

## Review

# The Impact of the Social Determinants of Human Health on Companion Animal Welfare

Sonya McDowall <sup>1,\*</sup>, Susan J. Hazel <sup>2</sup>, Catherine Chittleborough <sup>3</sup>, Anne Hamilton-Bruce <sup>4</sup>, Rwth Stuckey <sup>1</sup> and Tiffani J. Howell <sup>5</sup>

<sup>1</sup> School of Psychology and Public Health, La Trobe University, Bundoora, VIC 3082, Australia

<sup>2</sup> School of Animal and Veterinary Science, Roseworthy Campus, The University of Adelaide, Roseworthy, SA 5371, Australia

<sup>3</sup> School of Public Health, Robinson Research Institute, The University of Adelaide, Adelaide, SA 5005, Australia

<sup>4</sup> Adelaide Medical School, The University of Adelaide, Adelaide, SA 5005, Australia

<sup>5</sup> School of Psychology and Public Health, La Trobe University, Bendigo, VIC 3552, Australia

\* Correspondence: s.mcdowall@latrobe.edu.au

**Simple Summary:** The role of the social determinants of health (i.e., physical, social and economic factors affecting human health) and their impact on companion animal welfare have not been fully explored. Through a social determinants lens, it is possible to improve the understanding of companion animal guardian challenges in managing their companion animal's welfare needs. Considering the five domains of animal welfare in conjunction with the social determinants enables us to explore the impact of the social determinants of human health on animal welfare. This highlights the importance of multidisciplinary collaboration to achieve positive health outcomes for guardians and positive welfare outcomes for their companion animals.

**Abstract:** The social determinants of health (SDH) focus on the social, physical and economic factors that impact human health. Studies have revealed that animal guardians face a range of challenges in attaining positive welfare outcomes for their companion animals, which can be influenced by socioeconomic and environmental factors. Despite this, there is a lack of research specifically exploring the relationship between SDH and animal welfare outcomes. Given that the SDH impact on humans, which in turn directly impacts on their companion animal, it is important to adapt an SDH framework for companion animal welfare by characterising the impact of the SDH on companion animal guardians in their attempts to care for their animals and, by extension, the associated welfare outcomes. This paper explores how these human health determinants may impact animal welfare and the possible challenges that may arise for the guardian when attempting to meet their companion animal's welfare needs. By integrating the SDH with other key frameworks, including the five domains model of animal welfare, through multidisciplinary collaboration, this framework can be used to inform future programs aiming to improve animal welfare.

**Keywords:** pet; human–animal bond; five domains model; healthcare; socioeconomic



**Citation:** McDowall, S.; Hazel, S.J.; Chittleborough, C.; Hamilton-Bruce, A.; Stuckey, R.; Howell, T.J. The Impact of the Social Determinants of Human Health on Companion Animal Welfare. *Animals* **2023**, *13*, 1113. <https://doi.org/10.3390/ani13061113>

Academic Editor: Udo Ganslosser

Received: 14 February 2023

Revised: 15 March 2023

Accepted: 17 March 2023

Published: 21 March 2023



**Copyright:** © 2023 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

## 1. Introduction

Over the past 20 years, there has been increasing recognition of the integrative relationships between human health and animal welfare across both human and animal disciplines [1,2]. For example, one study [3] notes that improved human welfare can also be linked to improvements in animal welfare. In Western societies, the family unit structure has extended to include how we interact with companion animals [2]. Studies have, therefore, demonstrated the positive relationship between companion animal ownership and human health outcomes, such as reductions in anxiety, distress, depression, loneliness, disease prevalence and increased physical activity [4–10]. However, not all studies support these findings, with some indicating either a negative correlation or none at all between

companion animal ownership and human health outcomes [11–13]. Furthermore, selection biases and the use of convenience samples that may not be representative of the general population should be considered when interpreting the results presented in the relevant literature [14]. Whilst there is a lot of research in the fields of companion animal welfare and human health, there is a limited amount of literature that explores the roles and impacts each discipline has on the other.

Two existing frameworks, One Health and One Welfare, aim to highlight the interconnections between humans, animals and the environment [15–17]. One Health focuses on the integration of these sectors for human health outcomes [16,18,19]. One Welfare is an extension of the One Health framework, incorporating animal welfare by emphasising positive interactions between humans and animals, as well as supportive animal management techniques, to enhance both animal welfare and human well-being [15]. Both One Health and One Welfare highlight the importance of integrated, multidisciplinary collaboration to achieve better human health and animal welfare outcomes along with the importance of the development of a strong global One Health workforce both in the animal and human health sectors [20]. These frameworks provide a key starting point to illustrate the importance of interrelationships across both human and animal fields, but neither identifies the underlying causes of poor human health and animal welfare outcomes, with the human factors being those identified within the social determinants of health (SDH) [15,20].

The World Health Organization (WHO) identifies the role of SDH as a concept to ‘tackle the social, physical and economic conditions in society that impact upon health’ [21]. The SDH include aspects of a person’s life, such as income, education, social support and employment [22], and other circumstances in which a person is born, grows up, lives, works and ages [23,24]. Research has identified that consideration of SDH in the planning and designing of health campaigns or programs is associated with decreased morbidity and mortality, reduced health disparities and improved population health in marginalised groups [25]. Given that humans share their social, political and physical environments with companion animals, it is reasonable to conclude that because these environments affect humans, they would also directly affect animals [25,26]. Historically, regardless of this close human–animal interaction, the human and animal sectors have traditionally worked in silos, thus not truly integrating public policy or service delivery to achieve positive outcomes for both humans and animals [27]. To achieve positive human health and animal welfare outcomes, it is necessary to consider a prevention-orientated approach encompassing cultural, economic and political factors that underlie the physical and social environments in human and animal populations [28], reflecting their shared experience [27]. Despite this, applying the SDH to companion animals to improve animal welfare outcomes has not previously been explored in detail.

Historically, the concept of safeguarding animal welfare has been defined as being achieved through the ‘five freedoms’, developed in 1979, with the later development of the five domains, in 1994 [19,29]. The 2020 model identifies the five domains as (1) nutrition, (2) physical environment, (3) health, (4) behavioural interactions and (5) mental state [30]. In earlier models, the five domains focused mainly on identifying and correcting negative welfare states, while the current model emphasises the presence of positive welfare states [29,30]. Whilst the five domains model remains an important part of evaluating animal welfare, it does not focus on factors related to the animal guardian that could lead to poor animal welfare.

The aim of the five domains is to enable a systematic and structured welfare assessment of the animal, taking into account both the negative and positive experiences that an animal may experience, commonly referred to as their affective states [31,32], along with how humans may impact these states [29]. However, the five domains and the five freedoms models (the antecedent of the five domains) [33] fail to explicitly include links to the human impacts related to the income, education, employment or social status of the animal guardian on animal welfare outcomes [32].

The SDH influence how humans engage with and care for companion animals, which can impact on animals' welfare outcomes [26]. The most disadvantaged sectors of the human population often have poor health outcomes and lower life expectancy, and they face a range of socioeconomic challenges [22,24]. For instance, limited access to foods to meet daily nutritional needs can result in chronic health conditions, such as diabetes and heart disease [34]. For the community as a whole, safety and access to affordable goods and services play a role in health outcomes [34]. For example, both individual human and community determinants impact on the animal guardian's ability to access public space to exercise the animal and feel safe enough in the community to do so, an issue which is especially relevant for dog guardians. Companion animal guardians who come from lower social-economic communities may face many obstacles, such as the cost of veterinary care, cultural and language barriers, veterinary-client communication challenges, lack of accessibility of care and lack of education, all potentially influencing the animal guardian's ability to provide positive animal welfare outcomes [19,35–37].

We integrated the SDH with the other frameworks through a review of the existing literature and the consolidation of the concepts pertaining to the interrelations of companion animals and their guardians. By adapting an SDH model to address the impact of humans on animal welfare outcomes, based on the existing frameworks for human health, this will enable us to identify how the social determinants of health in human guardians may influence animal welfare outcomes. This will enable the development of preventative policies to protect the human-animal relationship and enhance positive welfare outcomes for companion animals. The aim of this paper was to characterise the impacts of the SDH on companion animal guardians in their attempts to look after their animals and, by extension, the associated preventative measures to mitigate potential negative animal welfare outcomes. Note that in this paper the term 'guardian' rather than 'owner' is used. Whilst we respect that the term 'guardian' in human literature often refers to a temporary carer, the term 'guardian' or 'guardianship' is often used to reflect the relationship between humans and animals [38]. Rather than the animal being 'owned' by a human as reported within most legal frameworks, the authors choose to lead by example, as they consider that animals should not be property and instead support the view that humans are guardians of the animal's welfare [38].

## 2. Impact of the Social Determinants of Health on Companion Animal Welfare

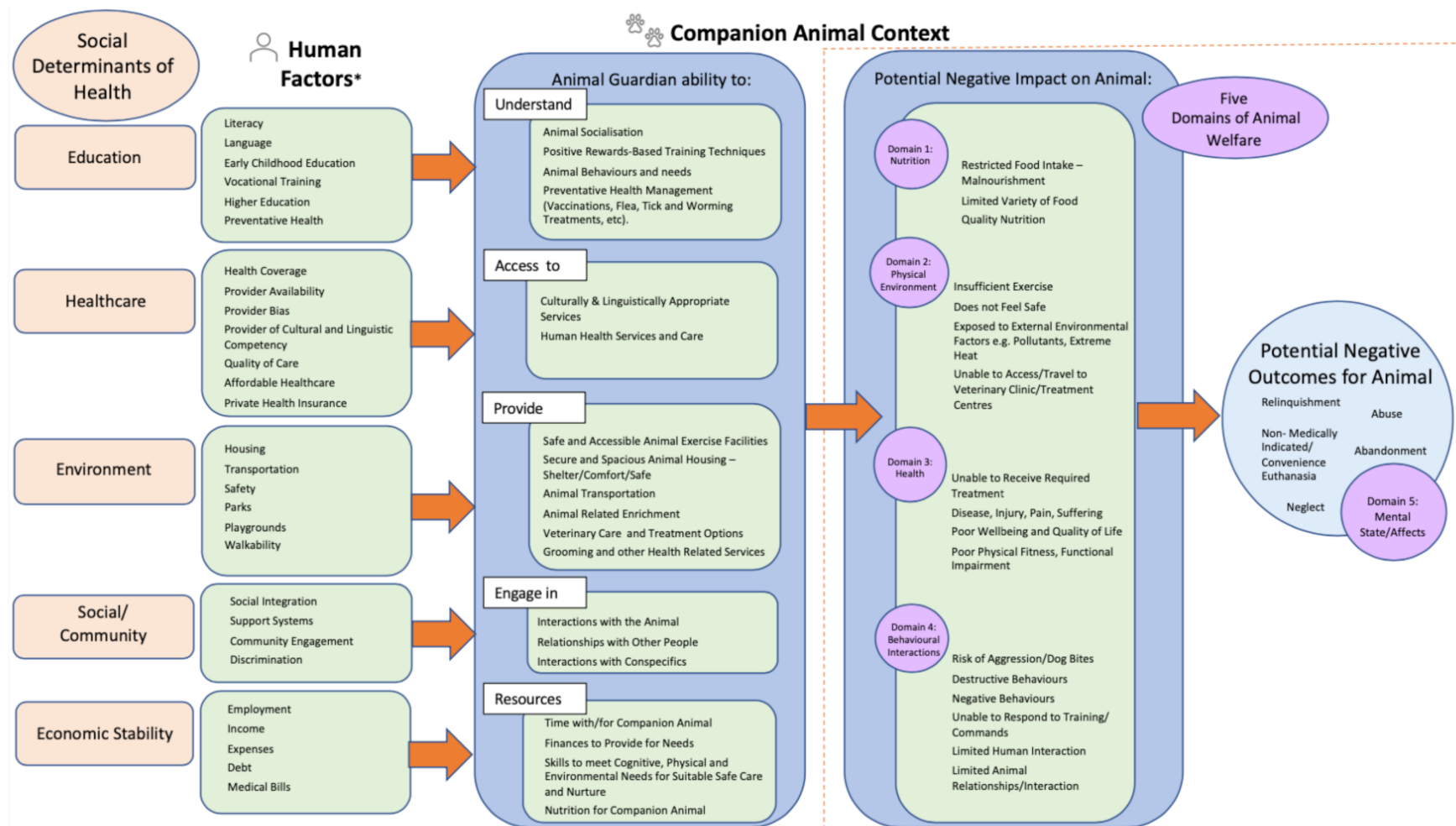
Regardless of socioeconomic status or background, a deep connection can develop between guardians and their companion animals [39]. However, this connection can also bring challenges for the guardian in ensuring the well-being of their companion animals [39]. Studies on the role of policies related to animal populations and their effect on human inhabitants and government organisations identified that animal shelter intake per capita was higher in neighbourhoods with lower mean household incomes, education and housing stability. The number of businesses that support companion animal ownership, such as grooming, veterinary care, behaviour support and kennels, was also lower in neighbourhoods with a higher animal shelter intake. Studies also identified that neighbourhoods with higher violent crime rates had a higher reported incidence of animal abuse, dangerous animals and illegal dog fighting [40–44]. Dogs involved in organised fights suffer from physical pain and also psychological and emotional distress, indicating that the actions of the guardian can influence the welfare outcomes of the dog [41]. The quality of infrastructure in a region can have a significant impact on both companion animal and guardian health by influencing the quality of veterinary care. It is highly plausible that if the SDH for humans were improved, so too would animal welfare [45].

The challenges of healthcare costs were demonstrated during the COVID-19 pandemic, where socioeconomic factors contributed to humans delaying accessing their own and their animals' healthcare, especially in scenarios where the human had low levels of social support or was not able to afford animal care services [46]. The same was found in the wake of Hurricane Katrina, when companion animal owners refused treatment, shelter

and healthcare for themselves to ensure they were not separated from their animal [19]. This emphasises the influence that companion animals have on human healthcare decision making and the importance of an interagency response [46]. Unfortunately, the relationship between humans and companion animals is often neglected when services are responding to society's basic needs [47]. For example, if a person does not have existing support and is homeless, it has been reported that they will forgo accessing medical care due to the lack of someone who can look after their companion animal [47]. Whilst this highlights the importance of the role of companion animals in their relationship with human guardians and subsequent health outcomes, research investigating the role of SDH on companion animal welfare is limited.

Studies focusing on the link between human social vulnerability on dog intake to an open shelter found that when humans and dogs share the same social and physical environments, the same vulnerabilities can be found across both population groups [27,35,48]. As such, companion animals that show signs of social and physical neglect are likely to be an extension of the same challenges faced by their guardian [27]. In particular, communities that experience socioeconomic challenges and are socially vulnerable are at a high risk of companion animal abandonment [27]. To enable companion animal guardians to achieve positive welfare outcomes, both the guardian and the animal risk factors need to be understood and integrated as one key focus area to develop clear strategies to prevent relinquishment [49–53], an approach supported by utilising the SDH in relation to companion animal welfare. Therefore, adopting an integrated approach to both the guardian and the animal in the context of the SDH can facilitate positive welfare outcomes for companion animals.

We used the United States Department of Health and Human Services SDH domains model to explore how the SDH influence animal welfare through the ability of companion animal guardians to provide care for them [54]. The five key SDH domains in this model are education, healthcare, environment, social/community and economic stability [54]. Each of the five SDH domains were explored to identify the relationship between humans and companion animals, as well as the potential negative animal welfare outcomes, as demonstrated in Figure 1. For the purpose of this review, the focus of Figure 1 is on the potential negative outcomes of SDH rather than the potential positive outcomes. There is also substantial overlap across the domains, and they do not exist in isolation; rather, all domains should be considered simultaneously as a holistic phenomenon for guardians and their companion animals.



**Figure 1.** Five domains of SDH that influence animal guardians' ability to care for their companion animal(s) and the potential negative outcomes on animal welfare.

\* Adapted from 'Healthy People 2030', US Department of Health and Human Services, Office of Disease Prevention and Health Promotion.



### 3. Applying the Social Determinants of Health to Companion Animal Welfare

In this section, we describe each SDH domain in turn, explaining how it can indirectly impact companion animal welfare. These domains were treated individually for the purposes of this review and for the sake of clarity. However, they are strongly interconnected and should be viewed holistically when considering an individual guardian's ability to care for their companion animal (e.g., a person's economic stability will inform their ability to access a safe environment to live in, and the ability to access high quality education will also inform their economic stability). Although we tried to avoid overlap as much as possible in this review, it was impossible to prevent it completely due to the fact of this inherent interconnectedness.

#### 3.1. Education

The SDH domain of education is linked to factors such as literacy, language, vocational and higher education (Figure 1) in humans. Within the companion animal context, this underpins the guardian's ability to understand how to train an animal and the importance of preventative health such as vaccinations (Figure 1). A study into the reasons for relinquishment at various animal shelters within the United States identified that guardians who had not reached an educational level beyond high school were more likely to surrender an animal [55]. Communities with a higher educational attainment had lower stray intake at animal shelters [56]. Guardians with lower levels of education were less likely to have visited a veterinarian within the last 18 months (57.1% with a high school education, 80.3% with a bachelor's degree) [57]. However, the companion animal guardian's ability to access services and/or support programs appears to be influenced by other associated factors, such as transport barriers, availability and hours of operations of veterinary/training services and affordability [58], highlighting the interconnected nature of all of the SDH domains.

Not understanding behavioural challenges in companion animals is a common reason for animal abandonment, relinquishment and euthanasia [55,58–62]. Studies have reported that between 22% and 35% of dogs are relinquished due to the fact of behavioural issues/concerns [50,63]. One preventative aspect of negative behavioural problems that could possibly avoid relinquishment is the early socialisation and training of companion animals, which is most commonly achieved through puppy classes [64–66]. A twenty-week study of participants who attended early animal socialisation classes compared to those who did not identified that 99% of the companion animal guardians who engaged in early socialisation methods had achieved a high school level or above qualification, suggesting a link between education and understanding the need for early animal socialisation [64]. In a study of rehomed pets, 34% of the participants identified that free or low-cost behaviour training would have prevented the relinquishment [67], with 70.6% reporting the same in a more recent study exploring the reasons for the relinquishment of dogs at a shelter [67]. Guardians are also unlikely to seek help for behavioural issues, with one study identifying that just over 50% of participants were not very likely or not at all likely to access veterinary care for these issues [57]. However, another study identified that access to low-cost/free behaviour consultation (67%) would assist in preventing relinquishment [63]. Barriers to attending such training or companion animal classes include the guardian's lack of motivation to attend, limited awareness, expense, class size and geographic availability [68].

#### 3.2. Healthcare

The SDH domain of healthcare is linked to the availability and coverage of health-related services, cultural and linguistic competency, and quality and affordability of care (Figure 1). Understanding the impact that human health conditions have on animal welfare has received limited attention. A few studies have identified companion animal guardian health reasons for relinquishment [61,69–71]; in particular, a Danish study identified that health-related conditions of the companion animal guardian was the primary reason for relinquishment at a large Danish shelter [72]. This was also reported in an earlier study [70,73], but neither study explored what the health-related illness/conditions of

the companion animal guardian actually were or if they were related to any particular demographic age groups [60]. Allergies associated with having pets have been raised in some studies, with the majority of these studies linking allergies to cat guardianship [62]. Whilst the understanding of the exact types of healthcare conditions beyond allergies is scarce, some parallels can be explored through studies with assistance dogs. A handler's medical condition has been found to potentially have an effect on the companion animal's welfare, both in the short and long term [74,75], resulting in the return of the assistance dog to an organisation or even relinquishment [76].

### 3.3. Environment

Given that humans and animals that live together share the same environment, the SDH environment domain highlights the challenges for low-socioeconomic communities in accessing services for their animal due to the fact of limited transportation options and safe access to green spaces to provide the animal with exercise and enrichment (Figure 1). The environment of companion animals and their guardians is variable depending on the region in which they live, along with traditional cultural and societal norms; therefore, SDH need to be considered in line with the region and culture in which it is being applied to ensure the outcomes for companion animals are proportionately reflected. Most of the literature in this section relates to the United States and Australia. Transportation is an important challenge for companion animal guardians in providing positive welfare outcomes for their animal [44,57]. In most cities in the United States [77] and throughout Australia [77–79], access to public transportation with a companion animal is typically limited to registered assistance animals or animals small enough to fit within a cage, although European countries often permit companion animals on public transport [77]. As a result, most companion animal guardians, especially those in low-socioeconomic areas in the United States and Australia, are unable to utilise public transportation with their pet [36,80,81]. The distance travelled also has an effect on companion animal guardian's ability to attend early socialisation classes, with those who live in rural or remote areas being 2.5 times less likely to participate [64].

Companion animal guardians may also face challenges in enabling their companion animal to access parks to support exercise and positive social interactions with other people and their companion animals [27]. Using the Social Vulnerability Index (SVI), it was found that households located in areas with a high SVI had difficulty socialising their companion animals, as the companion animals were often left alone for extended periods of time [27]. Companion animal guardians can have a direct influence over exercise and associated animal welfare outcomes, but if the community in which the companion animal and guardian reside is unsafe, such exercise opportunities might be limited. A review of the usage of green spaces within disadvantaged communities identified that most studies across the literature cite safety in accessing community green spaces as a key concern underpinning their limited use [82]. It has been reported that in the United States, behaviours that make another feel unsafe in their environment within low-socioeconomic communities was twice that of higher socioeconomic communities [83]. Aside from safety considerations, green spaces in lower social-economic communities are equipped with fewer amenities [84,85], are located further away from individuals' homes [86] and are less accessible than those in higher socioeconomic communities [87], thus restricting the ability of the companion animal guardian to provide positive welfare opportunities.

One of the many barriers to securing housing is having a companion animal and the reluctance of landlords or housing management organisations to allow applications from companion animal guardians [35,44,63,72,88–90]. For animal guardians trying to exit homelessness, pet ownership is the biggest barrier [81,91–94]. One study reported that 42.1% of participants relinquished their pet due to the fact of moving when the landlord would not allow companion animals [88]; these numbers were even higher in another study, with 77.5% relinquishing their pet due to the fact of moving and 35.1% due to the fact of landlord conditions [63]. It is reported that between 5% and 25% of people who are

unable to secure housing in the United States are companion animal guardians [91–93,95]. This challenge goes beyond the stereotypical socioeconomic barriers and affects a large swathe of the population, who have to choose between a roof over their heads or the relationship with their companion animal [96]. This is particularly prevalent in the current challenging economic environment, whereby rental availability is at an all-time low in many countries, including the United Kingdom [97], United States [97] and various cities in Europe (e.g., Amsterdam, Lisbon and Athens) [98], further limiting the availability of options for housing for companion animal guardians [99,100]. Whilst some states in Australia, such as Victoria, Queensland and Australian Capital Territory, have passed legislation preventing tenancy agreements from banning companion animals, animal guardians in other Australian jurisdictions are denied this protection [100]. Other factors identified as preventing relinquishment include pet-friendly housing (33% of participants), temporary boarding animal care (30% of participants) and pet-related housing deposits (17% of participants) [67].

The ability to access veterinary care and veterinary-related services, such as grooming and behavioural training, is a substantial barrier for low-socioeconomic populations and has a direct effect on the health and welfare of companion animals [25]. Companion animal guardians' access to veterinary care, including animal and human transportation, is further challenged by the availability of veterinary services. The availability of veterinary services within low-socioeconomic populations is limited. From a business perspective, a private practice is unlikely to set-up in an area where they are unable to make a profit or where companion animal guardians are either unable or unwilling to pay for veterinary care [36,101]. This finding is supported by a study in which for a low-socioeconomic area of Chicago (United States), which comprises 25% of the city's population, only 7% of the city's companion animal services were based in this area [40].

### 3.4. Social and Community

Where we live, work and learn, along with community involvement and equality, all play a role in improved health outcomes for humans [102]. Within the animal context, the animal guardian's ability to provide a safe place and their relationship with the animal and community, along with support networks, all factor into the overall context of enabling positive welfare outcomes for the companion animal (Figure 1).

In communities where environmental factors enable social and community engagement (see Section 3.3), companion animal guardians, such as those who are able to walk their dogs, are more likely to get to know people within their community than those who do not have a companion animal [7]. Furthermore, approximately one-quarter of the respondents reported that they met people within their community as a result of their companion animal and are part of their social circle, with 42.3% having received social support from people they met through their companion animal [7].

While there is evidence that companion animal guardians living in these positive environments can develop meaningful friendships with others in their community, as noted above, it has been reported that lower socioeconomic communities have poorer social networks and social support [103]. This limited social support has been found to delay healthcare treatment in companion animal guardians in low-socioeconomic communities due to the fact of financial constraints that inhibit care for the animal [104]. In addition, access to services required for animal guardians also includes the ability to be culturally aware and/or provide translation services [25,105].

While a person's social and community life with their companion animal extends beyond family, especially violent family situations, it has been well established throughout the literature that there is a link between domestic violence and animal abuse [47,106–120]. However, the challenge presented to most survivors of domestic violence is their ability to leave their home and take their companion animal(s) with them [47]. Studies have shown that between 26% and 71% of female companion animal guardians experiencing family violence reported that the offender had seriously harmed or killed the companion



animal [107,109,113,114,118,121–125]. Many survivors of domestic violence (48%) are hesitant to escape their domestic violence environment due to the fact of being concerned about what will happen to their companion animal [126]. Further, it has been reported that approximately 18–48% of survivors have delayed entering a domestic violence shelter due to the presence of welfare concerns for their companion animals that they had to leave behind [47,109,113,121,127]. As a result, both companion animal and guardian safety and welfare is at risk, as most survivors remain within the domestic violence environment, not wishing to leave their companion animal behind and having limited safe refuge options that accept guardians with companion animals [106,107,128].

### 3.5. Economic Stability

Income is considered to be one of the most influential of the SDH [26] along with employment, debt and expenses (Figure 1). For companion animals, this domain focuses on the guardian's ability to access the required resources to provide for the animal's needs cognitively, physically and environmentally. This includes their ability to pay for associated veterinary costs to ensure positive welfare outcomes, along with spending adequate time with their animal. However, some people with low incomes may have the possibility of spending more time with their companion animal if they have fewer other demands on their time (e.g., those on disability or retirement pensions) (Figure 1).

The issue of affordability for veterinary care as a barrier to maintaining companion animal guardianship has been covered extensively [35,36,57,67,80,129–137]. The most common reason provided across the literature for the relinquishment of a companion animal is low income [35,51,63,88,138,139], although the reasons for relinquishment continue to be multifactorial. Within Australia, areas of greater socioeconomic disadvantage had a higher number of preventable Canine parvovirus cases and higher rates of euthanasia-without treatment for parvovirus, but the reasons for this disparity were not fully explored [140]. The lack of affordable vaccinations and the number and timing of vaccinations are suggested to be causes, along with the ability to access veterinary services, thus resulting in poorer welfare outcomes for companion animals [141–143]. In a study of rehomed companion animals, 40% of the participants identified that free or low-cost veterinary care could have prevented relinquishment [57]. Furthermore, in a New-York-based subsidised grooming program, more than half of the animal guardian participants reported that the cost associated with companion animal grooming was a barrier to maintaining the animal's welfare [144]. There is limited financial support available for veterinary costs, with most financial support only available in emergency situations [47]. One study identified that when affordable veterinary care is provided to low-socioeconomic companion animal guardians, the number of veterinary visits increase for both disease/injury and wellness, including preventative interventions, such as heartworm and vaccinations [145]. Understanding and addressing the economic barriers to both the access and provision of care for companion animals are important for the improvement of health and welfare outcomes [25].

Traditionally, across the literature, companion animal healthcare has focused on the sterilisation of animals, with a limited scope on the comprehensive healthcare needs of the animal [130,132,146–148]. Nonetheless, the ability to access free or low-cost spay and neuter services was identified in two studies as a factor that may prevent animal relinquishment according to 30% [67] and 53% [63] of the participants. Low-cost standard veterinary care was also identified as a preventative measure for 56% of the participants [63].

Companion animal guardians with limited income often find it difficult to obtain appropriate food for their animals. The Foodbank Hunger Report 2022 [149] highlighted that over half a million people in Australia are struggling with the cost of food; of this population, 67% have pets. This provides a challenging dilemma for companion animal guardians forced to choose between feeding themselves or their companion animal [150,151]. In studies investigating the impact of the cost of living on animal relinquishment, between 30% [67] and 50% [63] of the participants reported that having low-cost or free pet food available would have prevented them from relinquishing their animal.

Unlike human healthcare, where free or heavily subsidised human healthcare is available in many developed countries [152], there is no policy supporting a universal healthcare system for veterinary care, so it is necessary for guardians to cover the full cost of care. Most companion animal guardians have little understanding of the costs associated with both human and veterinary care, so they tend to be predisposed to the view that the cost of veterinary care is too high [153]. Pet insurance has been viewed as expensive [154], and there are limited marketing and education programs around insurance products, resulting in their limited use [154]. Furthermore, for financially constrained companion animal guardians, the ability to pay for veterinary care is already a challenge in addition to the payment of an insurance premium [153]. There are some current initiatives towards mitigating this financial challenge. For instance, a political party in Victoria, Australia, has identified the need for affordable veterinary care in Australia and is campaigning for universal healthcare for animals [155]. A pilot program in the United States, Program for Pet Health Equity, is an integrated interagency approach with social workers, veterinary services and financial support organisations to enable the support of animal guardians with a low-socioeconomic status [156]. The provision of financial assistance through AlignCare for animal guardians in receipt of public assistance was established at the University of Tennessee, whereby clients are responsible for a 20% copay at the time of the visit, and the remaining 80% is funded by AlignCare [156]. In addition to the copay arrangement, AlignCare has partnerships with animal welfare agencies to support guardians where payment may not be possible [156].

#### 4. Five Domains of Animal Welfare and Their Relationship with SDH

The five domains model was developed as a scientific approach to evaluate animal welfare and promote positive outcomes [30]. The SDH can form part of a multidisciplinary perspective in conjunction with the five domains of animal welfare (See Figure 1) to improve companion animal welfare. Consider, for example, one aspect of the five domains, behavioural interactions, which explores an animal's interaction with the environment, with other animals and with humans [30,157]. The SDH conditions of the companion animal guardian may result in a restricted or confined environment or limited animal-to-animal activity, exposure of the animal to threats or result in a guardian who is inexperienced and unskilled in animal behaviours and training methods [158]. All five social determinants (i.e., education, healthcare, environment, social/community and economic stability) can impact a companion animal guardian's ability to provide training for their companion animal, which would have an associated impact on the animal's five domains—behavioural interactions outcomes (as outlined in Figure 1). This can be further explored on the basis that companion animal guardians from lower socioeconomic communities may not be able to train their animals or access appropriate veterinary services due to the fact of limited financial means or transport restrictions. Furthermore, for companion animal guardians residing in a household where violence or abuse is present, this may result in companion animals being exposed to stressors with potential threats and physical harm. The impact on the five domains—behavioural interactions is only one example; the influence of the SDH can be found across all five domains.

The five domains of animal welfare framework also highlights the importance of agency [30]. Agency plays a key role when considering the influence of the SDH, as it reflects an animal's natural tendency to interact with its physical, biological and social surroundings beyond that of its immediate needs, allowing the animal to make conscious choices to behave in a particular way [159]. However, the human's ability to make informed and meaningful choices and exercise controls over their own life decisions is referred to as autonomy [160]. However, unlike human autonomy, animal agency is reflected in the companions animal's ability to respond to certain stimuli, which can be influenced by the animal's guardian and their level of autonomy [159]. This results in the animal guardian having a significant role in the impact of the agency of the companion animal, which in turn can be influenced by impacts of the various factors within the SDH. The level

of agency and autonomy that a companion animal has is intertwined within their social and environmental factors, along with the ability, decisions and actions of the companion animal guardian. For example, if a companion animal guardian is able to provide access to exercise, positive reinforcement training and animal-to-animal and human-to-animal socialisation, the companion animal will have more agency and independence, which supports them in building their confidence and comfort within their environment.

### 5. Illustration of Social Determinants of Health on Companion Animals

The scenario below (Figure 2) demonstrates that there are multiple interrelated factors of the SDH that potentially have an influence on companion animal welfare outcomes. The illustration reminds us that not every companion animal guardian has the same opportunities to achieve the perceived optimal animal welfare outcomes, but the challenges faced by companion animal guardians have an effect on the animal's welfare. This provides an evidence base from which to explore the development of service provision and/or public policy to achieve positive companion animal welfare outcomes.



Figure 2. Cont.



**Figure 2.** Story of Two Tails: exploring the influence of the social determinants of health on companion animals. Inspired by The Pencilsword: On a plate [161].

## 6. Future Directions for Research

The SDH are designed to be comprehensive, taking a holistic perspective of the factors influencing a person's health status. In this review, we extended this concept one step further by describing how the SDH can indirectly influence the welfare of companion animals in the care of their guardians. Despite the comprehensive nature of the SDH framework, there are some aspects of companion animal care that were beyond the scope of this review, and they merit further investigation. For example, there is evidence that anthropomorphism by guardians may have negative effects on companion animals [162], and the caregiver burden on companion animal guardians can affect their perception of health, prognosis and euthanasia [163]. Furthermore, attention should be paid to the role of the veterinarian and the need for capacity building programs so that veterinarians themselves understand the impact of the SDH on their patients [20]. Future research should consider these additional influences on animal welfare.

## 7. Conclusions

The integration of the social determinants of health into human and animal welfare is crucial for multidisciplinary public policy and preventative support provision. The proposed integrated framework considers the interconnection between the social determinants of health, One Health, One Welfare and the five domains of animal welfare, providing a model for a more comprehensive approach to better outcomes for companion animals, their guardians and the community. Understanding the influence of these factors (i.e., income and access to veterinary care, education levels, community involvement and equity) on humans and, consequently, their companion animals enables the development of interventions aimed at enhancing the welfare outcomes of both the companion animal and their guardian. By utilising this model, we can better understand how to protect the human–animal bond, improve animal welfare outcomes and achieve long-term success in keeping companion animals and their guardians healthy and happy together.

**Author Contributions:** Conceptualisation, S.M., S.J.H., A.H.-B., R.S. and T.J.H.; writing—original draft preparation, S.M.; writing—review and editing, S.J.H., C.C., A.H.-B., R.S. and T.J.H.; supervision, S.J.H., A.H.-B., R.S. and T.J.H. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research article was supported by an Australian Government Research Training Program (RTP) Scholarship through La Trobe University.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Not applicable.

**Acknowledgments:** The graphic design illustration support for Figure 2 was received from Deborah Nash.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

1. Ryan, T. *Animals in Social Work Why and How They Matter*, 1st ed.; He Palgrave Macmillan Animal Ethics Series; Palgrave Macmillan UK: London, UK, 2014. [CrossRef]
2. Silva, K.; Lima, M. *Companion Animals and Human Health: On the Need for a Comprehensive Research Agenda Toward Clinical Implementation*; Springer International Publishing: Cham, Switzerland, 2019; pp. 295–315. [CrossRef]
3. Broom, D.M. *Animal welfare in the European Union*; Policy Department C: Citizens' Rights and Constitutional Affairs European Parliament: Brussels, Belgium, 2017; p. 74.
4. Headey, B.; Grabka, M.M. Pets and Human Health in Germany and Australia: National Longitudinal Results. *Soc. Indic. Res.* **2007**, *80*, 297–311. [CrossRef]
5. Kalenkoski, C.M.; Korankye, T. Enriching Lives: How Spending Time with Pets is Related to the Experiential Well-Being of Older Americans. *Appl. Res. Qual. Life* **2022**, *17*, 489–510. [CrossRef]
6. McGhee, W.R.G.; Dempster, M.; Graham-Wisener, L. The role of companion animals in advanced cancer: An interpretative phenomenological analysis. *BMC Palliat. Care* **2022**, *21*, 160. [CrossRef] [PubMed]
7. Wood, L.; Martin, K.; Christian, H.; Nathan, A.; Lauritsen, C.; Houghton, S.; Kawachi, I.; McCune, S. The pet factor—Companion animals as a conduit for getting to know people, friendship formation and social support. *PLoS ONE* **2015**, *10*, e0122085. [CrossRef]
8. Westgarth, C.; Christley, R.M.; Marvin, G.; Perkins, E. I walk my dog because it makes me happy: A qualitative study to understand why dogs motivate walking and improved health. *Int. J. Environ. Res. Public Health* **2017**, *14*, 936. [CrossRef] [PubMed]
9. Carr, E.C.J.; Wallace, J.E.; Onyewuchi, C.; Hellyer, P.W.; Kogan, L. Exploring the Meaning and Experience of Chronic Pain with People Who Live with a Dog: A Qualitative Study. *Anthrozoös* **2018**, *31*, 551–565. [CrossRef]
10. Serpell, J. Beneficial effects of pet ownership on some aspects of human health and behaviour. *J. R. Soc. Med.* **1991**, *84*, 717–720. [CrossRef]
11. Herzog, H. The Impact of Pets on Human Health and Psychological Well-Being: Fact, Fiction, or Hypothesis? *Curr. Dir. Psychol. Sci. A J. Am. Psychol. Soc.* **2011**, *20*, 236–239. [CrossRef]
12. Jorm, A.F.; Jacomb, P.A.; Christensen, H.; Henderson, S.; Korten, A.E.; Rodgers, B. Impact of pet ownership on elderly Australians' use of medical services: An analysis using Medicare data. *Med. J. Aust.* **1997**, *166*, 376–377. [CrossRef]
13. Parslow, R.A.; Jorm, A.F.; Christensen, H.; Rodgers, B.; Jacomb, P. Pet Ownership and Health in Older Adults: Findings from a Survey of 2,551 Community-Based Australians Aged 60–64. *Gerontology* **2005**, *51*, 40–47. [CrossRef]
14. Saunders, J.; Parast, L.; Babey, S.H.; Miles, J.V. Exploring the differences between pet and non-pet owners: Implications for human-animal interaction research and policy. *PLoS ONE* **2017**, *12*, e0179494. [CrossRef] [PubMed]
15. Pinillos, R.G. *One Welfare: A Framework to Improve Animal Welfare and Human Well-Being*; CAB International: Wallingford, UK, 2018.
16. Gibbs, E.P.J. The evolution of One Health: A decade of progress and challenges for the future. *Vet. Rec.* **2014**, *174*, 85–91. [CrossRef] [PubMed]
17. Rabinowitz, P.M.; Natterson-Horowitz, B.J.; Kahn, L.H.; Kock, R.; Pappaioanou, M. Incorporating one health into medical education. *BMC Med. Educ.* **2017**, *17*, 45. [CrossRef] [PubMed]
18. Conti, L.A.; Rabinowitz, P.M. One health initiative. *Infektološki Glas.* **2011**, *31*, 176–178.
19. Card, C.; Epp, T.; Lem, M. Exploring the Social Determinants of Animal Health. *J. Vet. Med. Educ.* **2018**, *45*, 437–447. [CrossRef]
20. Seffren, V.; Lowther, S.; Guerra, M.; Kinzer, M.H.; Turcios-Ruiz, R.; Henderson, A.; Shadomy, S.; Baggett, H.C.; Harris, J.R.; Njoh, E.; et al. Strengthening the global one health workforce: Veterinarians in CDC-supported field epidemiology training programs. *One Health* **2022**, *14*, 100382. [CrossRef]
21. World Health Organization. Social Determinants of Health—About Us. Available online: <https://www.who.int/teams/social-determinants-of-health/about> (accessed on 5 December 2022).



22. Lowcock, E.C.; Rosella, L.C.; Foisy, J.; McGeer, A.; Crowcroft, N. The social determinants of health and pandemic H1N1 2009 influenza severity. *Am. J. Public Health (1971)* **2012**, *102*, e51–e58. [\[CrossRef\]](#)
23. Chapman, A.R. The social determinants of health, health equity, and human rights. *Health Hum. Rights* **2010**, *12*, 17–30.
24. Braveman, P.; Gottlieb, L. The social determinants of health: It's time to consider the causes of the causes. *Public Health Rep.* **2014**, *129*, SS19. [\[CrossRef\]](#)
25. Hawes, S.M.; Hupe, T.M.; Winczewski, J.; Elting, K.; Arrington, A.; Newbury, S.; Morris, K.N. Measuring Changes in Perceptions of Access to Pet Support Care in Underserved Communities. *Front. Vet. Sci.* **2021**, *8*, 745345. [\[CrossRef\]](#)
26. Stephen, C. *Animals, Health, and Society: Health Promotion, Harm Reduction, and Health Equity in a One Health World*; CRC Press: Boca Raton, FL, USA, 2020.
27. Dyer, J.L.; Milot, L. Social vulnerability assessment of dog intake location data as a planning tool for community health program development: A case study in Athens-Clarke County, GA, 2014–2016. *PLoS ONE* **2019**, *14*, e0225282. [\[CrossRef\]](#) [\[PubMed\]](#)
28. Rock, M.; Buntain, B.J.; Hatfield, J.M.; Hallgrímsson, B. Animal–human connections, “one health,” and the syndemic approach to prevention. *Soc. Sci. Med.* **2009**, *68*, 991–995. [\[CrossRef\]](#) [\[PubMed\]](#)
29. Mellor, D.J.; Beausoleil, N.J. Extending the ‘Five Domains’ model for animal welfare assessment to incorporate positive welfare states. *Anim. Welf.* **2015**, *24*, 241–253. [\[CrossRef\]](#)
30. Mellor, D.J.; Beausoleil, N.J.; Littlewood, K.E.; McLean, A.N.; McGreevy, P.D.; Jones, B.; Wilkins, C. The 2020 five domains model: Including human–animal interactions in assessments of animal welfare. *Animals* **2020**, *10*, 1870. [\[CrossRef\]](#) [\[PubMed\]](#)
31. Duncan, I.J.H. Science-based assessment of animal welfare: Farm animals. *Rev. Sci. Et Tech. (Int. Off. Epizoot.)* **2005**, *24*, 483–492. [\[CrossRef\]](#)
32. Fraser, D. Assessing animal welfare at the farm and group level: The interplay of science and values. *Anim. Welf.* **2003**, *12*, 433–443. [\[CrossRef\]](#)
33. Mellor, D.J. Updating Animal Welfare Thinking: Moving beyond the “Five Freedoms” towards “A Life Worth Living”. *Animals* **2016**, *6*, 21. [\[CrossRef\]](#)
34. Lakerveld, J.; Mackenbach, J. The Upstream Determinants of Adult Obesity. *Obes. Facts* **2017**, *10*, 216–222. [\[CrossRef\]](#)
35. Spencer, T.; Behar-Horenstein, L.; Aufmuth, J.; Hardt, N.; Applebaum, J.W.; Emanuel, A.; Isaza, N. Factors that Influence Intake to One Municipal Animal Control Facility in Florida: A Qualitative Study. *Animals* **2017**, *7*, 48. [\[CrossRef\]](#)
36. LaVallee, E.; Mueller, M.K.; McCobb, E. A Systematic Review of the Literature Addressing Veterinary Care for Underserved Communities. *J. Appl. Anim. Welf. Sci.* **2017**, *20*, 381–394. [\[CrossRef\]](#)
37. White, S.C.; Scarlett, J.M.; Levy, J.K. Characteristics of clients and animals served by high-volume, stationary, nonprofit spay-neuter clinics. *J. Am. Vet. Med. Assoc.* **2018**, *253*, 737–745. [\[CrossRef\]](#) [\[PubMed\]](#)
38. Carlisle-Frank, P.; Frank, J.M. Owners, guardians, and owner-guardians: Differing relationships with pets. *Anthrozoös* **2006**, *19*, 225–242. [\[CrossRef\]](#)
39. Hoffman, C.L.; Spencer, T.G.; Makolinski, K.V. Assessing the Impact of a Virtual Shelter Medicine Rotation on Veterinary Students’ Knowledge, Skills, and Attitudes Regarding Access to Veterinary Care. *Front. Vet. Sci.* **2021**, *8*, 783233. [\[CrossRef\]](#) [\[PubMed\]](#)
40. Fischer, L.; Shankle, S.; Schwieterman, J. *Companion animals and Chicago Communities: A Strategic Assessment for the City of Chicago [Internet]*; Chaddick Institute for Metropolitan Development, De Paul University: Chicago, IL, USA, 2010.
41. Mota-Rojas, D.; Mariti, C.; Marcet-Rius, M.; Lezama-García, K.; Gazzano, A.; Hernández-Ávalos, I.; Mora-Medina, P.; Domínguez-Oliva, A.; Whittaker, A.L. The Welfare of Fighting Dogs: Wounds, Neurobiology of Pain, Legal Aspects and the Potential Role of the Veterinary Profession. *Animals* **2022**, *12*, 2257. [\[CrossRef\]](#)
42. Patronek, G.J. Use of geospatial neighborhood control locations for epidemiological analysis of community-level pet adoption patterns. *Am. J. Vet. Res.* **2010**, *71*, 1321–1330. [\[CrossRef\]](#)
43. Patronek, G.J. Mapping and measuring disparities in welfare for cats across neighborhoods in a large US city. *Am. J. Vet. Res.* **2010**, *71*, 161–168. [\[CrossRef\]](#)
44. Arluke, A.; Rowan, A. *Underdogs: Pets, People, and Poverty*; University of Georgia Press: Athens, GA, USA, 2020.
45. Beerda, B.; Schilder, M.B.H.; van Hooff, J.A.R.A.M.; de Vries, H.W. Manifestations of chronic and acute stress in dogs. *Appl. Anim. Behav. Sci.* **1997**, *52*, 307–319. [\[CrossRef\]](#)
46. Applebaum, J.W.; Adams, B.L.; Eliasson, M.N.; Zsembik, B.A.; McDonald, S.E. How pets factor into healthcare decisions for COVID-19: A One Health perspective. *One Health* **2020**, *11*, 100176. [\[CrossRef\]](#)
47. Compitus, K. *The Human-Animal Bond in Clinical Social Work Practice*; Springer International Publishing AG: Cham, Switzerland, 2021.
48. Shih, H.Y.; Paterson, M.B.A.; Phillips, C.J.C. Socioeconomic Influences on Reports of Canine Welfare Concerns to the Royal Society for the Prevention of Cruelty to Animals (RSPCA) in Queensland, Australia. *Animals* **2019**, *9*, 711. [\[CrossRef\]](#)
49. Mondelli, F.; Previde, E.P.; Verga, M.; Levi, D.; Magistrelli, S.; Valsecchi, P. Bond that never developed: Adoption and relinquishment of dogs in a rescue shelter. *J. Appl. Anim. Welf. Sci.* **2004**, *7*, 253–266. [\[CrossRef\]](#)
50. Marston, L.C.; Bennett, P.C.; Coleman, G.J. What happens to shelter dogs? An analysis of data for 1 year from three Australian shelters. *J. Appl. Anim. Welf. Sci.* **2004**, *7*, 27–47. [\[CrossRef\]](#) [\[PubMed\]](#)
51. Weiss, E.; Slater, M.; Garrison, L.; Drain, N.; Dolan, E.; Scarlett, J.M.; Zawistowski, S.L. Large Dog Relinquishment to Two Municipal Facilities in New York City and Washington, D.C.: Identifying Targets for Intervention. *Animals* **2014**, *4*, 409–433. [\[CrossRef\]](#) [\[PubMed\]](#)

52. Mota-Rojas, D.; Calderón-Maldonado, N.; Lezama-García, K.; Sepiurka, L.; Garcia, R.d.C.M. Abandonment of dogs in Latin America: Strategies and ideas. *Vet. World* **2021**, *14*, 2371–2379. [\[CrossRef\]](#)
53. Fatjó, J.; Bowen, J.; García, E.; Calvo, P.; Rueda, S.; Amblás, S.; Lanza, J.F. Epidemiology of Dog and Cat Abandonment in Spain (2008–2013). *Animals* **2015**, *5*, 426–441. [\[CrossRef\]](#)
54. U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. *Healthy People 2030*. Available online: <https://health.gov/healthypeople/objectives-and-data/social-determinants-health> (accessed on 17 December 2022).
55. New, J.C.; Salman, M.D.; King, M.; Scarlett, J.M.; Kass, P.H.; Hutchison, J.M. Characteristics of Shelter-Relinquished Animals and Their Owners Compared With Animals and Their Owners in U.S. Pet-Ownning Households. *J. Appl. Anim. Welf. Sci.* **2000**, *3*, 179–201. [\[CrossRef\]](#)
56. Reese, L.A. Community factors and animal shelter outcomes. *J. Appl. Anim. Welf. Sci.* **2022**, 1–19, ahead-of-print. [\[CrossRef\]](#) [\[PubMed\]](#)
57. Park, R.M.; Gruen, M.E.; Royal, K. Association between dog owner demographics and decision to seek veterinary care. *Vet. Sci.* **2021**, *8*, 7. [\[CrossRef\]](#)
58. Hawes, S.M.; Kerrigan, J.M.; Hupe, T.; Morris, K.N. Factors Informing the Return of Adopted Dogs and Cats to an Animal Shelter. *Animals* **2020**, *10*, 1573. [\[CrossRef\]](#)
59. Kwan, J.Y.; Bain, M.J. Owner Attachment and Problem Behaviors Related to Relinquishment and Training Techniques of Dogs. *J. Appl. Anim. Welf. Sci.* **2013**, *16*, 168–183. [\[CrossRef\]](#)
60. Lambert, K.; Coe, J.; Niel, L.; Dewey, C.; Sargeant, J.M. A systematic review and meta-analysis of the proportion of dogs surrendered for dog-related and owner-related reasons. *Prev. Vet. Med.* **2015**, *118*, 148–160. [\[CrossRef\]](#)
61. Diesel, G.; Brodbelt, D.; Pfeiffer, D.U. Characteristics of relinquished dogs and their owners at 14 rehoming centers in the United Kingdom. *J. Appl. Anim. Welf. Sci.* **2010**, *13*, 15–30. [\[CrossRef\]](#) [\[PubMed\]](#)
62. Salman, M.D.; New, J.G., Jr.; Scarlett, J.M.; Kass, P.H.; Ruch-Gallie, R.; Hetts, S. Human and animal factors related to the relinquishment of dogs and cats in 12 selected animal shelters in the United States. *J. Appl. Anim. Welf. Sci.* **1998**, *1*, 207–226. [\[CrossRef\]](#) [\[PubMed\]](#)
63. Russo, A.; Dowling-Guyer, S.; McCobb, E. Community Programming for Companion Dog Retention: A Survey of Animal Welfare Organizations. *J. Appl. Anim. Welf. Sci.* **2021**, 1–15. [\[CrossRef\]](#)
64. Cutler, J.H.; Coe, J.B.; Niel, L. Puppy socialization practices of a sample of dog owners from across Canada and the United States. *J. Am. Vet. Med. Assoc.* **2017**, *251*, 1415–1423. [\[CrossRef\]](#) [\[PubMed\]](#)
65. Howell, T.J.; King, T.; Bennett, P.C. Puppy parties and beyond: The role of early age socialization practices on adult dog behavior. *Vet. Med.* **2015**, *6*, 143–153. [\[CrossRef\]](#)
66. Serpell, J.; Jagoe, J. The domestic dog: Its evolution, behaviour and interactions with people. In *Early Experience and the Development of Behaviour*; Cambridge University Press: Cambridge, UK, 1995; pp. 79–102.
67. Weiss, E.; Gramann, S.; Spain, C.V.; Slater, M. Goodbye to a good friend: An exploration of the re-homing of cats and dogs in the US. *Open J. Anim. Sci.* **2015**, *5*, 435. [\[CrossRef\]](#)
68. Philpotts, I.; Dillon, J.; Rooney, N. Improving the Welfare of Companion Dogs-Is Owner Education the Solution? *Animals* **2019**, *9*, 662. [\[CrossRef\]](#)
69. Tuckerman, B.W.; Jensen, M.C. Stages of Small-Group Development Revisited. *Group Facil.* **2010**, 43.
70. Scarlett, J.M.; Salman, M.D.; New, J.G., Jr.; Kass, P.H. Reasons for relinquishment of companion animals in U.S. animal shelters: Selected health and personal issues. *J. Appl. Anim. Welf. Sci.* **1999**, *2*, 41–57. [\[CrossRef\]](#)
71. Eagan, B.H.; Gordon, E.; Protopopova, A. Reasons for Guardian-Relinquishment of Dogs to Shelters: Animal and Regional Predictors in British Columbia, Canada. *Front. Vet. Sci.* **2022**, *9*, 857634. [\[CrossRef\]](#)
72. Jensen, J.B.; Sandøe, P.; Nielsen, S.S. Owner-related reasons matter more than behavioural problems—A study of why owners relinquished dogs and cats to a danish animal shelter from 1996 to 2017. *Animals* **2020**, *10*, 1064. [\[CrossRef\]](#) [\[PubMed\]](#)
73. Sharkin, B.S.; Ruff, L.A. Broken bonds: Understanding the experience of pet relinquishment. *Psychol. Hum.-Anim. Bond. A Resour. Clin. Res.* **2011**, 275–287.
74. Gravrok, J.; Bendrups, D.; Howell, T.; Bennett, P. Beyond the benefits of assistance dogs: Exploring challenges experienced by first-time handlers. *Animals* **2019**, *9*, 203. [\[CrossRef\]](#) [\[PubMed\]](#)
75. Winkle, M.; Crowe, T.K.; Hendrix, I. Service Dogs and People with Physical Disabilities Partnerships: A Systematic Review. *Occup. Ther. Int.* **2012**, *19*, 54–66. [\[CrossRef\]](#) [\[PubMed\]](#)
76. Salmon, A.; Driscoll, C.; Paterson, M.B.A.; Harpur, P.; Pachana, N.A. Issues Regarding the Welfare of Assistance Dogs. *Animals* **2022**, *12*, 3250. [\[CrossRef\]](#)
77. Kent, J.L.; Mulley, C.; Stevens, N. Challenging policies that prohibit public transport use: Travelling with pets as a case study. *Transp. Policy* **2020**, *99*, 86–94. [\[CrossRef\]](#)
78. *Passenger Transport (General) Regulation*; NSW Legislation: New South Wales, Australia, 2017.
79. *Transport (Compliance and Miscellaneous) (Conduct on Public Transport) Regulations*; Victoria Legislation: Victoria, Australia, 2015.
80. Kogan, L.R.; Accornero, V.H.; Gelb, E.; Slater, M.R. Community Veterinary Medicine Programs: Pet Owners' Perceptions and Experiences. *Front. Vet. Sci.* **2021**, *8*, 678595. [\[CrossRef\]](#)
81. Slatter, J.; Lloyd, C.; King, R. Homelessness and Companion Animals: More than Just a Pet? *Br. J. Occup. Ther.* **2012**, *75*, 377–383. [\[CrossRef\]](#)

82. Chenyang, D.; Maruthaveeran, S.; Shahidan, M.F. The usage, constraints and preferences of green space at disadvantage neighborhood: A review of empirical evidence. *Urban For. Urban Green.* **2022**, *75*, 127696. [CrossRef]
83. Hughey, S.M.; Walsemann, K.M.; Child, S.; Powers, A.; Reed, J.A.; Kaczynski, A.T. Using an environmental justice approach to examine the relationships between park availability and quality indicators, neighborhood disadvantage, and racial/ethnic composition. *Landsc. Urban Plan.* **2016**, *148*, 159–169. [CrossRef]
84. Sefcik, J.S.; Kondo, M.C.; Klusaritz, H.; Sarantschin, E.; Solomon, S.; Roepke, A.; South, E.C.; Jacoby, S.F. Perceptions of Nature and Access to Green Space in Four Urban Neighborhoods. *Int. J. Environ. Res. Public Health* **2019**, *16*, 2313. [CrossRef] [PubMed]
85. Das, K.V.; Fan, Y.; French, S.A. Park-Use Behavior and Perceptions by Race, Hispanic Origin, and Immigrant Status in Minneapolis, MN: Implications on Park Strategies for Addressing Health Disparities. *J. Immigr. Minor. Health* **2017**, *19*, 318–327. [CrossRef] [PubMed]
86. Cohen, D.A.; Han, B.; Derosé, K.P.; Williamson, S.; Marsh, T.; Raaen, L.; McKenzie, T.L. Promoting physical activity in high-poverty neighborhood parks: A cluster randomized controlled trial. *Soc. Sci. Med.* **2017**, *186*, 130–138. [CrossRef]
87. Cohen, D.A.; Han, B.; Derosé, K.P.; Williamson, S.; Marsh, T.; Rudick, J.; McKenzie, T.L. Neighborhood poverty, park use, and park-based physical activity in a Southern California city. *Soc. Sci. Med.* **2012**, *75*, 2317–2325. [CrossRef]
88. Shore, E.R.; Petersen, C.L.; Douglas, D.K. Moving As a Reason for Pet Relinquishment: A Closer Look. *J. Appl. Anim. Welf. Sci.* **2003**, *6*, 39–52. [CrossRef]
89. Ramirez, V.; Frisbie, L.; Robinson, J.; Rabinowitz, P.M. The Impact of Pet Ownership on Healthcare-Seeking Behavior in Individuals Experiencing Homelessness. *Anthrozoös* **2022**, *35*, 615–632. [CrossRef]
90. O'Reilly-Jones, K. When Fido is Family: How Landlord-Imposed Pet Bans Restrict Access to Housing. *Columbia J. Law Soc. Probl.* **2019**, *52*, 427–472.
91. Cronley, C.; Strand, E.B.; Patterson, D.A.; Gwaltney, S. Homeless People who are Animal Caretakers: A Comparative Study. *Psychol. Rep.* **2009**, *105*, 481–499. [CrossRef]
92. Rhoades, H.; Winetrobe, H.; Rice, E. Pet Ownership Among Homeless Youth: Associations with Mental Health, Service Utilization and Housing Status. *Child Psychiatry Hum. Dev.* **2015**, *46*, 237–244. [CrossRef]
93. Irvine, L. Animals as Lifechangers and Lifesavers: Pets in the Redemption Narratives of Homeless People. *J. Contemp. Ethnogr.* **2013**, *42*, 3–30. [CrossRef]
94. Lem, M.; Coe, J.B.; Haley, D.B.; Stone, E.; O'Grady, W. Effects of Companion Animal Ownership among Canadian Street-involved Youth: A Qualitative Analysis. *J. Sociol. Soc. Welf.* **2013**, *40*, 285–304.
95. Irvine, L.; Kahl, K.N.; Smith, J.M. Confrontations and Donations: Encounters between Homeless Pet Owners and the Public. *Sociol. Q.* **2012**, *53*, 25–43. [CrossRef] [PubMed]
96. Power, E.R. Renting with pets: A pathway to housing insecurity? *Hous. Stud.* **2017**, *32*, 336–360. [CrossRef]
97. Sweney, M. Average London Rent Hits Record £553 a Week Amid Property Shortage. Available online: <https://www.theguardian.com/money/2022/oct/17/average-london-rent-record-property-shortage-foxtons> (accessed on 21 January 2023).
98. ICEF Monitor. European Rental Housing Costs up 17% This Year as Crunch Continues. Available online: <https://monitor.icef.com/2022/12/european-rental-housing-costs-up-17-this-year-as-crunch-continues/> (accessed on 21 January 2023).
99. Anglicare Australia. *Anglicare Australia Rental Affordability Snapshot: National Report April 2022*; Anglicare Australia: Canberra, Australia, 2022.
100. Shepherd, T. 'Heartbreaking choice': Families forced to give up dogs and cats as Australia's rental crisis bites. *The Guardian* 10 June 2022. Available online: <https://www.theguardian.com/australia-news/2022/jun/10/heartbreaking-choice-families-forced-to-give-up-dogs-and-cats-as-australias-rental-crisis-bites> (accessed on 9 January 2023).
101. Villarroel, A.; McDonald, S.R.; Walker, W.L.; Kaiser, L.; Dewell, R.D.; Dewell, G.A. Survey of reasons why veterinarians enter rural veterinary practice in the United States. *J. Am. Vet. Med. Assoc.* **2010**, *236*, 849–857. [CrossRef] [PubMed]
102. Singu, S.; Acharya, A.; Challagundla, K.; Byrareddy, S.N. Impact of Social Determinants of Health on the Emerging COVID-19 Pandemic in the United States. *Front. Public Health* **2020**, *8*, 406. [CrossRef] [PubMed]
103. Weyers, S.; Dragano, N.; Möbus, S.; Beck, E.-M.; Stang, A.; Möhlenkamp, S.; Jöckel, K.H.; Erbel, R.; Siegrist, J. Low socio-economic position is associated with poor social networks and social support: Results from the Heinz Nixdorf Recall Study. *Int. J. Equity Health* **2008**, *7*, 13. [CrossRef] [PubMed]
104. Canady, B.; Sansone, A. Health Care Decisions and Delay of Treatment in Companion Animal Owners. *J. Clin. Psychol. Med. Settings* **2019**, *26*, 313–320. [CrossRef] [PubMed]
105. Landau, R.E.; Beck, A.; Glickman, L.T.; Litster, A.; Widmar, N.J.O.; Moore, G.E. Use of veterinary services by Latino dog and cat owners with various degrees of English-language proficiency. *J. Am. Vet. Med. Assoc.* **2016**, *248*, 681–689. [CrossRef]
106. Krienert, J.L.; Walsh, J.A.; Matthews, K.; McConkey, K. Examining the Nexus Between Domestic Violence and Animal Abuse in a National Sample of Service Providers. *Violence Vict.* **2012**, *27*, 280–296. [CrossRef]
107. Faver, C.A.; Strand, E.B. Domestic Violence and Animal Cruelty: Untangling the Web of Abuse. *J. Soc. Work. Educ.* **2003**, *39*, 237–253. [CrossRef]
108. Faver, C.A.; Cavazos, A.M. Animal Abuse and Domestic Violence: A View from the Border: Animal Abuse and Family Violence: Linkages, Research and Implications for Professional Practice. *J. Emot. Abus.* **2007**, *7*, 59–81. [CrossRef]
109. Flynn, C.P. Woman's Best Friend: Pet Abuse and the Role of Companion Animals in the Lives of Battered Women. *Violence Against Women* **2000**, *6*, 162–177. [CrossRef]



110. Ascione, F.R. The abuse of animals and human interpersonal violence: Making the connection. In *Child abuse, Domestic Violence, and Animal Abuse: Linking the Circles of Compassion for Prevention and Intervention*; Purdue University Press: West Lafayette, IL, USA, 1999; pp. 50–61.
111. Ascione, F.R. *Safe Havens for Pets: Guidelines for Programs Sheltering Pets for Women Who Are Battered*; Utah State University: Logan, Utah, 2000.
112. Ascione, F.R. *The International Handbook of Animal Abuse and Cruelty: Theory, Research, and Application*; Purdue University Press: West Lafayette, IL, USA, 2010.
113. Ascione, F.R.; Weber, C.V.; Thompson, T.M.; Heath, J.; Maruyama, M.; Hayashi, K. Battered Pets and Domestic Violence: Animal Abuse Reported by Women Experiencing Intimate Violence and by Nonabused Women. *Violence Against Women* **2007**, *13*, 354–373. [[CrossRef](#)] [[PubMed](#)]
114. Wood, D.S.; Weber, C.V.; Ascione, F.R. The abuse of animals and domestic violence: A national survey of shelters for women who are battered. *Soc. Anim.* **1997**, *5*, 205–218. [[CrossRef](#)]
115. Arkow, P.; Ascione, F.R. *Child Abuse, Domestic Violence and Animal Abuse Linking the Circles of Compassion for Prevention and Intervention*; Purdue University Press: West Lafayette, IL, USA, 2001.
116. Boat, B.W. Connections among adverse childhood experiences, exposure to animal cruelty and toxic stress: What do professionals need to consider. *Natl. Cent. Prosec. Child Abus. Update* **2014**, *24*, 1–3.
117. Loring, M.T.; Bolden-Hines, T.A. Pet Abuse by Batterers as a Means of Coercing Battered Women Into Committing Illegal Behavior. *J. Emot. Abus.* **2004**, *4*, 27–37. [[CrossRef](#)]
118. Carlisle-Frank, P.; Frank, J.M.; Nielsen, L. Selective battering of the family pet. *Anthrozoös* **2004**, *17*, 26–42. [[CrossRef](#)]
119. Hartman, C.A.; Hageman, T.; Williams, J.H.; Ascione, F.R. Intimate Partner Violence and Animal Abuse in an Immigrant-Rich Sample of Mother–Child Dyads Recruited From Domestic Violence Programs. *J. Interpers. Violence* **2018**, *33*, 1030–1047. [[CrossRef](#)]
120. Mota-Rojas, D.; Monsalve, S.; Lezama-García, K.; Mora-Medina, P.; Domínguez-Oliva, A.; Ramírez-Necoechea, R.; Garcia, R.d.C.M. Animal Abuse as an Indicator of Domestic Violence: One Health, One Welfare Approach. *Animals* **2022**, *12*, 977. [[CrossRef](#)]
121. Volant, A.M.; Johnson, J.A.; Gullone, E.; Coleman, G.J. The Relationship Between Domestic Violence and Animal Abuse: An Australian Study. *J. Interpers. Violence* **2008**, *23*, 1277–1295. [[CrossRef](#)]
122. Gallagher, B.; Allen, M.; Jones, B. Animal abuse and intimate partner violence: Researching the link and its significance in Ireland—A veterinary perspective. *Ir. Vet. J.* **2008**, *61*, 658–667. [[CrossRef](#)] [[PubMed](#)]
123. Febres, J.; Shorey, R.C.; Brasfield, H.; Zucosky, H.C.; Ninnemann, A.; Elmquist, J.; Bucossi, M.M.; Andersen, S.M.; Schonbrun, Y.C.; Stuart, G.L. Adulthood Animal Abuse Among Women Court-Referred to Batterer Intervention Programs. *J. Interpers. Violence* **2012**, *27*, 3115–3126. [[CrossRef](#)]
124. Hartman, C.; Hageman, T.; Williams, J.H.; Mary, J.S.; Ascione, F.R. Exploring Empathy and Callous–Unemotional Traits as Predictors of Animal Abuse Perpetrated by Children Exposed to Intimate Partner Violence. *J. Interpers. Violence* **2019**, *34*, 2419–2437. [[CrossRef](#)] [[PubMed](#)]
125. Travers, C.; Dixon, A.; Thorne, K.; Spicer, K. Cruelty towards the family pet: A survey of women experiencing domestic violence on the Central Coast, New South Wales. *Med. J. Aust.* **2009**, *191*, 409–410. [[CrossRef](#)]
126. Haden, S.C.; McDonald, S.E.; Booth, L.J.; Ascione, F.R.; Blakelock, H. An Exploratory Study of Domestic Violence: Perpetrators’ Reports of Violence Against Animals. *Anthrozoös* **2018**, *31*, 337–352. [[CrossRef](#)]
127. Kotzmann, J.; Bagaric, M.; Wolf, G.; Stonebridge, M. Addressing the impact of animal abuse: The need for legal recognition of abused pets as sentient victims of domestic violence in Australia. *Univ. New South Wales Law J.* **2022**, *45*, 184–208. [[CrossRef](#)]
128. Newberry, M. Pets in danger: Exploring the link between domestic violence and animal abuse. *Aggress. Violent Behav.* **2016**, *34*, 273–281. [[CrossRef](#)]
129. Lem, M. Barriers to accessible veterinary care. *Can. Vet. J.* **2019**, *60*, 891–893.
130. Decker Sparks, J.L.; Camacho, B.; Tedeschi, P.; Morris, K.N. Race and ethnicity are not primary determinants in utilizing veterinary services in underserved communities in the United States. *J. Appl. Anim. Welf. Sci.* **2018**, *21*, 120–129. [[CrossRef](#)]
131. Downes, M.J.; Devitt, C.; Downes, M.T.; More, S.J. Neutering of cats and dogs in Ireland; pet owner self-reported perceptions of enabling and disabling factors in the decision to neuter. *PeerJ* **2015**, *2015*, e1196. [[CrossRef](#)]
132. Faver, C.A. Sterilization of companion animals: Exploring the attitudes and behaviors of Latino students in south Texas. *J. Appl. Anim. Welf. Sci.* **2009**, *12*, 314–330. [[CrossRef](#)] [[PubMed](#)]
133. Lue, T.W.; Pantenburg, D.P.; Crawford, P.M. Impact of the owner-pet and client-veterinarian bond on the care that pets receive. *J. Am. Vet. Med. Assoc.* **2008**, *232*, 531–540. [[CrossRef](#)] [[PubMed](#)]
134. Rohlf, V.I.; Bennett, P.C.; Toukhsati, S.; Coleman, G. Beliefs Underlying Dog Owners’ Health Care Behaviors: Results from a Large, Self-Selected, Internet Sample. *Anthrozoös* **2012**, *25*, 171–185. [[CrossRef](#)]
135. American Veterinary Medical Association. *AVMA Pet Ownership and Demographics Sourcebook*; Libraries; Colorado State University: Fort Collins, CO, USA, 2018.
136. Dolan, E.D.; Scotto, J.; Slater, M.; Weiss, E. Risk factors for dog relinquishment to a Los Angeles municipal animal shelter. *Animals* **2015**, *5*, 1311–1328. [[CrossRef](#)]
137. King, E.; Mueller, M.K.; Dowling-Guyer, S.; McCobb, E. Financial fragility and demographic factors predict pet owners’ perceptions of access to veterinary care in the United States. *J. Am. Vet. Med. Assoc.* **2022**, *260*, 1–8. [[CrossRef](#)]

138. Patronek, G.J.; Glickman, L.T.; Beck, A.M.; McCabe, G.P.; Ecker, C. Risk factors for relinquishment of dogs to an animal shelter. *J. Am. Vet. Med. Assoc.* **1996**, *209*, 572–581. [PubMed]
139. Ly, L.H.; Gordon, E.; Protopopova, A. Exploring the Relationship Between Human Social Deprivation and Animal Surrender to Shelters in British Columbia, Canada. *Front. Vet. Sci.* **2021**, *8*, 656597. [CrossRef] [PubMed]
140. Kelman, M.; Barrs, V.R.; Norris, J.M.; Ward, M.P. Socioeconomic, geographic and climatic risk factors for canine parvovirus infection and euthanasia in Australia. *Prev. Vet. Med.* **2020**, *174*, 104816. [CrossRef]
141. Brady, S.; Norris, J.M.; Kelman, M.; Ward, M.P. Canine parvovirus in Australia: The role of socio-economic factors in disease clusters. *Vet. J. (1997)* **2012**, *193*, 522–528. [CrossRef]
142. Kelman, M.; Ward, M.P.; Barrs, V.R.; Norris, J.M. The geographic distribution and financial impact of canine parvovirus in Australia. *Transbound. Emerg. Dis.* **2019**, *66*, 299–311. [CrossRef]
143. Zourkas, E.; Ward, M.P.; Kelman, M. Canine parvovirus in Australia: A comparative study of reported rural and urban cases. *Vet. Microbiol.* **2015**, *181*, 198–203. [CrossRef] [PubMed]
144. McDonald, S.E.; Doherty, C.; Sweeney, J.; Kisiel, L.; Matijczak, A.; Niestat, L.; Gupta, M. Barriers to and facilitators of pet grooming among clients served by a subsidized grooming service program. *Front. Vet. Sci.* **2022**, *9*, 1021707. [CrossRef] [PubMed]
145. Mueller, M.K.; Chubb, S.; Wolfus, G.; McCobb, E. Assessment of canine health and preventative care outcomes of a community medicine program. *Prev. Vet. Med.* **2018**, *157*, 44–49. [CrossRef] [PubMed]
146. Poss, J.E.; Bader, J.O. Attitudes toward companion animals among Hispanic residents of a Texas border community. *J. Appl. Anim. Welf. Sci.* **2007**, *10*, 243–253. [CrossRef]
147. Poss, J.E.; Bader, J.O. Results of a free spay/neuter program in a Hispanic colonia on the Texas-Mexico border. *J. Appl. Anim. Welf. Sci.* **2008**, *11*, 346–351. [CrossRef]
148. Poss, J.E.; Everett, M. Impact of a bilingual mobile spay/neuter clinic in a U.S./Mexico border city. *J. Appl. Anim. Welf. Sci.* **2006**, *9*, 71–77. [CrossRef]
149. Foodbank Australia. Foodbank Hunger Report. 2022. Available online: <https://reports.foodbank.org.au/wp-content/uploads/2022/10/Foodbank-Hunger-Report-2022-1.pdf> (accessed on 21 January 2022).
150. Irvine, L. *My Dog Always Eats First: Homeless People and Their Animals*; Lynne Rienner Publishers: Boulder, CO, USA, 2013.
151. Kidd, A.H.; Kidd, R.M. Benefits and liabilities of pets for the homeless. *Psychol. Rep.* **1994**, *74*, 715–722. [CrossRef]
152. Barua, B.; Jacques, D. *Comparing Performance of Universal Health Care Countries, 2018*; Fraser Institute: Vancouver, BC, Canada, 2018.
153. Becker, M.; Volk, H.; Kunzmann, P. Is Pet Health Insurance Able to Improve Veterinary Care? Why Pet Health Insurance for Dogs and Cats Has Limits: An Ethical Consideration on Pet Health Insurance. *Animals* **2022**, *12*, 1728. [CrossRef]
154. Coe, J.B.; Adams, C.L.; Bonnett, B.N. Prevalence and nature of cost discussions during clinical appointments in companion animal practice. *J. Am. Vet. Med. Assoc.* **2009**, *234*, 1418–1424. [CrossRef]
155. Animal Justice Party. Veterinary Care. Available online: [https://www.animaljusticeparty.org/veterinary\\_care](https://www.animaljusticeparty.org/veterinary_care) (accessed on 21 January 2023).
156. Nolen, R.S. Model Aims to Increase Access to Veterinary Care AlignCare Pilot Receives Funding to Continue Work. AMER VETERINARY MEDICAL ASSOC 1931 N MEACHAM RD SUITE 100, SCHAUMBURG, IL ... : 2021. American Veterinary Medical Association, JAVMA News. Available online: <https://avmajournals.avma.org/display/post/news/model-aims-to-increase-access-to-veterinary-care.xml> (accessed on 9 January 2023).
157. Courcier, E.A.; Thomson, R.M.; Mellor, D.J.; Yam, P.S. Epidemiological study of environmental factors associated with canine obesity. *J. Small Anim. Pract.* **2010**, *51*, 362–367. [CrossRef]
158. Špinka. Animal agency, animal awareness and animal welfare. *Anim. Welf.* **2019**, *28*, 11–20. [CrossRef]
159. Taylor, J.S. *Personal Autonomy: New Essays on Personal Autonomy and Its Role in Contemporary Moral Philosophy*; Cambridge University Press: Cambridge, UK, 2005.
160. Morris, T. The Pencilword: On a Plate. Available online: <https://www.rnz.co.nz/news/the-wireless/373065/the-pencilword-on-a-plate> (accessed on 12 February 2023).
161. Mota-Rojas, D.; Mariti, C.; Zdeinert, A.; Riggio, G.; Mora-Medina, P.; del Mar Reyes, A.; Gazzano, A.; Domínguez-Oliva, A.; Lezama-García, K.; José-Pérez, N.; et al. Anthropomorphism and Its Adverse Effects on the Distress and Welfare of Companion Animals. *Animals* **2021**, *11*, 3263. [CrossRef] [PubMed]
162. Spitznagel, M.B.; Gober, M.W.; Patrick, K. Caregiver burden in cat owners: A cross-sectional observational study. *J. Feline Med. Surg.* **2023**, *25*, X221145835. [CrossRef]
163. Spitznagel, M.B.; Patrick, K.; Hillier, A.; Gober, M.; Carlson, M.D. Caregiver burden, treatment complexity, and the veterinarian–client relationship in owners of dog with skin disease. *Vet. Dermatol.* **2022**, *33*, 208–213. [CrossRef] [PubMed]

**Disclaimer/Publisher’s Note:** The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.