficult to measure because of the cognitive decline expected in dementia sufferers, AAT remains a potentially positive option for relieving symptoms and improving quality of life for older demented nursing home residents (Majić et al, 2013).

Filan and Llewellyn-Jones (2006) also observed that the effect of quiet company between humans and pet dogs lowers the person's blood pressure and increases the levels of neurochemicals linked to relaxation and bonding. They concluded that this indicates a positive potential for AAT in the treatment of behavioural and psychological symptoms of dementia.

### ***Emotional health and well-being***

A 2007 meta-analysis of the effectiveness of AAA in the treatment of depression found five randomly assigned control group studies published between 1984 and 2000 in which dogs were part of interventions in a hospital-based nursing home setting, a psychiatric hospital and three nursing homes. Four of the five studies examined showed 'significant improvements in depression' of residents from the pre- to post-test phases (Souter & Miller, 2007).

Banks and Banks (2002) conducted a small study including residents of a long-term care facility and found a reduction in loneliness scores among participants receiving AAT as compared with no AAT. To understand the intensity and duration of such interventions, residents were randomly assigned to three groups for a six-week program: (1) three 30-minute AAT sessions per week; (2) one 30-minute AAT; and (3) no AAT. Researchers reported firstly a significant reduction in loneliness in the AAT groups; somewhat surprisingly, the intervention was just as effective in the one 30-minute session as it was in the three sessions (Banks & Banks, 2002).

Researchers note strong evidence to the effect that companion animals are associated with increased self-esteem, life satisfaction, positive moods and lower levels of loneliness (El-Alayli et al, 2006). Animals are also seen to be beneficial for ameliorating depression in various groupings.

In a study of the effects of AAT on dementia sufferers with depressive symptoms, improvements in the symptoms of depression were found in both the intervention and control groups; however, the AAT group demonstrated a greater degree of reduction in these symptoms than the control group (Moretti et al, 2011). The use of AAT with dogs among hospitalised patients suffering from major depression was found to lessen anxiety (Hoffmann et al, 2009; Majić et al, 2013). While a 2011 study concluded that depressive symptoms in demented older subjects remained unaffected by AAA, investigators did find a reduction in scores of sadness in the Observed Emotion Rating Scale and an increase in participants' levels of pleasure and general alertness, equating an improvement in mood (Mossello et al, 2011; Majić et al, 2013). Souter and Miller's meta-analysis supports the effectiveness of AAA and, in one case, AAT, as an effective treatment for depression. The sample sizes were small; yet in combination they suggest that AAA/AAT can bring about a significant improvement in the depressive mood, as measured with a range of well-accepted instruments. They also conclude that AAA/AAT is unlikely to enable a dramatic decrease in depression but can create a noticeable degree of relief (Souter & Miller, 2007).

It is suggested that pets may have an important role to play in consoling older people through the bereavement period. A study of older people whose spouse had recently died showed that strong attachment to their pet mitigated depression (Garrity et al, 1989). Another study found a significant deterioration in the health of grieving widows who were non-pet owners as compared with pet owners (Bolin, 1987).



### ***Social and community health***

From a survey of 339 Australian residents, Woods et al (2005) reported that, in comparison with non-pet owners, those residents who owned a pet or pets rated their own health as 'very good' or 'excellent'; felt less lonely; appeared to have stronger support networks (especially in times of crisis); scored higher on social capital and civic engagement scales; had a greater perception of 'suburb friendliness'; were more likely to exchange favours with neighbours and to be involved in community issues. Investigators concluded that animals may be an integral part of creating a sense of community and belonging; they may increase and facilitate the use of public spaces, such as parks to walk dogs and play with animals; and they may act as enablers of social interaction and civic engagement (Wood [ed], 2009; Wood et al, 2007).

### ***Economic health***

Investigators estimated that cost savings for the year 2000 of companion animals as pets to the health care system was €5.59 billion in Germany and \$3.86 billion in Australia. The longitudinal study about pet ownership using a sample of about 10,000 German citizens at two intervals in 1996 and 2001 controlled for health status as well as demographic variables. Results showed that long-term pet owners and pet owners who acquired a pet in the last five years reported fewer doctor visits in the three months before interview. When compared with non-pet owners and those who no longer had a pet, the pet owner group accessed health services via the general practitioner approximately 10 percent less (Headey & Grabka, 2003).



## Research Findings: Equivocal and Negative Indicators

### *Physical health*

In contrast to other findings, Parker et al (2010) asserted that pet owners were more likely to die or to be readmitted to the hospital after a heart attack or unstable angina than non-pet owners, and that owners of cats experienced even higher morbidity than dog owners. In a large-scale survey of the Finnish population, researchers found pet ownership was associated with poorer perceived health and higher body mass index scores (Koivusilta & Ojanlatva, 2006).

In an attempt to replicate the 1992 Anderson et al study results, Parslow and Jorm (2003) conducted a community survey in Australia with a larger sample size but found no evidence that pet ownership is associated with cardiovascular health benefits. Older adults (individuals between the ages of 60 and 64 years) with pets appeared to have poorer mental and physical health and use more pain medication (Parslow et al, 2005). This study, containing a sample size of 2,551 older adults, also did not find a reduction in visits to the general practitioner within this age group of pet owners.

According to a number of researchers, the contrast in the results of these studies can be attributed to differences in community culture, human behaviours and relationships, socio-economic status and health, different pet populations and regimes of care, methodological variations, the lack of randomised data, and different approaches to data analysis (Wells & Rodi, 2000; Herzog, 2011; Siegel, 2011).

Notwithstanding these differences, the American Heart Association (AHA) published a scientific statement on pet ownership and cardiovascular (CVD) risk in 2013, in which it concluded that 'pet ownership, particularly dog ownership, is probably associated with a decrease in CVD risk' and 'may have some causal role in reducing CVD risk' (Levine et al, 2013).

Using the data from the Health, Aging and Body Composition (Health ABC) study, Thorpe et al (2006) found that older adults who are dog owners reported more walking and improved cardiovascular output. Yet there were no statistically significant associations between pet ownership and prevalence of health conditions, which could be explained by the nature of the sample size.

Barriers to maintaining companion animals or to introducing a pet into an older person's life include suggestions that older people will neglect their own health care, avoid seeking medical care or resist medical advice because of their companion animal (McNicolas et al, 2005). Researchers have estimated that up to 70 percent of pet owners ignore advice to find another home for their pet because of allergies (Anderson et al, 1992), and report that older people avoid medical attention because they fear admission to hospital or residential care, which would mean handing their pet on to someone else (Raina et al, 1999) – or the greater fear that their pet will be put down.

A Scandinavian study showed that cat owners had higher body mass index values and higher systolic blood pressure readings than both dog owners and non-pet owners, and exercised less frequently than both other groups (Enmarker et al, 2012). A study conducted in the Netherlands among a group of older people with a chronic illness or disability concluded that dog owners were more likely to exercise than non-pet owners, and cat owners were less likely to exercise. They also found that cat owners were more likely to access ambulatory mental health care services compared to non-cat owners, while noting the lack of evidence that older cat owners have lower psychological health than those who do not have a cat (Rijken & Beek, 2011).

### ***Mental and psychological health***

Some research indicates that AAA and AAT have little impact. For example, one study concluded that there were no significant differences between a pet therapy group and an exercise control group when participants were observed for self-care, level of orientation or disorientation, and demonstrated symptoms of depression, anxiety, irritability or social withdrawal (Zisselman et al, 1996). Another study indicated no directly beneficial effects of AAA although participants did demonstrate more measurable purposeful behaviour during the AAA session (Jendro et al, 1984). Other studies report mixed findings in terms of the demonstrated effectiveness of AAA and AAT (Harris et al, 1993; Batson et al, 1998; reported in Souter & Miller, 2007).

### ***Emotional health and well-being***

A study of loneliness and depression among older cat and dog owners in Canada found that dog owners with a significant amount of human support reported less loneliness than non-pet owners and cat owners. In contrast, dog owners with lower levels of human interaction and support experienced comparable loneliness and depression to both cat owners and non-pet owners. The researchers noted the limitations in their study caused in part by a much smaller number of cat owners than dog owners. They recommended future longitudinal studies of cat and dog owners separately, with a new measure of loneliness to gauge the impact of pet ownership on individuals' well-being (Duvall Antonacopoulos & Pychyl, 2010).



## Limitations and Gaps in Current Research Methodologies

Research findings that human–companion animal interactions are beneficial tend to be predicated on anecdotal evidence and scant qualitative and quantitative data (Chur-Hansen et al, 2010). Although it may be true in many instances that the companionship between animal and human is beneficial to one or more aspects of the older person’s health, clear evidence is lacking. Many claims are founded on descriptive and anecdotal findings in cross-sectional designs, and studies are often poorly-constructed and poorly-controlled with weakness in the study design (Chur-Hansen et al, 2010; Filan & Llewellyn-Jones, 2006; Jendro et al, 1984; Perkins et al, 2008; Souter & Miller, 2007; Virués-Ortega et al, 2012). As a result, an understanding of the mechanisms by which older people may benefit from animal companions is unclear, and research conclusions about whether or for whom companion animal ownership may be beneficial cannot be drawn with confidence (Chur-Hansen et al, 2010).

*Recommendations for research in these areas are noted in the Discussion Section of the review.*

A number of potentially confounding variables have not been included in research, and lack of detail is evident, hindering verifiable conclusions and comparisons with similar research. These include, but are not limited to:

Confounding variables in the human-animal interactions that are largely unaccounted for in current research include potential bias or blinding resulting from the influence of other humans involved in the research – such as the animal handler and investigator as well as those who act as proxies for the study participants – for example, in interactions between animals and dementia sufferers (Chur-Hansen et al, 2010; Filan & Llewellyn Jones, 2006; Perelle & Granville, 1993; Perkins et al, 2008; Souter & Miller, 2007).

In dog-assisted therapy for older people with dementia, several gaps and limitations were noted: a lack of necessary detail about the dogs used – their sex, neutering status, age, breed/type, colour and so forth; failure to report whether the participants were being treated with behaviour-modifying medications – e.g. anticholinesterase inhibitors and antidepressants, which could influence responses to external stimuli such as an animal visitor or resident; and a lack of precise psychometric instruments for people with dementia to measure the effects of dog contact, to inform outcomes and to better understand the theoretical basis for dog-assisted therapy and activity (Perkins et al, 2008; Chur-Hansen et al, 2010).

Another limitation is the lack of accounting for the relative benefits of pet dogs that live on the premises versus those that visit residents. Current research data is confounded by the positive effect of pet interaction on staff or caregivers. For example, whereas visiting dogs are encouraged to interact with the residents, an animal which lives in the facility may choose to spend most time with staff and/or a few of the residents (McCabe et al, 2002; Winkler et al, 1989; Filan & Llewellyn-Jones, 2006).

Another limitation is the lack of research into the possible economic benefits of companion animals and AAls. This area of the research suffers from a lack of systematic comparative studies (Stern et al, 2011). This review notes several other research gaps and limitations, listed below. Recommendations for research in these areas are noted in the Discussion section of the review.

- a) Lack of research studies involving veterinarians, whose professional expertise and frequent interactions with pet owners make them well-placed to be included in studies on the effect of companion animals on older people's attachment, affection and bonding capacities, their well-being and social capital. An example of veterinarian interest and expertise in the subject of companion animals is the Australian Veterinary Association's online resource, Centre for Companion Animals in the Community, which offers the public authoritative information and advice on companion animal management and related issues. Veterinarians have to be included in studies addressing the risk- benefit balance between animals as perceived disease carriers compared to the positive effect of their companionship for older people whose lives may be otherwise diminished by loss and decreasing capabilities.
- b) The impact on pathogens potentially transmitted between pets and humans, especially vector-borne diseases and other zoonotic diseases, needs to be investigated in more depth. Research data is needed to formulate advice and guidelines on disease and zoonosis prevention between older people and pets, along the lines of existing guidelines for specific risk groups such as HIV-infected people (Brown et al, 2003; Kaplan et al, 2002).
- c) A notable limitation to the research into economic benefits of companion animals is the focus on health services usage only – such as the time spent by older people seeking medical intervention, and the money they spend on medicines.
- d) Studies considering the impact on older people of the physical health and temperament (or personality) of the animal with whom they interact are scarce.
- e) Geographical representation and cultural gaps exist in the literature. Much of the published research has been conducted in the United States, Canada, Europe and Australia. Aside from a few descriptive and qualitative studies focused on older adults from different cultures (such as Risley-Curtiss, 2006), the extent to which older adults from different cultural groups may benefit from companion animals and AAls is unclear. Research is similarly lacking into AAAs among older people of different ethnic origins who live alongside each other in long-term care facilities in multicultural communities.






## Investigator Recommendations for Improvement

Meta-analysts and reviewers alike note the shortcomings in the current body of research, which serve to prevent scientifically verifiable conclusions – as discussed in the previous section. In order to allow for progress in this important field of research by clarifying both the positive and negative indicator findings to date, the following recommendations have been posited by the researchers themselves. In general terms, they recommend:

- a)** Randomised, double-blind (wherever possible) controlled trials with moderate to large sample sizes.
- b)** Instruments of measurement should be standard and inclusive of many variables, including (but not limited to) the location of the AAA, details of the humans (participants and others such as staff and animal handlers) and the animals, how often the interventions occur, how long the visits last, and the nature of the interaction.
- c)** Open-ended qualitative research conducted without prior assumptions, and free from any potential for experimenter, observer or participant bias.
- d)** Intervention studies with adequate longitudinal follow-ups.
- e)** Studies into the 'health' of older persons should encompass physical, psychological, emotional and social / community health, employing appropriate tools of objective measurement in addition to self-report and questionnaires.
- f)** There is a need for a more sophisticated psychometric scale with which to chart the bond of attachment between humans and animals.
- g)** Comparisons of individual versus group interactions.

Investigators studying particular groups of older people, such as those suffering from dementia or depression, and/or studying one species of animal only, such as dogs, make the following recommendations:

- a)** Inclusion of account variables, such as other forms of social interactions available to the older people in the study, how much leisure time they have, their level of financial independence, their previous (positive or negative) relationship with animals, and the emotional bond they have with their animal (Chur-Hansen et al, 2010; Baun & Johnson, 2010).
- b)** When studying older people with psychiatric disorders, research should be structured to prioritise facilitated animal-human interactions rather than observation of spontaneous interactions; there should be more attention given to individual rather than group-based interventions; and studies should focus more on the duration of AAT than on its intensity (Virués-Ortega et al, 2012).

- c) Studies of the effect of companion animals on the mood of the depressed older people need an accepted model of the measurement of psychological well-being, as well as inclusion of measurement of the sense of self-worth and purpose generated by caring responsibilities, increase in social contacts and sense of being needed (Chur-Hansen et al, 2010).
  - d) In residential facilities to which companion animals (commonly dogs) are introduced, more specific parameters are necessary for studies to be conclusive. These include:
    - o the sex of the dog and its neutering status, age, breed, background, training, temperament, health and behaviour record;
    - o measurement of the therapeutic and recreational goals and programs of the older residents in the facility as well as the facility's ability to support AAT or AAA;
    - o inclusion of details regarding participants' premorbid relationship with dogs;
    - o inclusion of the variables of behaviour-modifying medication;
    - o functional differences between facilities, including the relationship of the companion animals with the staff;
    - o studies featuring the therapist alone as the control condition, to overcome the potential for bias from human-human contact in the AAT interaction; and
    - o usage of self-report instruments designed to measure outcomes of animal contact for people with mild to moderate levels of dementia, who can be relied upon to complete some self-report instruments and to state their preferences (Perkins et al, 2008).
  - e) To measure the health benefits of human-animal interactions, objective measures should be employed. These include pedometers to measure how many steps the research subject takes, salivary cotinine as an indicator of smoking, and professional measurements of mobility and fitness. Reliable standardised health and psychological well-being measures are available and have demonstrated efficacy: these include self-report in combination with physiological measurements of, for example, blood pressure, body mass index and salivary cortisol (Chur-Hansen et al, 2010).
  - f) Investigators should also explore the human social supports that pet owners have, and carry out studies on pet owners with a strong attachment to their companion animal that tends to exclude human relationships. They should also consider the reasons behind this level of attachment to the companion animal (Chur-Hansen et al, 2010).
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## Discussion

It is widely acknowledged that research in this field is sparse and often limited in its rigour, rendering current data inconclusive. It is equally widely stated by researchers that more time and energy should be directed towards this important field of research, as there is considerable positive potential for health benefits affecting both individual older people and their community or society. In this section, some promising initiatives are explored and recommendations for future research projects are presented.

Research into AAA and AAT is viewed in the literature as an emerging field of investigation to support an improved quality of life for older people, both independently and in institutionalised settings. It is considered easier to implement controls for the different variables when researching the benefits of AAls in care facilities compared to research on pet ownership in the general population. Nonetheless, several programs exist which enable older people to keep and care for their companion animal. The following provide a sample of existing programs and projects in community, health and residential settings:

Paws Houston, a volunteer-run program in Houston, Texas, aims to sustain relationships between pet owners and their pets through a period of the owner's terminal and/or chronic illness in hospital, hospice and at home (Paws Houston, n.d.).

The TigerPlace Pet Initiative (TiPPI) in Missouri is a collaborative program between the University of Missouri and TigerPlace, a 32-apartment retirement facility which provides for older people to live in a homelike setting with their pet.

Veterinary and nursing students visit three times weekly to walk pets, clean litter boxes and provide other services, and a retired veterinarian visits monthly to conduct a wellness check on the pets (Baun & Johnson, 2010).

The Dementia Dog Project in Scotland, UK places trained dogs with people in the early phases of dementia who live with a full-time career. The dogs provide support with daily living routines, such as waking, eating, exercising and going to the toilet; they offer reminders, such as prompts to take medicine, drink fluids and other user-identified regular tasks; and they provide constant companionship, to reassure the older person in a new and unfamiliar situation (Dementia Dog Project, n.d.).

Through the Pet Companion Program in Victoria, Australia funded by the Department of Human Services, volunteers visit older people and those with a disability in their own homes to help them care for their pet, such as dog walking, pet bathing and grooming, and to transport clients and pets to veterinary visits (Wood [ed.], 2009, 47).

Also in Australia, the 'Pets of Older Persons (POOPs)' program in New South Wales, a collaboration between St Joseph's Hospital staff and the RSPCA NSW, caters to pet owners in palliative care and those over 65 without family members to support them. This program offers routine care of pets, veterinary attention, emergency boarding of pets or foster care, and RSPCA-facilitated re-homing of pets when required (Wood [ed.], 2009, 55).

***Recommendation 1:***

Some of these programs provide clinical education and training in addition to practical support for the older people and their pets (Walsh, 2009). Programs such as these could become the focus of future research on the health and social benefits of AAls, to include the perspective of both health care practitioners for the humans in the project – nurses, physiotherapists, social workers, occupational therapists – as well as for the animals – veterinarians and veterinary nurses.

Animals visiting and living in retirement residences and long-term care facilities are increasingly prevalent in developed countries. The role of the health care practitioner – of both humans and animals – is critical, and is under-represented in current research, particularly veterinarians and veterinary nurses. The personal history and significance of companion animals in the lives of their clients is of fundamental importance to an assessment of need, the effectiveness of an AAI, and the advantageous or adverse impact upon the attention that the client gives to their own health.

***Recommendation 2:***

Studies involving veterinarians and veterinary nurses should be conducted – as, for example, standardised questionnaires and/or interviews covering perceptions of attachment and bonding, health care attention and prioritisation, as well as self-reported and observed impact of companion animals on older people's psychological and emotional health.

***Recommendation 3:***

Complementary research is needed into the risk versus advantage (fact and perception) of animals as perceived carriers of pathogens transmitting diseases that may adversely affect the health of older people. In addition, the health risks of the animals need to be taken into account, to assure the mutual benefit of the human-animal companion relationship and to ensure that animals are able to fulfil their companion role. This research needs to involve veterinarians and should examine data for actual infectivity rates as well as perceived risk of disease. This perceived risk needs to be compared with the demonstrated and perceived advantages of having a pet for older people's mental, emotional and social health – such as increased well-being, sense of purpose and social interactivity.

***Recommendation 4:***

Research into the influence of the animal's health upon the interaction between companion animal and the older person would be valuable, to explore the impact of AAls involving young, healthy animals with full vitality in comparison with other studies using older animals with age-related behaviours, such as slower responses and the need for more resting periods. Animal handlers and veterinarians should be included in these studies.

**Recommendation 5:**

Current research into the efficacy or otherwise of AAls comes from a limited number of geographical areas – Europe, UK, Australia, Canada, and the USA. Research on the impact of companion animals and AAls in developing countries is needed, as well as studies of attitudes towards companion animals among various cultural groups in modern, multicultural societies. This research is necessary to inform programs and protocols for the inclusion of AAls in long-term care facilities whose residents may have significantly different ethnic origins, which may impact upon their individual responses to the introduction of AAAs and AATs.

While some key studies have attempted to put a dollar value on companion animals, measured impact is not yet well explained and any findings tend to be anecdotal. When stratified by age, researchers were not able to find satisfactory age-specific determinations of cost savings to the system for older adults with companion animals. A notable limitation is the focus on health services usage alone, specifically whether older people with companion animals spend less money on medicines and make fewer visits to the doctor (Headley et al, 2002).

*Improvements in the precision, quality and rigour of research methodologies will undoubtedly enable significant progress to be made in this important field of research, and are therefore strongly recommended.*

**Recommendation 6:**

More complex socio-economic models of services and delivery that have so far been overlooked – for example gender, urban versus rural, cultural and other variants in living arrangements – should be factors in future research into the economic effects of companion animal programs. This area of study has the potential to bring beneficial changes to professional protocols and practices and to influence healthy ageing policy development. In societies with increasing numbers of older people, further research is therefore critical for the development and evaluation of new policies and programs at a fiscal, governmental level.

**Conclusion**

Improvements in the precision, quality and rigour of research methodologies will undoubtedly enable significant progress to be made in this important field of research, and are therefore strongly recommended. Any practical, truly useful evaluation of ways in which the well-being of older people in the community can be enhanced requires a deepening of the exploration into their relationships, including those with companion animals.

Furthermore, advances in the creation of age-friendly societies, such as those brought about by facilitating positive interactions between older citizens and animals, can only have a positive influence upon the health of society as a whole.



## References

- Allen K, Blascovich J and Mendes WB (2002). Cardiovascular Reactivity and the Presence of Pets, Friends, and Spouses: The truth about cats and dogs. *Psychosomatic Medicine*, 64 (5): 727–739. USA.
- Allen K, Shykoff BE and Izzo JL Jr (2001). Pet Ownership, but not ACE Inhibitor Therapy, Blunts Home Blood Pressure Responses to Mental Stress. *Hypertension* 38: 815–820. USA.
- Alzheimer Disease International [ADI] (2009). World Alzheimer Report. [www.alz.co.uk/research/files/WorldAlzheimerReport.pdf](http://www.alz.co.uk/research/files/WorldAlzheimerReport.pdf)
- American Pet Products Manufacturers Association [APPMA] (2003). National Pet Owners Survey. [www.americanpetproducts.org/pubs\\_survey.asp](http://www.americanpetproducts.org/pubs_survey.asp)
- American Veterinary Medical Association (AVMA) (2014). [www.avma.org/kb/resources/reference/animalwelfare/pages/default.aspx](http://www.avma.org/kb/resources/reference/animalwelfare/pages/default.aspx); [www.avma.org/KB/Policies/Pages/The-Human-Animal-Bond.aspx](http://www.avma.org/KB/Policies/Pages/The-Human-Animal-Bond.aspx)
- Anderson WP, Reid CM and Jennings GL (1992). Pet Ownership and Risk Factors for Cardiovascular Disease. *Medical Journal of Australia* 157: 298-301.
- Australian Companion Animal Council Inc (n.d.). Dogs in Society Position Paper: Health and social benefits of dog ownership.
- Australian Companion Animal Council Inc (2009). The Power of Pets: The benefits of companion animal ownership.
- Australian Veterinary Association Centre for Companion Animals in the Community (2014). [www.ccac.net.au](http://www.ccac.net.au)
- Banks MR, Willoughby LM and Banks WA (2008). Animal-Assisted Therapy and Loneliness in Nursing Homes: Use of robotic versus living dogs. *Jamda* 9 (3): 173-177. USA.
- Banks MR and Banks WA (2005). The Effects of Group and Individual Animal-Assisted Therapy on Loneliness in Residents of Long-term Care Facilities. *Anthrozoös: A Multi-disciplinary journal of the interactions of people and animals* 18 (4): 396-408. USA.
- Banks MR and Banks WA (2002). The Effects of Animal-Assisted Therapy on Loneliness in an Elderly Population in Long-Term Care Facilities. *The Journals of Gerontology* 57 (7): 428 – 432. USA.
- Barker SB and Wolen AR (2008). The benefits of Human-Companion Animal Interaction: A review. *Journal of Veterinary Medical Education* 35: 487–495.
- Batson A. (2008). Global Companion Animal Ownership and Trade: Project Summary. World Society for the Protection of Animals. [www.wspa-international.org](http://www.wspa-international.org)
- Batson K, McCabe B, Baun M and Wilson C (1998). The Effect of a Therapy Dog on Socialization and Physiological Indicators of Stress in Persons Diagnosed with Alzheimer's Disease, in CC Wilson and DC Turner (eds), *Companion Animals in Human Health*. Sage Publications (Thousand Oaks, CA). USA.
- Baun M and Johnson R (2010). Human/Animal Interaction and Successful Aging, chapter in Fine AH [ed.], *Handbook on Animal-Assisted Therapy* (3rd ed.), 283-300.
- Bernstein PL, Friedmann E and Malaspina A (2000). Animal-Assisted Therapy Enhances Resident Social Interaction and Initiation in Long-term Care Facilities. *Anthrozoös* 13 (4): 213-224. USA.
- Bolin, SE (1987). The Effects of Companion Animals during Conjugal Bereavement. *Anthrozoös* 1 (1): 26-35. USA.
- Brown RR, Elston TH, Evans L, Glaser C, Gullledge ML, Jarboe L, Lappin MR and Marcus LC (2003). Feline Zoonoses Guidelines from the American Association of Feline Practitioners. *Compendium on Continuing Education for the Practicing Veterinarian* 25: 936-965.
- Companion Animals multisectorial interprofessional Interdisciplinary Strategic Think tank On zoonoses [CALLISTO] (2014). [www.callistoproject.eu](http://www.callistoproject.eu)
- Castelli P, Hart LA and Zasloff RL (2001). Companion Cats and the Social Support Systems of Men with AIDS. *Psychological Reports* 89(1): 177-87. USA.
- Chur-Hansen A, Stern C and Winefield H (2010). Gaps in the Evidence about Companion Animals and Human Health: Some suggestions for progress. *International Journal of Evidence Based Healthcare* 8(3):140-6.

- Connor K and Miller J (2000). Animal-Assisted Therapy for Children with Pervasive Developmental Disorders. *Western Journal of Nursing Research* 24: 657-670. USA.
- Cutt HE, Knuiman MW and Giles-Corti B (2008). Does Getting a Dog Increase Recreational Walking? *International Journal of Behavioral Nutrition and Physical Activity* 5:17. Australia.
- Cutt HE, Giles-Corti B, Knuiman MW and Burke V (2007). Dog Ownership, Health and Physical Activity: A critical review of the literature. *Health & Place* 13(1):261-72.
- Dembicki D and Anderson J (1996). Pet Ownership may be a Factor in Improved Health of the Elderly. *Journal of Nutrition for the Elderly* 15 (3): 15-31.
- Dementia Dog Project UK (2014). [www.dementiadog.org/index.html](http://www.dementiadog.org/index.html)
- Duvall Antonacopoulos NM and Pychyl TA (2010). An Examination of the Potential Role of Pet Ownership, Human Social Support and Pet Attachment in Psychological Health of Individuals Living Alone. *Anthrozoös* 23 (1): 37-54. Canada.
- Edwards NE and Beck AM (2002). Animal-Assisted Therapy and Nutrition in Alzheimer's Disease. *Western Journal of Nursing Research* 24(6): 697-712. USA.
- El-Alayli A, Lystad AL, Webb SR, Hollingsworth SL and Ciolli JL (2006). Reigning Cats and Dogs: A pet-enhancement bias and its link to pet attachment, pet-self similarity, self-enhancement, and well-being. *Journal of Basic and Applied Social Psychology* 28 (2): 131-143. USA.
- Endenburg N and van Lith HA (2011). The Influence of Animals on the Development of Children. *The Veterinary Journal* 190 (2): 208-14. UK.
- Enmarker I, Hellzén O, Ekker K and Berg AG (2012). Health in Older Cat and Dog Owners: The Nord-Trøndelag Health Study (HUNT)-3 Study. *Scandinavian Journal of Public Health* 40 (8): 718-24.
- Filan, SL and Llewellyn-Jones RH (2006). Animal-Assisted Therapy for Dementia: A review of the literature. *International Psychogeriatrics* 18 (4): 597-611.
- Fine, AH [ed.] (2010). *Handbook on Animal-Assisted Therapy: Theoretical foundations and guidelines for practice* (3rd ed.). San Diego, CA: Academic Press.
- Friedmann E and Thomas SA (1995). Pet Ownership, Social Support, and One-year Survival after Acute Myocardial Infarction in the Cardiac Arrhythmia Suppression Trial (CAST). *American Journal of Cardiology* 76 (17): 1213-1217. USA.
- Friedmann E, Katcher AH, Lynch JJ and Thomas SA (1980). Animal Companions and One-year Survival of Patients after Discharge from a Coronary Care Unit. *Public Health Reports* 95 (4): 307-312. USA.
- Garrity TF and Stallones L (1998). Effects of Pet Contact on Human Well-being: Review of recent research, in CC Wilson and DC Turner (eds), *Companion Animals in Human Health*. Sage Publications (Thousand Oaks, CA). USA.
- Garrity TF, Stallones L, Marx MB and Johnson TP (1989). Pet Ownership and Attachment as Supportive Factors in the Health of the Elderly. *Anthrozoös* 3 (1): 35-44.
- Harris M, Rinehart J and Gerstman J (1993). Animal-Assisted Therapy for the Homebound Elderly. *Holistic Nursing Practice* 8 (1): 27-37. USA.
- Hart, L (2010). Positive Effects of Animals for Psychosocially Vulnerable People: A turning point in delivery, chapter in Fine AH [ed.], *Handbook on Animal-Assisted Therapy* (3rd ed.), 59-84. USA.
- Headey B and Grabka M (2003). Pet Ownership is Good for your Health and Saves Public Expenditure Too: Australian and German longitudinal evidence. *Australian Social Monitor* 4: 93-99.
- Headey B (1999). Health Benefits and Health Cost Savings due to Pets: Preliminary estimates from an Australian national survey. *Social Indicators Research* 47 (2): 233-243.
- Hoffmann AOM, Lee AH, Wertenaue F, Ricken R, Jansen JJ, Gallinat J and Lang UE (2009). Dog-assisted Intervention Significantly Reduces Anxiety in Hospitalized Patients with Major Depression. *European Journal of Integrative Medicine* 1 (3): 145-148. Germany.
- Herzog H (2011). The Impact of Pets on Human Health and Psychological Well-Being: Fact, fiction, or hypothesis? *Current Directions in Psychological Science* 20 (4): 236-239.
- Irvine L (2013). Animals as Lifechangers and Lifesavers: Pets in the redemption narratives of homeless people. *Journal of Contemporary Ethnography* 42 (1): 3-30. USA.

Jendro C, Watson C and Quigely J (1984). The Effects of Pets on the Chronically-ill Elderly, in Anderson RK, Hart BL and Hart LA [eds], *The Pet Connection: Its influence on our health and quality of life*, USA: Minneapolis. 416-422.

Joanna Briggs Institute [JBI] (2011). 'Canine-Assisted Activities (CAAs) for Older People Residing in Long-term Care', Best Practice: Evidence-based information sheets for health professionals. 15(13): 1-4. Australia.

Johnson RA and Meadows RL (2002). Older Latinos, Pets, and Health. *Western Journal of Nursing Research* 24 (6): 609-620. USA.

Kaplan JE, Massur H and Holmes KK (2002). Guidelines for Preventing Opportunistic Infections among HIV-infected Persons. *Morbidity and Mortality Weekly Report* 51 (RR08): 1-46.

Knight S and Edwards VJ (2008). In the Company of Wolves: The physical, social, and psychological benefits of dog ownership. *Journal of Aging and Health* 20, 437-455.

Knisely JS, Barker SB and Barker RT (2012). Research on Benefits of Canine-assisted Therapy for Adults in Nonmilitary Settings. *The United States Army Medical Department Journal* Apr-Jun: 30-37.

Koivusilta LK and Ojanlatva A (2006). To Have or Not to Have a Pet for Better Health? *Plos*. Finland.

Krause-Parello CA (2008). The Mediating Effect of Pet Attachment Support between Loneliness and General Health in Older Females Living in the Community. *Journal of Community Health Nursing* 25 (1): 1-14. USA.

Kruger KA and Serpell JA (2010). Animal-Assisted Interventions in Mental Health: Definitions and theoretical foundations, chapter in Fine AH [ed.], *Handbook on Animal-Assisted Therapy* (3rd ed.), 33-48.

Levine GN, Allen K, Braun LT, Christian HE, Friedmann E, Taubert KA, Thomas SA, Wells DL and Lange RA (2013). Pet Ownership and Cardiovascular Risk: A scientific statement from the American Heart Association. *Circulation* 127: 2353-2363. USA.

Majíc T, Gutzmann H, Heinz A, Lang UE and Rapp MA (2013). Animal-Assisted Therapy and Agitation and Depression in Nursing Home Residents with Dementia: A matched case-control trial. *American Journal of Geriatric Psychiatry* 21 [Nov]: 1052-1059. Germany.

McCabe BW, Baun M, Speich D and Agrawal S (2002). Resident Dog in the Alzheimer's Special Care Unit. *Western Journal of Nursing Research* 24 (6): 684-696. USA.

McNicholas J, Gilbey A, Rennie A, Ahmedzai S, Dono JA and Omerod E (2005). Pet Ownership and Human Health: A brief overview of evidence and issues. *British Medical Journal* 331, 1252-1254.

Miltiades H and Shearer J (2011). Attachment to Pet Dogs and Depression in Rural Older Adults. *Anthrozoös* 24 (2): 147-154. USA.

Moretti F, de Ronchi D, Bernabei V, Marchetti L, Ferrari B, Forlani C, Negretti F, Sacchetti C and Atti AR (2011). Pet Therapy in Elderly Patients with Mental Illness. *Psychogeriatrics* 11 (2): 125-129. Italy.

Mossello E, Ridolfi A, Mello AM, Lorenzini G, Mugnai F, Piccini C, Barone D, Peruzzi A, Masotti G and Marchionni N (2011). Animal-Assisted Activity and Emotional Status of Patients with Alzheimer's Disease in Day Care. *International Psychogeriatrics* 23 (6): 899-905. Italy.

Motomura N, Yagi T and Ohyama H (2004). Animal-Assisted Therapy for People with Dementia. *Psychogeriatrics* 4 (2): 40-42. Japan.

Nafsted P, Magnus P, Gaader PI and Jaakola JJK (2001). Exposure to Pets and Atopy-related Diseases in the First 4 Years of Life. *Allergy* 56: 307-12. Norway.

Nimer J and Lundahl B (2007). Animal-Assisted Therapy: A meta-analysis. *Anthrozoös* 20 (3): 225-238.

Norris PA, Shinew KJ, Chick G and Beck AM (1999). Retirement, Life Satisfaction, and Leisure Services: The pet connection. *Journal of Park and Recreation Administration* 17(2): 65-83. USA.

Ondendaal SJ and Meintjes R (2003). Neurophysiological Correlates of Affiliative Behavior between Humans and Dogs. *Veterinary Journal*, 165, 296-301. South Africa.

Pachana NA, Ford JH, Andrew B and Dobson AJ (2005). Relations between Companion Animals and Self-reported Health in Older Women: Cause, effect or artifact? *International Journal of Behavioral Medicine* 12 (2), 102-110. Australia.

Parker GB, Gayed A, Owen CA, Hyett MP, Hilton TM and Heruc GA (2010). Survival Following an Acute Coronary Syndrome: A pet theory put to the test. *Acta Psychiatrica Scandinavica* 121 (1), 65-70. Australia.

- Parslow RA and Jorm AF (2003a). Pet Ownership and Risk Factors for Cardiovascular Disease: Another look. *Medical Journal of Australia* 179: 466–468.
- Parslow RA and Jorm AF (2003b). The Impact of Pet Ownership on Health and Health Service Use: Results from a community sample of Australians aged 40 to 44 years. *Anthrozoös* 16 (1): 43–56.
- Parslow RA, Jorm AF, Christensen H, Rodgers B and Jacomb P (2005). Pet Ownership and Health in Older Adults: Findings from a survey of 2,551 community-based Australians aged 60–64. *Gerontology* 51 (1): 40–47.
- Paws Houston, USA (2014). [www.pawshouston.org/public/pag1.aspx](http://www.pawshouston.org/public/pag1.aspx)
- Perelle IB and Granville DA (1993). Assessment of the Effectiveness of a Pet Facilitated Therapy Program in a Nursing Home Setting. *Society and Animals* 1 (1): 91-100. USA.
- Perkins J, Bartlett H, Travers C and Rand J (2008). Dog-Assisted Therapy for Older People with Dementia: A review. *Australasian Journal on Ageing* 27 (4): 177–82.
- Pet Partners (n.d.). [www.petpartners.org/Page.aspx?pid=319](http://www.petpartners.org/Page.aspx?pid=319) (definition of AAA); [www.petpartners.org/page.aspx?pid=320](http://www.petpartners.org/page.aspx?pid=320) (definition of AAT). USA.
- Prosser L, Townsend M and Staiger P (2008). Older People's Relationships with Companion Animals: A pilot study. *Nursing Older People* 20 (3): 29-32. Australia.
- Raina P, Waltner-Toews D, Bonnett B, Woodward C and Abernathy T (1999). Influence of Companion Animals on the Physical and Psychological Health of Older People: An analysis of a one-year longitudinal study. *Journal of the American Geriatric Society* 47 (3), 323–329. Canada.
- Rhodes RE, Murray H, Temple VA, Tuokko H and Higgins JW (2012). Pilot Study of a Dog Walking Randomized Intervention: Effects of a focus on canine exercise. *Preventive Medicine* 54 (5): 309–12. Canada.
- Rijken M and van Beek S (2011). About Cats and Dogs ... Reconsidering the relationship between pet ownership and health related outcomes in community-dwelling elderly. *Social Indicators Research* 102 (3): 373-388. The Netherlands.
- Risley-Curtiss C (2010). Social Work Practitioners and the Human-Companion Animal Bond: A national study. *Social Work* 55 (1): 38-46. USA.
- Risley-Curtiss C, Holley LC and Wolf S (2006). The Animal-Human Bond and Ethnic Diversity. *Social Work* 51: 257-268. USA.
- Scheibeck R, Pallauf M, Stellwag C and Seeberger B (2011). Elderly People in Many Respects Benefit from Interaction with Dogs. *European Journal of Medical Research* 16 (12): 557-563. Austria.
- Siegel JM (2011). Pet Ownership and Health, chapter in Blazina C, Boyra G and Shen-Miller D (eds), *The Psychology of the Human-Animal Bond* 167-177. USA.
- Siegel JM, Angulo FJ, Detels R, Wesch J and Mullen A (1999). AIDS Diagnosis and Depression in the Multicenter AIDS Cohort Study: The ameliorating impact of pet ownership. *AIDS Care: Psychological and Socio-medical Aspects of AIDS/HIV* 11 (2): 157–170. USA.
- Siegel JM (1990). Stressful Life Events and Use of Physician Services among the Elderly: The moderating effects of pet ownership. *Journal of Personality and Social Psychology* 58 (6): 1081-1086. USA.
- Shubert J (2012). Dogs and Human Health/Mental Health: From the pleasure of their company to the benefits of their assistance. *The United States Army Medical Department Journal* Apr-Jun: 21-29. USA.
- Slatter J, Lloyd C and King R (2012). Homelessness and Companion Animals: More than just a pet? *British Journal of Occupational Therapy* 75(8): 377-383.
- Souter MA and Miller MD (2007). Do Animal-Assisted Activities Effectively Treat Depression? A meta-analysis. *Anthrozoös*, 20 (2): 167-180.
- Stern C, Pearson A and Chur-Hansen A (2011). The Economic Feasibility of Canine-Assisted Interventions (CAIs) on the Health and Social Care of Older People Residing in Long Term Care: A systematic review, *The JBI Database of Systematic Reviews* 9 (32).
- Tamura T, Yonemitsu S, Itoh A, Oikawa D, Kawakami A, Higashi Y, Fujimooto T and Nakajima K (2004). Is an Entertainment Robot Useful in the Care of Elderly People With Severe Dementia? *The Journals of Gerontology* 59 (1): 83-85. Japan.
- Thorpe RJ, Kreisle RA, Glickman LT, Simonsick EM, Newman AB and Kritchevsky S (2006). Physical Activity and Pet Ownership in Year 3 of the Health ABC Study. *Journal of Aging and Physical Activity* 14 (2): 154–168. USA.

TigerPlace / Americare. [www.americareusa.net/location/tigerplace/](http://www.americareusa.net/location/tigerplace/)

United Nations Population Division [UNDP], World Population Ageing 2013 Report.

Van Assche L, Luyten P, Bruffaerts R, Persoons P, van de Ven L and Vandenbulcke M (2013). Attachment in Old Age: Theoretical assumptions, empirical findings and implications for clinical practice. *Clinical Psychology Review* 33 (1): 67-81.

Virués-Ortega J, Pastor-Barriuso R, Castellote JM, Poblacion A and de Pedro-Cuesta J (2012). Effect of Animal-Assisted Therapy on the Psychological and Functional Status of Elderly Populations and Patients with Psychiatric Disorders: A meta-analysis. *Health Psychology Review* 6 (2): 197-221.

Virués-Ortega J and Buela-Casal G (2006). Psychophysiological Effects of Human-Animal Interaction: Theoretical issues and long-term interaction effects. *Journal of Nervous and Mental Disease* 194 (1): 52-57.

Walsh F (2009). Human-Animal Bonds I: The relational significance of companion animals. *Family Process* 48 (4): 462-480.

Wells DI (2009). Associations between Pet Ownership and Self-reported Health Status in People Suffering from Chronic Fatigue Syndrome. *Journal of Alternative and Complementary Medicine* 15 (4): 407-413. UK.

Wells Y and Rodi H (2000). Effects of Pet Ownership on the Health and Well-being of Older People. *Australasian Journal on Ageing* 19 (3): 143-148.

Winefield HR, Black A and Chur-Hansen A (2008). Health Effects of Ownership of and Attachment to Companion Animals in an Older Population. *International Journal of Behavioral Medicine* 15 (4): 303-310. Australia.

Winkler A, Fairnie H, Gericevich F and Long M (1989). The Impact of a Resident Dog on an Institution for the Elderly: Effects on perceptions and social interactions. *The Gerontologist* 29 (2): 216-223. Australia.

Wood L [ed.] (2009), *Living Well Together: How companion animals can strengthen social fabric*. Petcare Information & Advisory Service Pty Ltd and the Centre for the Built Environment and Health (School of Population Health), University of Western Australia.

Wood LJ, Giles-Corti B, Bulsara MK and Bosch DA (2007). More Than a Furry Companion: The ripple effect of companion animals on neighborhood interactions and sense of community. *Society and Animals* 15 (1): 43-56. Australia.

Wood L, Giles-Corti B and Bulsara M (2005). The Pet Connection: Pets as a conduit for social capital? *Social Science and Medicine* 61 (6): 1159-1173. Australia.

World Health Organization [WHO] (2002). Active Aging: A policy framework. [www.who.int/ageing/publications/active\\_ageing/en/](http://www.who.int/ageing/publications/active_ageing/en/)

World Health Organization [WHO] (n.d.). Global Network of Age-friendly Cities and Communities. [www.who.int/ageing/age\\_friendly\\_cities\\_network/en/](http://www.who.int/ageing/age_friendly_cities_network/en/)

World Small Animal Veterinary Association (WSAVA) (2013). Committee on One Health. [www.wsava.org/educational/one-health-committee](http://www.wsava.org/educational/one-health-committee)

Zisselman MH, Rovner BW, Shmueli Y and Ferrie P (1996). A Pet Therapy Intervention with Geriatric Psychiatry Inpatients. *The American Journal of Occupational Therapy* 50 (1): 47-51. USA.



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*As the elderly cohort within our societies expands, further human-animal studies will have valuable implications, as research contributes valuable insights into the mechanisms by which older individuals benefit from animal companions, informs new professional protocols and practices in elder health care, and ensures a more compassionate age-friendly society.*



# IFA



INTERNATIONAL FEDERATION ON AGEING  
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IFA is an international non-governmental organization with a membership base of NGOs, the corporate sector, academia, government, and individuals. We believe in generating positive change for older people throughout the world by stimulating, collecting, analyzing, and disseminating information on rights, policies, and practices that improve the quality of life of people as they age.

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