A Biomedical Ethical Analysis of Using Socially Assistive Robots with an Animal-like Form with Elderly Individuals in Institutionalized Care

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Abstract

Animal-like Socially Assistive Robots (A-SARs) are primarily intended to improve patients' quality of life in institutional eldercare facilities and to reduce caregiver workload by simulating the benefits of Animal Assisted Therapy. A-SARs are used by elderly residents, caregivers, family members, and researchers in institutionalized eldercare. These robots are used to promote emotional, social, and imaginative engagement as well as empathy and communication. While benefits of usage has been extensively evaluated, the ethical implications of replacing human interactions with A-SARs has not been considered in-depth.

The overarching objective of this thesis was to examine the ethical considerations for using A-SARs in eldercare. A critical interpretive literature review revealed that major ethical concerns were centered around interpretations of the rights of elderly residents, caregiver expectations, and family obligations. The use of A-SARs was not considered inherently unethical if it was used to improve communication and existing relationships. Ethical theories used to support the considerations found in the literature were: duty-based deontology, virtue ethics, ethics of care, and the capabilities approach.

The wider Patient-Centered Clinical Method provided a more in-depth theoretical analysis approach for Canadian eldercare. The four components of the model—1) exploring health, disease, and the illness experience, 2) understanding the whole person, 3) finding common ground, and 4) enhancing the patient-doctor relationship—were analyzed independently in light of the major ethical considerations raised about the use of A-SARs in institutional eldercare. The legal framework of the Ontario Long Term Home Act was taken as an example of normative requirements that governs the ethical expectations of resident rights and caregiver expectations.

The conclusion of this thesis suggests that the legislation is compatible with patient-centered care and guides the ethical expectations that ground caregiver-resident relationships when using A-SARs. Furthermore, considerations from the capabilities approach enrich how capabilities would impact caregiving relationships. The insights in this thesis presents a relevant contribution to the applied utilization, ethical concerns, and legislative considerations for future

discussions on the impact of A-SARs use on institutional eldercare practices. The findings from this thesis may be useful for future discussions in the dynamic field of socially assistive robots and eldercare.

Résumé

Les robots d'assistance sociale de type animal (A-SAR) sont principalement destinés à améliorer la qualité de vie des patients et à réduire la charge de travail du personnel soignant en simulant les avantages de la thérapie assistée par les animaux. Les A-SARs ont été utilisés par des résidents âgés, des soignants, des membres de la famille et des chercheurs dans le cadre des soins aux personnes âgées en institution. Dans des contextes appliqués, ces robots ont également été utilisés pour promouvoir l'engagement émotionnel, social et imaginatif ainsi que l'empathie et la communication.

L'objectif principal de ce mémoire était d'examiner les considérations éthiques de l'utilisation des A-SAR dans les soins aux personnes âgées. La revue critique de la littérature a révélé que les principales considérations étaient centrées sur les interprétations des droits des résidents âgés, les attentes des soignants et les obligations familiales. L'utilisation des A-SAR n'était pas intrinsèquement contraire à l'éthique si elle était utilisée pour améliorer la communication et les relations existantes. Les théories éthiques utilisées pour soutenir les considérations trouvées dans la littérature étaient : la déontologie basée sur le devoir, l'éthique de la vertu, l'éthique des soins et l'approche des capacités. Étonnamment, aucune analyse de ce type ne couvrait les considérations éthiques invoquées par l'approche des soins centrés sur le patient.

La méthode clinique plus large centrée sur le patient de Stewart et al. (2014) fournit une approche d'analyse théorique plus approfondie pour les soins des personnes âgées. Les quatre composantes du modèle–1) explorer la santé, la maladie et l'expérience de la maladie, 2) comprendre la personne dans sa globalité, 3) trouver un terrain d'entente et 4) améliorer la relation patient-médecin–ont été analysés de manière indépendante, à la lumière des principales considérations soulevées sur l'utilisation des A-SAR dans les soins institutionnels aux personnes âgées. Le cadre juridique de la loi sur les foyers de soins de longue durée de l'Ontario (2007) a été pris comme un exemple d'exigences normatives qui régit les attentes éthiques des droits des résidents et les attentes des soignants. Ce mémoire suggère que la législation est compatible avec les soins centrés sur le patient et oriente les pratiques acceptables de soins aux personnes âgées faites par les soignants dans leur utilisation des A-SARs. En outre, les

considérations de l'approche par les capacités enrichissent la manière dont les capacités auraient un impact sur les relations de soins.

Les idées de ce mémoire présentent une contribution pertinente au contexte appliqué, à la bioéthique, et aux considérations législatives pour les discussions futures sur l'impact de l'utilisation des A-SARs sur les pratiques de soins aux personnes âgées en institution. Ce mémoire peut être utile pour les discussions futures dans le domaine dynamique des robots d'assistance sociale et des soins aux personnes.

Contents

List of Abbreviations

AAI: Animal Assisted Intervention

AAT: Animal Assisted Therapy

ADL: Activities of Daily Living

AI: Artificial Intelligence

ARR: Assistive Rehabilitative Robot

A-SAR: Animal-like Socially Assistive Robot

CA: Capabilities Approach

LTCHA: Long Term Care Homes Act

PCC: Patient-Centered Care

QoL: Quality of Life

RCC: Resident-Centered Care

SAR: Socially Assistive Robot

SIR: Socially Interactive Robot

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CHAPTER 1: Rethinking the Role of Robotics in the Eldercare Context

> Technologies for the 'silver generation' is not as smooth as it is intended to be… technology use results in the co-construction of the social phenomenon of aging.
> (Nierling & Domínguez-Rué, 2016)

1.0 Elderly Residents in Eldercare

Over the past century gains in life expectancy have been unprecedented and human relationships with animal-like technology has also changed. Many individuals are living in contexts where interactions with technology, in a variety of forms, is commonplace. The reality of living with adaptive eldercare services is unprecedented and suggests new ethical questions and discussions (Sharkey, 2014).

Extended years of life has created a category of individuals who are classified as 'elderly.' A Canadian born in 1900 would not expect to live beyond 50 years of age (Suzman & Beard, 2011). In 2019 the average life expectancy for a Canadian was 82 years old (Duffin, 2019). By 2036 the number of people aged 80 and older will double to 3.3 million (Statistics Canada, 2011). Many of these elderly individuals will likely require specialized care in facilities with assistive services. According to Chappel & Hollander (2011), there are three main ways used to define an elderly person: 1) by chronological age in years; 2) by titles and possible roles individuals take on within their social networks; and 3) by a combined physical and health status whereby the person is vulnerable to multiple chronic comorbidities which have worsened over time. In most developed countries, the chronological age 65 has been used as the numerical cut off between the elderly and the non-elderly. This number is said to date back to more than a century ago, to Prince Otto von Bismarck, who selected 65 as the numerical age at which citizens should retire and participate in the national pension plan (Orimo et al., 2006). During the period of his influence in Europe from 1871-1890, the life expectancy was 35 years old; 95% of the population would have died by 65 years old (Broadberry & O'Roule, 2010, p.110). While the use of numerical values to categorize whether an individual is 'elderly' is currently contested as it is not an accurate indicator of a person's health (Chappel & Hollander, 2011) however, this convention persists.

Another definition is based on the social titles assigned to individuals. Social titles such as grandparent, village elder, senior are used to depict those aged 65 years old and older (Gruman et al., 1979). In stories, elderly characters are often called grandpa, e.g., 78-year-old Carl Fredrickson in the movie UP (Doctor & Rivera, 2009) or Frank in the movie Robot & Frank (Schreier, 2012). These social titles are specific to characters who have their physical and cognitive health questioned by adult or child characters. The ageist undertones create a stereotype of what elderly individuals are expected to be, i.e., physically weak or frail (Gendron, Inker, Welleford, Bowers, 2018). The metaphorical othering of elderly individuals contributes social titles which increase intergenerational conflict between the younger and older generations (Lakoff & Johnson, 1980). The elderly group has been metaphorically categorized as a dangerous force of nature, i.e., a grey tsunami (Gruman et al., 1979) and has faced backlash from elderly advocacy groups (Gendron et al., 2018). This conceptualization lends credence to the definition of elderly as being physically impaired.

As a result, the more widely accepted definition of 'elderly' is based on the combined physical and life status of those aged 65 and above. Studies have shown that being at an advanced age places individuals at a higher risk for comorbidity, polypharmacy, dementia, and other such conditions of cognitive and physical decline (Orimo, 2006). Their illness experience may make it difficult to complete activities of daily living (ADL), such as moving from place to place, maintaining personal hygiene, toileting, dressing, and eating (Keidel, 2002). In this case, a healthy, stronger person over the age of 65 would not necessarily be considered elderly.

For the purposes of this thesis the last concept is integral and elderly[1] will be considered as persons aged 65 years old or older who have moved to institutional eldercare due to the consequences of some health or social event with lasting implications for poor health (e.g., disability, illness, death of a spouse, or declining health) and require caregiver assistance for ADL. Additionally, there are various terms in the literature that categorize eldercare institutions (Ballard, 2016). These institutions are where elderly can reside for extended

[1] Within this thesis the term 'elderly individuals' is used equivalently with elderly patients and elderly residents of institutionalized eldercare.

periods, e.g., long-term care facilities, assisted living facilities, retirement homes, residential facilities, nursing homes and convalescent homes (Ballard, 2016).

1.0.1 Compassion Fatigue and Caregivers

A major problem is increasing numbers of elderly residents who require daily assistance relates to a higher demand for informal and formal caregivers (DeWall et al., 2011). The provision of eldercare is not an easy task. Eldercare responsibilities are associated with higher levels of strain and lower levels of well-being (Bramble, Duerk, & Baltes, 2019). Friends and family who perform services when they visit the resident and who have a personal investment in the resident's health and wellbeing are termed informal caregivers. Meanwhile, professionally certified to perform their caregiving job at the eldercare institution are termed formal caregivers. For the purpose of this thesis, 'caregivers' will be restricted to formal caregivers. Formal caregivers are paid by the government, family, or private institutions, including nurses, occupational therapists, rehabilitative therapists, orderlies, or Préposé aux Bénéficiaires.

Caregivers exert energy to complete tasks, i.e., 'workload' (Van Bogaert et al., 2013). The workload is the total physical and emotional labour required to provide eldercare (Keidel, 2002). An overwhelming workload can lead to a specific type of physical and emotional stress called 'compassion fatigue.' This occurs when caregivers have provided highly emotionally taxing care for extended periods but feel unrewarded for their efforts (Keidel, 2002). The heightened feelings of frustration may increase tensions until informal and formal caregivers feel that emotionally investing in the interaction becomes meaningless (Nerenberg, Davies, & Navarro, 2012). The caregivers can become despondent, indifferent, and apathetic (Bolin, Lindgren, Lundborg, 2008; Heitmueller & Inglis, 2007). Some caregivers may become isolated leading to further resentment, loneliness, and objectification of those they are expected to provide care for (Neufeld & Harrison, 1998). This caregiver disengagement is linked to heightened senior abuse and neglect (Yaffe et al., 2002). Many eldercare facilities recognize the existing strain on caregiver-resident relationships and are searching for alternative solutions (Yaffe et al., 2002; Day, 2011).

1.0.2 Challenges in Eldercare and Proposed QoL improvements

In the challenge of providing care that meets an expected standard of good care, various social interventions have been developed. Quality of Life (QoL) is a term popularized by Kane (2001) as a priority goal of LTC for meeting ADL. What contributes to good QoL has been investigated by several researchers (Edwards et al., 2003; Kane, 2003; Murphy et al., 2007), and while there is little consensus on what the domains of QoL are called, there is a general agreement on what matters for elderly resident's QoL. A common theme across studies which focuses on what adds quality to resident's lives is that social relationships and social support matters for elderly resident's QoL. Elderly individuals are likely to experience the rupture of bonds from an established social network (Abdi et al., 2018; DeWall et al., 2011; Scharf & Keating, 2012). According to Scharf & Keating (2017) the elderly residents are at high risk of becoming separated from crucial social activities linked to the familiarity of independent living and life outside the walls of the facility. Smith & Victor (2019) reports how contacts with friends, relatives, and neighbours halved after elderly residents transferred to a care facility, while relationships became less intimate at the same time. Elderly residents in institutionalized eldercare often spend most of their time alone. In a study of 107 nursing home residents with dementia, researchers found that nearly 45% received little to no facility activities, 20% received occasional activities, and only 12% received daily activities (Buettner & Fitzsimmons, 2003). Studies have recognized that elderly residents who lack social connections, infrequent participation in social activities, and social disengagement are at risk of rapid cognitive decline (Zunzunegui et al.,2003; Walsh & Keating, 2017).

In Canada, Coughlan and Ward (2007) explored residents' understanding of 'quality of care' in LTC settings. They found that residents' understanding of 'quality of care' was analogous to 'quality of life' because they focused on the socio psychological as opposed to the technical elements of care. QoL interventions such as one-on-one sessions with pets are encourage the creation of new friendships or confidants (Wada & Shibata, 2007). Spiritual connection of engaging in shared religious beliefs and culture-specific rituals also amplifies a sense of personal belonging (Eckert et al., 2001). The concept of wanting company, similar to Register and Herman's (2010) explanation of the dimensions of belonging helps healthcare

professionals identify what to focus on when planning patient-centered interventions, such as enjoying nature or engaging in creative engagement. The social engagement interventions reduce feelings of boredom and apathy (Aday, Wallace, & Krabill, 2019; Bacsu et al., 2014). Eldercare facilities are legally obligated to provide care services that meets 'residents' needs and respects their rights (CUPE, 2017). Activities and interventions are implemented with careful consideration on how it might affect the residents' QoL. Ultimately, QoL is a personal perception that is a broad-ranging concept, affected in a multi-faceted way by a person's physical health, psychological state, personal belief, social relationship, and their relationship to their environment (WHO, 2004). With thousands of elderly individuals living in institutionalized eldercare settings QoL interventions can alleviate the caregiving and QoL problems within eldercare institutions.

1.0.3 Positive and Negative Outcomes of Alternative Animal-Assisted Interventions

Animal-Assisted Interventions (AAIs) appeared in the 1860s as a possible clinical method to improve an individual person's wellbeing while ill (Bernabei et al., 2013). One of the pioneers of nursing, Florence Nightingale, observed that "a small pet is often an excellent companion for the sick, especially for long chronic cases", and recommended that patients have access to such animals while receiving medical attention (Baun, 1991, p.103). From there, it was a small step to conclude that if pets are beneficial for sick patients, they may be beneficial for elderly residents. In the past fifty years, AAIs have risen from sporadic to mainstream media in institutionalized elder care settings (Lane et al., 2016). The spectrum of AAIs includes animal-assisted activities (AAAs, with recreational goals), animal-assisted education (AAE, with educational goals), and animal-assisted therapy (AAT, with therapeutic goals). In the last twenty years, there has been an exponential increase in the number of eldercare AAT interventions (Bernabei et al., 2013).

There are many definitions of AAT. LaJoie (2003) reports finding 20 different definitions of AAT and 12 different terms for the same phenomenon (e.g., pet therapy, pet psychotherapy, pet facilitated psychotherapy, four-footed therapy, animal facilitated counseling, and co-therapy with an animal). The multiplicity of terms and definitions creates confusion both within the field and without. In an attempt to provide clarity the Delta Society (n.d.), one of the largest

organizations responsible for the certification of therapy animals in the USA, published the following widely cited definitions of AAA and AAT:

> "AAA provides opportunities for motivational, educational, recreational, and/or therapeutic benefits to enhance QoL. AAAs are delivered in a variety of environments by specially trained professionals, paraprofessionals, and/or volunteers, in association with animals that meet specific criteria. Key features include the absence of specific treatment goals; visit content is spontaneous.
> 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 professional with specialized expertise and within the scope of practice of his/her profession. Key features include specified goals and objectives to each individual, and measured progress" (Delta Society, n.d.)

The Delta Society's definition of AAT is general enough to include various animal-related interventions and shares the following attributes: 1) the intervention involves the use of an animal or animals; and 2) the intervention must be delivered by, or under the oversight of, a health/human service professional who is practicing within the scope of his/her professional expertise (Delta Society, n.d.). There are beneficial and negative effects of implementing AAT in eldercare (Wells & Rodi, 2000; Shiloh, Sorel, & Terkel, 2003; Ventura et al., 2010) as summarized in Table 1.0.

Table 1.0 General Effects of Implementing AAT in Eldercare

Positive outcomes of AAT	Negative impacts of AAT
Feelings of relaxation Improved mood Stress buffer Improved cardiovascular health	Insufficient caregiver resources Injuries Financial Costs for Veterinarian Care Physical limitations Allergies Infections / Disease

Positive outcomes of AAT are very pronounced in those who are experiencing a crisis, particularly when owners were found to be attached to their animals (Wells & Rodi, 2000). AAT

is effective when the animal is suitably trained to meet the needs of the institutional eldercare settings (Cherniack & Cherniack, 2014). According to a study measuring the impact of AAT on verbal reports of attachment, objective assessments of loneliness decreased when pet attachment was high (Prato-Previde et al., 2006). In an elderly group with particularly high levels of distress (the bereaved) those who were pet owners had significantly less severe symptoms of depression (Garrity et al., 2015). In a controlled laboratory setting study by Shiloh, Sorel, & Terkel (2003), 58 participants were exposed to a stressful situation - the presence of a Tarantula spider - which they were told they might be asked to hold, and then randomly assigned a rabbit, a turtle, a toy rabbit, a toy turtle, or to a control group with no animal or toy. Petting an animal reduced anxiety. The anxiety-reducing effect applied to both the soft cuddly animals and hard-shelled ones. The reduced physiological tensions, according to the State-Trait Anxiety Inventory, applied to people with different attitudes towards animals and were not restricted to animal lovers (Shiloh, Sorel, & Terkel, 2003).

Animal use in therapy has been found to encourage communication with users' feelings enabling them to talk about their feelings without interruptions (Aarskog et al., 2019; Filan & Llewellyn-Jones, 2006). Engagement with animals increases the amount of time individuals spend outside on walks or with other people and may provide a common discussion point with others whom they might not have had interactions with otherwise (Jorgenson, 1997). Pet visitation programs encourage elderly individuals to pet a dog in a group setting to increase community bonding (Kramer, Friedmann, & Bernstein, 2009). In addition to these findings, AAT has been shown to provide multiple other benefits that include improving motor skills; verbal, tactile, and auditory stimulation; verbalization skills; ambulation and equilibrium; instruction following and decision making; memory recall; and concentrated and extended attention span (Jorgenson, 1997). There is evidence that owning a pet is beneficial for cardiovascular health as a meta-analysis found that a higher survival rate was observed in the pet owner group, with pet owners having significantly lower heart rate, mean arterial pressure compared to non-pet-owners (El-Qusharyi et al., 2020). Coppola (2006) found that blood pressure decreased when petting a familiar dog than when petting an unfamiliar dog. Yet, not all studies report benefits of AAT, with some studies suggesting the benefits of pet ownership can be attributed to the

more active lifestyle due to the physical demands of taking care of a pet rather than the physical presence of an animal (Barker & Wolen, 2008).

In addition to the controversy over benefits of ATT in the community, institutional eldercare facilities have found that problems of implementing AAT outnumber the possible benefits (Eachus, 2001). AAT is limited by implementation problems and worries that caregiver workloads could increase if living animals are introduced into eldercare (Wilson & Barker, 2003). Caregiving staff fear that introducing live animals will increase workload as these animals will require daily food and water, of which deprivation would be cruel and unethical (Cherniack & Cherniack, 2014). Animals can also cause injuries for pet owners. The US Center for Disease Control and Prevention reported 86,629 falls per year are attributed to dogs and cats, with a mean injury rate of 29.7 per 100,000 persons a year from 2001 to 2006 (Prevention, 2009). A case series from Australia reported 16 elderly individuals developed fractures due to human-animal interactions over 18 months (Kurrle, Day, & Cameron, 2004). There are also financial burdens as the average lifetime cost of an average-sized pet can surpass CAD 10,000 for a dog and CAD 8,000 for a cat, not including health-related surgeries that can cost up to or over CAD 7,000 per operation (Dangerfield, 2018; Walsh, 2009).

Elderly are more likely to have physical limitations at advanced ages, e.g., conditions such as arthritis, osteoporosis, and hypertension (Suzman & Beard, 2011). They may struggle to take the pets outside for the recommended periods (Beck & Katcher, 2003). Limiting the animal's freedom to move, exercise, and play causes heightened stress levels in dogs leading to behavioural disorders such as excessive aggression (Coppola, 2006; Walsh, 2009). To handle behavioural problems, the facility would be required to find additional staff or volunteers to train or care for these animals.

The prevalence of allergic diseases in the elderly population is estimated to be around 5-10% and can worsen other chronic diseases (Ventura et al., 2010). Allergies in elderly individuals tend to worsen with age, mostly because the immune system will break down (Baptist, & Nyenhuis, 2018). Typical symptoms of allergic rhinitis like nasal obstruction, postnasal drip, or cough may be aggravated by the anatomic and physiological changes of the nose that occurs with age (Baptist, & Nyenhuis, 2018). Since many dog behaviours in AAT

include rubbing or nuzzling, institutions that provide care for immunocompromised elderly would need to consider allergy-related complications (Michelazzi, 2007).

Other adverse consequences could include infection due to parasites and diseases (Filan & Llewellyn-Jones, 2006). During the COVID-19 pandemic, one household pet tested positive for coronavirus, and researchers found there is a possibility of animal-human transmission (Adam, 2020). Elderly individuals may place themselves in danger by engaging with habits such as inviting the pet to engage in close, intimate interactions such as face licking (Mani & Maguire, 2009; Stull, Peregrine, Sargeant, & Weese, 2012). Although the positive effects of AAT are known, most eldercare facilities do not accept pets for the possibly negative effects described above.

1.1 Socially Assistive Robots for Elderly Individuals

To address the possible limitations and feasibility issues of using live animals in AAT, advances in robotics has led to a large body of evidence suggesting that aging technologies can assist elderly individuals in remaining active, socially connected, and emotionally satisfied (Abdi, Al-Hindawi, Ng, & Vizcaychipi, 2018; DeWall et al., 2011; Zafrani & Nimrod, 2019). There appears to be a push towards using more technology for eldercare where the evaluated outcomes are for efficacy or technical feasibility, however, evaluations have not necessarily considered the ethical complexities of healthcare (Nierling & Domínguez-Rué, 2016).

This may be an issue as healthcare robots are increasing in prevalence in countries such as Japan, Germany, and the Netherlands (Shibata & Wada, 2011). Japan is at the forefront of social, economic, and medical advances in aging and is creating and using robots for companionship, therapy, safety, and treatment (Ries & Sugihara, 2017; Takanori, 2007). Alongside Japan, the European Union (EU) is pursuing research into social robots. Social Engagement with Robots and Agents is an EU project that aims to understand how people react to robots in their daily lives (von der Putten et al., 2011). The European focus is on developing pilot studies that test how robotics can enrich human life (Cavallo et al., 2018). Canada, meanwhile, has conducted limited research into the effect robots could have on eldercare services within long-term care facilities (Sabelli et al., 2011).

The role of technology in eldercare services is not clear and requires specific consideration in technological development and design (Nierling & Domínguez-Rué, 2016). Currently, there are three recognized categories of assistive robots for eldercare. These are assistive rehabilitation robots (ARRs), socially interactive robots (SIRs), and socially assistive robots (SARs)[2]. These are described below.

ARRs focus on physical assistive features. They provide personal aid in ADL and mechanical support to the user. Research into ARRs includes smart wheelchairs, artificial limbs, and exoskeletons (Gomi & Griffith, 1998; Kazerooni, 2005). Broadly, the category of ARRs also encompasses the robots that assist through interaction and without physical contact (Feil-Seifer & Mataric, 2005). This thesis will not address this category, as these robots are used primarily as a tool for mobility or other physical assistance and is not intended to duplicate the functions of AAT.

SIRs were first used to describe robots whose main task was some form of interaction (Fong, Nourbakhsh, & Dautenhahn, 2003). SIRs include a programmable robot which can recognize the language, sing, and dance (Abdi et al., 2018). These robots can model human behaviour and have one or more of the following characteristics: (1) the ability to communicate using natural language or non-verbal modalities (such as lights, movements, and sound); (2) the ability to express affective behaviours and perceiving human emotions; and (3) the ability to possess a distinctive personality.

SARs are at the intersection of ARRs and SIRs. SARs share with assistive robotics the goal to aid users and improve QoL. It predominantly assists through social interactions, for example, by moving its head back and forth for nods of agreement or no for disapproval. The SARs are embedded into the context they are meant to be used in and exhibit a wide range of social behaviour (Fong, Nourbakhsh, & Dautenhahn, 2003). The social robots are designed to establish social and affective relations with humans (Pedersen, Reid, & Aspevig, 2018). The social embeddedness of SARs depends on the programming that stimulates the behaviour that encourages robot-human interactions (van Oost & Reed, 2011). The SARs play social, assistive,

[2] This thesis examines SARs with an animal-like form. Hence, ethical considerations for ARRs and SIRs, such as financial equity, robot rights, robot personhood or agency, will not be examined in this thesis.

or therapeutic roles (Dautenhahn, 2007; Sharkey, 2019). There are four major SARs: animal-like, humanoid, telepresence, and companion (Abdi, 2018). These robots replicate life-like behaviour and aim to fulfill specific psychological needs such as interaction and communication (Agrigoroaie & Tapus 2016). Moreover, these SARs foster the experiential aspects of belonging by providing movements that suggest mutual care and attachment to users (Baisch et al., 2017).

Animal-like socially assistive robots (A-SARs) have an animal-like appearance and form. The A-SARs have more complex responses than the immobile beanie babies or animal-shaped plushies used by children. The multiple sensors and interfaces sense and respond accurately to external stimuli through movement, making noises, or generating heat; are sensitive to external stimuli; and are tailored to meet user preferences (Abbott et al., 2019; Stiehl et al., 2005). Several A-SAR models have been invented. Some examples of A-SARs are AIBO, CuDDler, JustoCat, and PARO described below.

AIBO is a doglike mobile robot that was invented in Japan (Sony, 2020). It weighs 1.6 kg. AIBO has 18 degrees of freedom, that enables it to present complicated motions and auditory responses. It has a wide variety of sensors, including a range finder, microphone, speaker, touch sensor, camera, angular velocity, and acceleration sensor (Sony, 2020). An English study found that AIBO improves the QoL of elderly users at the same levels as living dogs on the Lexington Attachment to Pet Scale and the loneliness scale (Banks & Willoughby 2008; Odetti et al., 2007).

CuDDler is a small robotic bear developed by Tan Yeow Kee in Singapore by the Robotic Senses Research Institute (Limbu et al., 2013). It weighs approximately 4 kg. CuDDler has three degrees of freedom to move its neck, two degrees of freedom to move its arms, and one degree of freedom to open and close its eyelids. CuDDler moves its limbs and vocally interacts with a bear-like growl (Moyle et al., 2016). Three contact microphones are positioned in the robot's head, stomach, and back to detect touch. These identify the type of participant touch, for example, whether a participant hits, pats, strokes, or squeezes the bear-like SAR (Moyle et al., 2016).

JustoCat is a cat-like SAR that was manufactured in Sweden. It is approximately the same size and weight as a living cat. The construction of JustoCat (e.g., easy-to-change

washable fur facilitating colour customization) follows Swedish hygiene guidelines required in nursing homes and hospital settings (Gustafsson, Svanberg, & Mullersdorf, 2015). This A-SAR is approved as a medical device by the Swedish Medical Products Agency (Libin, 2004). Justocat is reliable, stable with long battery life, and durable. An English observational study that compared comments about robot design found that JustoCat did not disappoint residents with its repetitive behaviour since living cats are not trained to obey verbal commands to the same extent dogs are (Bradwell, Edwards, Winnington, Thill, & Jones, 2019).

PARO is a harp seal pup-like A-SAR and was developed by the National Institute of Advanced Industrial Science and Technology in Japan. It weighs approximately 2.7 kg. It is covered by soft anti-microbial fur and surface tactile sensors, which allow it to adapt to user preferences. It has a light sensor, balance, speech recognition, and sound source determiner (Wada & Shibata, 2007). It has programmed movable components, including moving eyelids, flapping back limbs, swiveling front paws, and neck movements. PARO has been approved as a medical tool and is the most widely researched A-SAR device (Abbott et al., 2019). PARO is also the best-known example of successful animal robot prototypes and has been in use in hospitals and care facilities in more than 30 countries worldwide (Shibata, 2012).

The A-SARs were inspired by familiar or unfamiliar animals. Familiar animals are those whose behaviour is recognized quickly, such as cats and dogs, while unfamiliar animals are those that most people know something about but have rarely interacted with and have weak ideas about, such as seals (Shibata & Wada, 2011). The researchers who invented A-SARs assumed that familiar animals would evoke strong expectations that the A-SAR would be life-like despite the possible "uncanny rigid movements of the robots" (Shibata & Wada, 2011). Since A-SARs have specific programmed responses, the user can individualize both the appearance and reactions of the A-SAR to fit their preferences (Pino, Boulay, Jouen, & Rigaud, 2015).

Advocates for A-SARs note a suitable match between the abilities of the A-SAR and the needs of elderly residents. While, for example, elderly residents often experience limitations in establishing and maintaining social engagement and participation, A-SARs can be used to stimulate the effects of AAT. They can prevent boredom and depression caused by loneliness

or may foster communication with the device as well as with other persons- even positive effects in vital parameters and increase in overall well-being have been shown to occur (Abdi et al. 2018; Kachouie et al, 2014). In addition, the use of A-SARs can support caregivers by providing opportunities for high quality care by relieving caregivers from additional tasks (Kachouie et al. 2014). Currently, they are increasingly used in formal care settings, such as dementia care (Abdi et al.2018).

1.1.2 A-SARs as a Therapeutic Tool or a Companionship Pet

The Canadian public generally has very little real-world exposure to robots (Sabelli et al., 2011) and the way they are perceived can affect usage. Elderly individuals can have a complex relationship with technology, most recent academic works have shifted the focus from the technological to the human aspects to understand the co-construction of the social phenomenon of aging. The role of technology in elderly people's lives, together with their needs and habits towards it, are not as clear as they should be at first sight but rather requires more sensitive approaches to technological development and design. Importantly, the A-SARs are not meant for monitoring purposes. Physically, the A-SARs are self-contained and are only able to record simple movements. These A-SARs are not connected to an external data storage system. They cannot record data for third party organizations. This thesis is concerned with A-SARs that resemble and imitate an animal. They are covered in synthetic animal fur and can make sounds predominantly associated with animals such as cooing, purring, or barking, which are distinctly dissimilar to human language (Pino et al., 2015).

A-SARs are intended to be therapeutic tools that supplement the other existing QoL activities used in the institutionalized eldercare facilities (Moyle et al., 2019). The object is bought, charged, and stored in cabinets until a user brings it out. It does not require additional maintenance and can be left on the shelf with other objects until it is needed. The A-SAR is a programmed object that can be broken and repaired (Wada & Shibata, 2002). The actions are predictable and reliable. It is impartial and will display the same level and type of response to all users as a tool (Birks et al., 2016).

The A-SAR can also be described as a pet. In a US study, multi-sensory therapy researchers noted that one of the residents had become convinced that the A-SAR was a real

outdoor cat; she started to try to escape the unit to take the 'cat' outside (Sabanovic et al., 2013). The success of the design to replicate a living cat's actions was applauded, but the personal attachment and willingness of users to place themselves at risk for the A-SAR was not predicted and was a potential negative outcome (Sabanovic et al., 2013).

Not all users have viewed the A-SAR as being strictly one or another. Berrios & Markova (2016) found that family members did not seem to mind that the A-SAR was a robot as long as their elderly relative received observable benefits from engagement. The responses to A-SARs has also varied according to life experiences. Elderly users, caregivers, or family members could choose to use, ignore, or pretend it was not in the room. Responses to A-SARs were not constant as even those who reported initial disinterest would approach and engage with the A-SARs and other elderly individuals (Robinson, Macdonald, Kerse, & Broadbent, 2013).

How A-SARs are perceived can impact ethical theories and guiding ethical values in healthcare systems. This thesis will focus on the biomedical ethics considerations that are raised in academic discussions about the use of socially assistive robots and technology in institutionalized eldercare settings.

1.2 The Legal and Ethical Context of Institutionalized Eldercare

Canadian ethical principles and values for institutionalized eldercare is codified and governed by legally binding documents. The *Ontario Long Term Care Homes Act (LTCHA) 2007, 2.0. 2007, c. 8* is the legislation in effect for Ontario (Health Ontario, 2008) and it will be used here as an example of such legislation. The Ontario government has a comprehensive list of legally upheld ethical expectations in LTC. This document follows the UN principles of older persons (1999), which guides member states. The UN principles of older persons (1999) determined that there are fundamental human rights afforded to elderly individuals under independence, participation, care, self-fulfillment, and dignity. The principle of care includes assessing benefits from family and professionals by each society's values. One would have the ability to utilize appropriate institutionalized care, provisions of protection, rehabilitation, and social and mental stimulation in a humane and secure environment (UN, 1999). In Ontario, Canada, the LTCHA (2007) replaces the *Nursing Homes Act, Homes for the Aged and Rest Homes Act* and the *Charitable Institutions Act,* and the regulations under those Acts (Health

Ontario, 2008). The LTCHA (2007) is designed to help ensure that residents of institutionalized care receive safe, consistent, high-quality, resident-centered care (RCC) (Health Ontario, 2008)

There are two parts to the LTCHA (2007). Part 1 presents that the institutionalized elderly care institutions in Ontario must have policies and guidelines that comply with all applicable requirements under the LTCHA (2007). Part 2 is the Resident Bill of Rights. The Resident Bill of Rights contains 27 articles that outline and protect residents' dignity, interests, safety, wishes, beliefs, and values (see Table 1.1 for the articles most relevant to this thesis). The Resident's Bill of Rights may be enforced as though the resident and the Home has entered a contract in which the Home agrees to fully respect and promote the resident's rights. The LTCHA (2007), the Regulation, and any agreements between the institutionalized eldercare facility and the resident must be interpreted to advance the respect of the resident's rights (Health Ontario, 2008).

This LTCHA (2007) was put forth by the Ontario Liberal government in response to the failings of the Ontario long term care institutions. Multi separate and independently organized reports had been published in the years preceding, such as Ontario Health *Coalition-Ownership Matters: Lessons Learned from Long-Term Care Facilities* (2002) that recommended unifying legislation. *Commitment to Care: A Plan for Long-Term Care in Ontario* (2004) recommended establishing a model that provides homes with a basic level of funding for consistency of care. *Dignity Denied: Long-Term Care and Canada's Elderly* (2007) recommended recruiting and retaining staff to guarantee optimal standards and hours of care per resident. The independent reviews of care standards in LTC homes in Ontario suggested that the existence of a legislative document outlining the legal obligations and Bill of Rights is a first step in ensuring adequate care.

The Ontario government incorporated the recommendations into the LTCHA (2007) designed to help ensure that residents of institutionalized eldercare are treated with respect and have the support and services they need for health and wellbeing. Admittedly, the ratification of an Act does not in itself mean that the problems of treatment in institutionalized eldercare will decrease nor that degenerative treatment will diminish. The LTCHA (2007) has limited jurisdiction, and its lack of enforcement offers limited oversight. During each provincial

election, LTC's problems are raised, and each Ontario premier has promised legislation and oversight (Armstrong, 2009). The result of provincial underfunding and cuts means that there is not enough staff to provide residents with the care time they need each day (CUPE, 2017).

The LTCHA (2007) applies to individuals working in and affiliated with the elderly long-term care home licensees; long term care home staff; residents' substitute decisionmakers; residents' family members; residents' councils, family councils, and volunteers. The various formal caregivers are held accountable by institutional Codes of Conduct, workplace expectations, and the profession-specific Code of Ethics.

The Canadian Medical Association Code of Ethics and Professionalism for Doctors articulates the fundamental commitments of the medical profession, including the commitment to the wellbeing of the patient, respect of persons, justice, professional integrity and competence, professional excellence, self-care and peer support, inquiry, and reflection (CMA, 2020). The Code of Ethics for Registered Nurses in Canada (2017) is a regulatory tool that articulates nurses' fundamental expectations to provide safe, compassionate, competent, and ethical care to support each other in providing care that meets ethical standards. The Code of Ethics for Personal Support Workers of Ontario articulates a collection of principles that provide direction and guidance for responsible conduct, ethical, and professional behaviour (OPSWA, 2020). The Code of Ethics for Social Workers sets forth core social work values and principles, respect for the inherent dignity and worth of persons, pursuit of social justice, service to humanity, the integrity of professional practice, confidentiality in professional practice, and competence in professional practice (CASW, 2005).

Table 1.1 Selected Articles from the Resident Bill of Rights in the Long-Term Care Homes Act (2007) that are relevant to the use of A-SARs.

	Resident Bill of Rights
3.1	Every resident has the right to be treated with courtesy and respect and in a way that fully recognizes the resident's individuality and respects the resident's dignity.
3.9	Every resident has the right to have his or her participation in decision-making respected.
3.11.1.	Every resident has the right to participate fully in the development, implementation, review, and revision of their plan of care.
3.11.2.	Every resident has the right to give or refuse consent for any treatment, care or services for which his or her consent is required by law and to be informed of the consequences of giving or refusing consent.
3.12	Every resident has the right to receive care and assistance towards independence based on a restorative care philosophy to maximize independence to the greatest extent possible.
3.14	Every resident has the right to communicate in confidence, receive visitors of their choice, and consult in private with any person without interference.
3.15	Every resident who is dying or who is very ill has the right to have family and friends present 24 hours per day.
3.18	Every resident has the right to form friendships and relationships and to participate in the life of the long-term care home.
3.19	Every resident has the right to have his or her lifestyle and choices respected.
3.23	Every resident has the right to pursue social, cultural, religious, spiritual and other interests, to develop his or her potential and to be given reasonable assistance by the licensee to pursue these interests and to develop his or her potential.

There are overlapping similarities in the Codes of Ethics for the different professional groups involved in caregiving in institutionalized eldercare (see Table 1.2). Certain overlapping similarities pertinent to the use of A-SARs were extracted from the various professional code of ethics mentioned above. The similarities imply that long term care has overlapping ethical expectations that are a cross-professional system of values and principles. Fundamentally, caregivers should cater to the resident's needs and uphold the principles central to care.

Measurable outcomes such as QoL and satisfaction with care levels are dependent on the development and continuation of the resident-caregiver relationships.

Table 1.2 Overlapping Similarities in Codes of Ethics

	Significant overlapping similarities pertinent to discussions around A-SAR use
1	The wellbeing and good of the patient must be considered first.
2	Dignity of both the resident and the caregiver must be respected.
3	Residents have a right to participate in their care, allocate decisional authority to trusted persons, and have access to communication tools.
4	Care is compassionate, understands the unique circumstances of each patient, and alleviates the patient's suffering.
5	The balance of potential benefits and harms associated with any healthcare act must be considered and brings about a positive balance of benefits over harms.
6	Communication about care goals should be accessible and reasonable.
7	Professionals need to collaborate with others and assume responsibility to change policies incompatible with ethical practice.
8	Individual preferences and needs should be accommodated within reasonable limitations.
9	Professionals are required to have a commitment to inquiry and reflection on further medical science to facilitate ethical decision-making.
10	The values and responsibilities in each code of ethics are intended to support and provide professionals working through ethical dilemmas.

In the LTCHA (2007), the phrase 'resident-centered care' (RCC) is used as a more specific sub-division of the Patient-Centered Care (PCC) approach because the institutionalized individuals are referred to as residents, who are living in institutionalized settings. RCC follows the core definitions of PCC. It is a care model that invites, accommodates, and respects wishes in healthcare and lifestyle decisions while being within the care routine prescribed by the resident physician (Koren, 2010).

1.2.1 Patient Centered Care and Importance to Clinical Practice

Patient Centered Care is a theory of ethical health care practice with defined moral motivations, intentions, and goals (Epstein & Street, 2011; Mead & Bower, 2000). It is closely congruent with and responsive to patients' wants, needs, and preferences; and has become a core value in family medicine (Hudon et al., 2011). PCC is increasingly influential in the professional code of ethics, medical education curricula, and quality assurance assessments. It represents a turn away from a clinical method that focused solely on the disease or condition and built upon a holistic view of the patient, including the patient's psychological, spiritual, and emotional needs (Reynolds, 2009, p.133).

PCC presupposes that several changes in the mindset of the formal caregiver will occur with its implementation. The approach can encourage an expansive view of suitable caregiving practices with a greater reflection on what people find meaningful in life and appreciate from caregivers (Entwistle & Watt, 2013). The caregiver's hierarchical notion of being in charge and the elderly individual as passive and incapable is dissembled. To be patient-centered, there is an empowerment of the resident resulting in a more equal relationship (Stewart et al., 2014).

Furthermore, plans of care are devised and acted upon to the patient in the specific context in which care occurs. The patient is assumed to have a unique configuration of elements compromising their identity, illness experience, and situational context (Ells, Hunt, and Evans, 2011). Receiving whole person care in this way helps residents remain connected to that which is meaningful to them and gives purpose to their lives (Santana et al., 2018). By having residents participate in institutional eldercare there is a personal connection to their own goals of care. PCC interactions promote adherence to prescribed health care regimens and follow up treatments. PCC promotes the responsibility patients for their health status, which increases the likelihood that patients will make necessary health-related lifestyle choices (Reynolds, 2009). Academics and professionals support the PCC clinical methods. The method is straightforward as the main injunction is to follow the patient’s lead, while using the structure as a guide only (Clarke et al., 2007).

Consequentially, procedural methods have been created to help guide how PCC should be delivered. PCC clinical methods result in an integrated understanding of each patient.

Stewart et al. (2014) identify four interactive components of this method. In institutionalized eldercare, the first three interactive components encompass the caregiver and the elderly resident's interactions. The fourth component focuses on the ongoing relationships that forms the foundations on which the interactions occur. The components interact and unite uniquely for each caregiver-resident encounter (Stewart et al., 2014). Stewart et al. (2014) addressed how PCC could be applied to the context of primary care. Primary health care refers to approaches to health and spectrums of services beyond the traditional health care system.

Table 1.3 The Four Interactive Components of the Patient-Centered Clinical Method Adapted to Eldercare

	The Four Interactive Components of the Patient-Centered Care Clinical Method Adapted to Eldercare
1	Exploring Individual Values within the Institutionalized Experience
2	Understanding the Resident as a Whole Person
3	Recognizing and Responding to Emotion to find Common Ground
4	Enhancing the Caregiver-Resident Relationship/Friendship

The first step of a patient-centered clinical method is to explore disease and resident perceptions of health and illness. The caregiver actively seeks to enter into the elderly individual's world to understand their perceptions of health (its meaning to the resident and his or her aspirations or life goals) and the unique experience of illness (Stewart et al., 2014). The second component understands the resident, as a whole person, who is a combination of their own unique experiences. Care includes an awareness of the multiple aspects of the resident's life, such as personality, developmental history, and the multiple contexts in which they live. The mutual task of finding common group between caregivers and elderly individuals, the third component of the method and its components can be applied to narrower concepts of A-SARs in institutionalized eldercare. It focuses on three key areas: defining the problem, establishing the goals of treatment, and identifying the roles to be assumed by caregivers and elderly

individuals. The fourth component emphasizes that each contact with the resident should be used to build on the resident-caregiver relationship by including compassion, empathy, a sharing of healing and hope. All four clinical method components are central considerations around A-SAR use and will be discussed further in Chapter 4.

Table 1.4 The Six Elements of the Patient-Centered Care Adapted to Eldercare

	The Six Elements of the Patient Centered-Care by Clarke, Ells, Thombs, and Clarke (2007) Adapted to Eldercare
Engaging the Patient as a Whole Person	- Adopting a biopsychosocial perspective of the elderly individual's current living condition - Respecting the elderly individual, their needs and preferences - Acknowledging the relationships and social bonds of elderly residents and others
Recognizing and Responding to Emotion	- Identifying and responding to emotional cues - Validating and reacting to emotional cues - Affirming emotional and behavioural cues (when emotional responses are obscure)
Fostering a Therapeutic Alliance	- Establishing and sustaining trust - Sharing power with the resident - Affirming the resident's voice and accessibility to services and relationships
Promoting an Exchange of Information	- Facilitating information exchange - Ensuring information access and retention
Sharing Decision Making	- Finding common ground - Engaging elderly residents in their sustained care
Enabling Self-Management and Patient Navigation	- Enabling continuity of care - Enabling resident self-management and advocacy

The PCC clinical method has not been universally accepted and supplementary identified PCC themes have been suggested to enrich PCC-based analysis (Epstein et al., 2005). For example, a literature review by Clarke, Ells, Thombs, and Clarke (2017) identified characteristics of PCC at the patient-health professional level that can aid professional in PCC delivery. They identified six elements of PCC in therapeutic relationships 1) engaging the

person as a whole person, 2) recognizing and responding to emotions, 3) fostering a therapeutic alliance, 4) promoting an exchange of information, 5) sharing decision making, and 6) enabling self-management and patient navigation. The elements 1) recognizing and responding to emotion and 2) fostering a therapeutic alliance highlight certain aspects of the PCC clinical method that offer additional insight into A-SAR use, dissimilar from Stewart et al. (2014).

The added value of recognizing the similarities and difference in the two methods is that it is influential in the evolution of clinical care and development. The focus on appreciating the relationships in eldercare settings focuses on enabling continued eldercare. The PCC characteristics will be used to ethically examine whether the use of A-SAR is congruent and complimentary to Canadian legislation around caregiving expectations. The narrower application of the four similar and two unique concepts of the PCC method (see Table 1.3 and Table 1.4) will be used in Chapter 4 to examine A-SAR use in institutionalized eldercare settings.

1.3 Conclusion of Introduction

Canada's elderly population in institutionalized eldercare is projected to grow. With unmet needs and challenges in eldercare, socially assistive robots with animal-like forms are becoming focal points of healthcare and ethical examination. The ethics-based examination on emerging considerations and alignment with existing legislature will provide insights on what impact these technological additions have on eldercare. Th ethical examination is context specific, depending on who, why, and with which intentions the A-SARs are used. Literature reviews on A-SARs tend to be broadly about SARs (Abdi et al., 2018). The novelty of A-SARs has meant that an examination on the ways A-SARs, specifically, are used in applied contexts of eldercare has not been examined. An identification of ethical considerations related to A-SARs and applied considerations for use in PCC eldercare settings is yet to be explored. There is an urgent need to examine what A-SARs QoL interventions are being used and whether these are appropriate within the expectations of eldercare. Each chapter will aim to contribute further insight and examination on what ethical considerations exist and how PCC could guide eldercare practices under the LTCHA (2007).

Chapter 2 will present a contextual background through the results of a literature review on the ways A-SARs have been used in eldercare settings. This will provide a contextual foundation of A-SAR use in applied practice. It will identify the groups of A-SAR users and the ways each group used A-SARs. Chapter 3 will aim to identify and extract ethical insights through a critical interpretive review. The theories and ethical insights for different user groups will be presented. Chapter 4 will first examine the alignment of A-SAR use to ethical caregiving through the concepts and elements of the PCC and second demonstrate how the Capabilities Approach provides additional insights. Chapter 5 will be a final implications and conclusion section. The objective of this thesis is to examine the ethical considerations for the current or future use of A-SARs for institutionalized eldercare.

CHAPTER 2: Use of A-SARs in Institutionalized Eldercare: Literature Review

> "Elderly individuals remind us that ultimately, they aim to achieve something akin to comfortable aging – a lifestyle that emphasizes ease, familiarity, and prudence [...]. Technology may or may not deliver comfort or control in their lived experience" (Loe, 2015 p.145).

2.0 Contextual Introduction to A-SAR use in Applied Settings

Healthcare robots have been produced as a rapid response to the growing interest in replicating the benefits of various therapies within the constraints of institutionalized eldercare (Shibata & Wada, 2011). The ongoing development of socially assistive technology is seen as having vast potential for the provision of eldercare (Bemelmans, 2015). Within the domain of socially assistive robots (SARs), at least 25 systems have become available in recent years (Abdi, et al., 2018). One category of SARs is animal-like socially assistive robots (A-SARs) which have an animal-like form and can move in ways that mimic animal behaviour. PARO, Justocat, and AIBO are some of the A-SARs adopted for use in institutionalized eldercare (refer to Chapter 1.12). These robots are proposed to be capable of replicating the benefits of Animal Assisted Therapy (AAT) without the limitations living animals have. Literature reviews have suggested that A-SARs could improve the well-being of elderly individuals and raise questions about the lack of a clear national policy to govern technology use in eldercare (Broekens & Rosendal, 2009).

Indeed, the original intended use of A-SARs was to assist caregivers by improving QoL and decreasing the caregiver workload (Wada, Shibata, Saito, & Tanie, 2002). Studies with robots for emotional stimulation recognized that mutual feelings of joy or delight stimulated powerful emotions that could improve caregiver practice (Shibata, Inoue, & Irie, 1996). Transitioning robots from research design labs to applied use is not necessarily a smooth process. Researchers have a specific problem or application of A-SARs in mind when they design it. The use, however, is determined by how each user finds the technology fits or does not fit with their personal needs and preferences. Engineers and elderly users had different perspectives on what added value the A-SAR had to eldercare practices (Sharts-Hopko, 2014) Engineers focused on how smooth the A-SAR motions were and stated elderly users would be alarmed if the A-SAR appeared to be too life-like while elderly users, themselves, commented that they were disappointed the A-SARs were unable to behave like animals (Sharts-

Hopko,2014). There are fears that elderly individuals would be resistant and fearful to animal-like technologies (Vallor, 2011). Ageist perceptions (e.g., elderly individuals are slow, hostile to technology, and unwilling to adapt) are barriers that impede an elderly individual's adoption of new technologies (Neven, 2010). Repeated studies suggest that factors such as computer anxiety, fluid intelligence, and crystallized intelligence were more important predictors of technology use, rather than numerical age (Czaja, et al., 2006). The ambiguous use of A-SARs can limit the access elderly individuals should have to the benefits of technological advancements in fulfillment of socially acceptable ethics principles of justice and equity (Bemelmans, Gelderblom, Jonker, & de Witte, 2012; Cutler, 2005).

This is a review on the ways A-SARs are used in applied settings. It validates and goes beyond the existing reviews to provide a foundation of evidence for how certain groups use a-SARs and how that will affect the caring relationships and understanding of what added or dimished value A-SARs have for institutionalized eldercare. The purpose of this review is to evaluate what A-SARs are used for and by whom in institutionalized eldercare settings.

2.1 Methods

This chapter synthesizes the results of a literature review that identified the ways A-SARs are being used in institutionalized eldercare (for full methodology see Appendix 1-3). The inclusion criteria was that the A-SAR must have an animal-like form, such as PARO, AIBO, JustoCat, and CuDDler (see Chapter 1). A-SARS had to have the robotic capability to respond to stimuli in a way that can communicate, interact with, understand, and even relate to users in a highly personalized way (Eachus, 2001). The A-SARs had to be programmed to move to stimulate animal-like behaviour.

Six relevant databases were searched with three search concepts: 1) the context (elderly care), 2) the intervention (robot), and 3) the dimension (companion and social assistance). The years from 2002 onwards were included. Social assistance was chosen because of the socially assistive aspect of A-SARs (see Appendix 1-3).

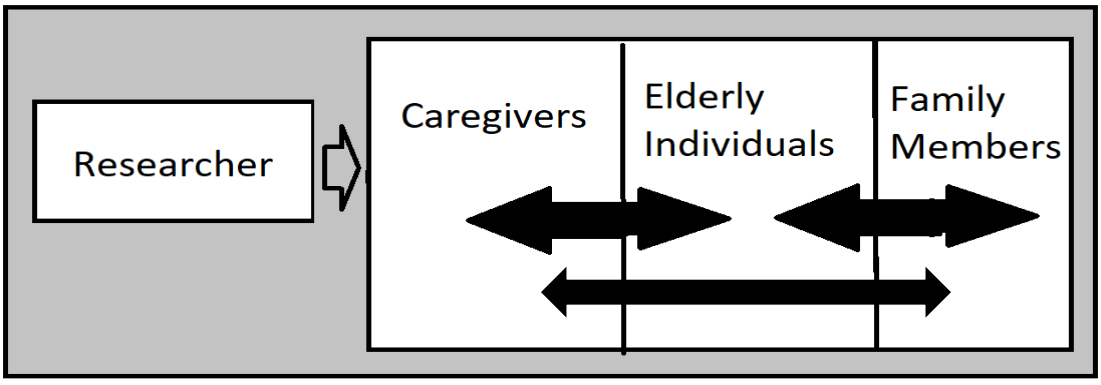
2.2 Results and A-SARs User Groups

The review resulted in 28 articles for final inclusion and analysis (see Appendix 2). From these publications, four A-SAR user groups were identified (see Appendix 1-3). The

relationships between elderly individuals, caregivers, family members, and researchers were intertwined and interdependent (see Figure 2.0). Each of the user groups is further elaborated on in the following sections: elderly individuals (section 2.1.1), caregivers (section 2.1.2), family members (2.1.3), and researchers (2.1.4). Each section contains the ways in which each group used the A-SAR.

The researchers were not directly integrated into the practice of eldercare but observed and recorded for the observational studies and were integral in determining the inner mechanisms of A-SARs (Sabanovic et al., 2013). The caregivers, elderly users, and family members were closely linked together with the elderly individuals in the eldercare institution. Caregivers and family members were loosely dependent on one another and were major decision makers in deciding which QoL interventions should be used in the eldercare practices. The relationships amongst and within these four groups are directionally represented by the arrows used in Figure 2.0.

Figure 2.0 Four Groups of A-SAR Users in Institutionalized Eldercare.



2.2.1 Elderly Residents

Elderly residents, as a user group, were identified because of the direct reference to being the primary users and target population. The identified articles had great interest in whether A-SARs were used by elderly residents to meet unsatisfied needs, e.g., love, belonging, or self-esteem. The efficacy and impact on the delivery of eldercare was centered on this group of users. A-SARs are designed to be used as a therapeutic tool to provide benefits, including a sense of well-being, psychological benefit, and social network development (Wada & Shibata,

2008). Identified articles referred to AAT and the potential for A-SARs to be an alternative to having live animals in eldercare institutions. institutions aimed to use ASARs to assist with skills-building, social interaction, and stimulation (Aarskog et al., 2019; Banks et al., 2008; Bernstein, Friedmann, & Malaspina, 2000). Despite the prevalence of AAT as the original type of therapy to be replicated, some authors introduced alternative therapy types when using A-SAR for therapeutic purposes. The ways elderly individuals used A-SARs can be described as follows: an overall therapeutic use with engagement subcomponents; emotional, social, imaginative engagement.

A-SARs were used to stimulate emotional engagement between individuals present in the institutionalized eldercare facility. The emotional engagement was reported through means such as assessing measurements in anxiety using the Cohen-Mansfield Agitation Inventory- Short Form (CMAI-SF) mood and engagement as measured by video observation (Moyle et al., 2015). The completed study resulted in the PARO group being significantly more verbal (3.61, 95% CI: 6.40-0.81, P= .011) and visually engaged with the PARO than the plush toy group (Moyle et al., 2015). Elderly residents who used the A-SAR reported that this companion SAR was like having a pet who could evoke feelings of higher psychosocial well-being and purpose (Baisch et al., 2017; Liang et al., 2017). Elderly residents reported that they perceived themselves as being of the pseudo protector of the A-SAR (Stevens, Martina, & Westerhof, 2006). One notable Australian study reported that elderly residents used the A-SAR as something that gave and received their affection, “as something to love” (Moyle et al., 2019, p. 180). “An occupational therapist reported: ‘…on entering the room, I noticed her looking forlorn, distinct and looking into space... she spotted George (PARO) in my arms, and her body language changed immediately by showing exuberance. She immediately held out her arms to hold George’” (Birks et al., 2016, p.3). In instances where there was a renaming, e.g., PARO to George, the new named endured throughout the study and elderly residents reported a higher sense of ownership and personal connection to the A-SAR (Bradwell et al., 2019).

A U.S. study in a Veteran Affairs psycho-geriatric unit observed decreases in interpersonal negative patient behavioural states when comparing the sample group before and after the PARO intervention ($z= 4.927$, $p<0.01$) (Lane et al., 2016). There were

decreased levels of observed anxiety, sadness, yelling, pain reports, and observations of wandering/pacing behaviour (Lane et al., 2016). Having the A-SAR present, made it possible for the elderly users to feel emotions that they may not have felt without this stimulation. For example, Moyle et al., conducted a study to explore the effects of SARS, including A-SARs, on emotional expression (2013). The elderly residents were assessed by using the Quality of Life in Alzheimer's Disease Scale (QOL-AD, modified version; Edelman, Fulton, Kuhn, & Chang, 2005), Rating Anxiety in Dementia Scale (Shankar, Walker, Frost, & Orrell, 1999), Apathy Evaluation Scale (Marin, Biedrzycki & Firinciogulli, 1991), Geriatric Depression Scale (Yesavage, 1988), and Revised Algase Wandering Scale-Nursing Home version (Algase, Beattie, Bogue, & Yao, 2001). The elderly residents were more likely to be smiling, feel less anxious, or be making vocalizations of pain or agitation when holding PARO in their arms (Moyle et al., 2019).

A-SARs were also used to stimulate higher measurements of social engagement. In multiple studies, resident participation levels improved with A-SAR use (Metzler & Barnes, 2014; Tamura et al., 2004). PARO was an icebreaker, a social mediator between staff and elderly residents, and served as an impetus towards social communication between residents (Robinson, MacDonald, & Broadbent, 2013). A study by Shibata (2012) found that an elderly female user with mid-stage dementia, who had not communicated verbally for over a year, joined residents sitting around a table with PARO on it. At first, she showed no interest, and then she reached for PARO and pulled him toward her. Others around her were surprised to hear her speak as she had not expressed any wish to communicate in previous social events. She began stroking him and spoke about the animals on her farm. Since being introduced to PARO, she has shown minimal communication with staff and family, much more than she did before being introduced to PARO (Shibata, 2012). A Japanese study measured how social networks might change by placing PARO in a social setting as a shared topic of discussion (Wada & Shibata, 2007). PARO's Japanese inventors, mapped out how friendships changed by plotting out with whom each elderly individual talked before and after PARO was added into the social setting (Wada & Shibata, 2007). There was a significant increase in the amount of movement between elderly residents' rooms.

Furthermore, the addition of PARO led elderly users in the institutionalized care to spend more time in the common area interacting with Paro and other people (Shibata, Wada, Saito, & Tanie, 2008). Researchers noted that the most significant increase in activity for primary interactions was not with the A-SAR itself but with the people around them suggesting that the addition of the robot did not reduce the human-human contact and communication (Sabanovic et al., 2013). The A-SAR was used to improve social networks and communication between residents, caregivers, and others.

Finally, A-SARs were used to stimulate higher measurements of imaginative engagement. Imaginative engagement is a type of learning that enhances the ability to think of the possible, not just the actual; it is the source of invention, novelty, and flexibility in human thinking (Coeckelbergh, 2007). Following the influential work of Nussbaum, Coeckelbergh (2007) considers imagination as the empathy defined as the ability to imagine ourselves in different situations and conditions at past and future times. It is an engagement where moral imagination is public and shared with others. In Kearney (1998) suggests that without this imaginative ability… to put oneself in other's shoes, to identify oneself with their actions, thoughts, or feelings, it is difficult to see how moral sentiment or reason could operate at all.

PARO, and a comparable seal-like toy were provided to a group of eight elderly residents as prompts to create a collaborative story about each of the objects. The stories were then analyzed to examine the depth of character development and plot complexity. Participants in the PARO group demonstrated greater involvement and were also more articulate on creating character, setting and story, and song (Iacono & Marti, 2016). There were more expressions of laughter and joy when using the PARO instead of the similarly seal shaped plush toy. The story created with PARO had a richer plot and was longer. Participants would ask PARO questions during the writing process and treated it as if PARO could communicate its agreement (Iacono & Marti, 2016). Using their imaginative and creative thinking allowed for a type of engagement that is not distinct from rationality. Rather, the capacity to empathize with others greatly enriched rational thinking and the human ability to empathize with others (Coeckelbergh, 2007).

2.2.2 Caregivers

Caregivers used the A-SARs as a therapeutic tool to alleviate the emotional investment and work associated with burnout and compassionate fatigue (Wada, Ikeda, Inoue, & Uehara, 2010). The use was mainly as another tool to stimulate therapeutic effects to improve elderly individuals' welfare without compromising their own mental and physical health (Bedaf, Marti, & de Witte, 2019). Caregivers were encouraged to to re-evaluate pre-existing biases:

> "…they came in, and they observed him, and they could not believe what he was doing, like singing all these songs- they have never heard this cranky man in their life sing, smile as much. They never saw his teeth, and here he is, smiling, and his face lights up. Watch, observe, and I said, he is your client now you know what he can do when he is cranky, you can now put a smile on his face. PARO made him come out of his shell [and made] the staff more aware of what was happening…" (Birks et al., 2016, p. 3).

The addition of the A-SAR increased caregivers' willingness to engage with elderly users on a less hierarchical level (Takayanagi et al., 2014).

Caregivers also reported that A-SARs were used to make their work easier when calming down or distracting more difficult elderly users with severe behavioural agitation (Bemelmans, Gelderblom, Jonker, & de Witte, 2015a; Moyle et al., 2018). A-SARs offered an opportunity to reduce the need to monitor elderly for falls by reducing the frequency aimless wandering (Bemelmans et al., 2015a; Bemelmans, Gelderblom, Jonker, & L. de Witte, 2016). Reducing the number of wanderings helped reduce resident's reported levels of boredom (Moyle et al., 2018; Libin & Cohen-Mansfield, 2004). The increased collaboration and mutual interest in the A-SAR led to a sense of community that prevented backbiting between elderly residents and caregivers (Moyle et al., 2018; Robinson, MacDonald, & Broadbent, 2015). Some caregivers reported feeling that they regained a sense of closeness to the elderly user after seeing how they smile and engage with PARO (Lane et al., 2016).

The A-SARs were also used by caregivers to evaluate impact on workload and cost (Bemelmans et al., 2015b). At the start of the intervention when caregivers were being trained how to uses A-SARs, workload increased (Bemelmans, Gelderblom, Jonker, & de Witte, 2012).

The A-SARs were not particularly useful for accomplishing daily tasks more efficiently as caregivers found their workload increased with ADL (McGlynn, Kemple, Mitzner, King, & Rogers, 2017). Caregivers reported that using A-SARs increased the physical movement required for providing QoL activities. With PARO, caregivers had to plan the time and location of the QoL intervention, bring the complex A-SAR out of the storage cabinet, gather residents in the common room, explain what PARO was, explain how to touch PARO, and supervise as PARO was passed around to each resident. The expensive cost of the A-SAR also required additional training and maintenance. The time required to train reduced the time that caregiver could use to perform ADL tasks, thus increasing the workload. Over time, when caregivers were able to create a routine and became more comfortable organizing the QoL intervention, the amount of workload decreased (Bemelmans et al., 2015a).

Caregivers also used the A-SAR to highlight concerns about how eldercare institutions used available funds for technological means to support caregiving practice. Moyle et al., (2018) suggested that there was institutional benefit from spending funds on socially assistive technology. Yet, the more complex the SAR, the higher the financial cost. JustoCat costs CAD 1600 and PARO can cost upwards of CAD 7600 (Robottimmies, 2015). Government support in countries where PARO is a certified therapeutic medical device (such as U.S. and Japan) can reduce the financial cost (Birks et al., 2016). In cases where the institutionalized eldercare requires financial support caregivers had access to PARO units which were loaned from other facilities (Thodberg, 2016).

Caregivers used PARO as an educational tool for advocacy with their fellow staff (Birks et al., 2016). A sense of responsibility was cultivated within caregivers to ensure the success of A-SARs as a therapeutic tool. When the caregiving staff found PARO alleviated their workload, they were more likely to recommend the A-SAR to their co-workers. The A-SARs were used to advocate for continual and regular eldercare care and required regularity and momentum to effect maximum benefits (Birks et al., 2016).

Caregivers are a central user group of A-SARs and for the intervention to be successful their interest in the A-SAR is integral (Wada & Shibata, 2002). The way that caregivers used A-SARs to distract residents, hence impacting the workload, was expected (Wada & Shibata,

2007). The use of PARO as advocacy tool against resident objectification (Birks et al., 2016) was an unexpected outcome.

2.2.3 Family Members

The third group of individuals who used A-SARs in institutionalized eldercare were the family members. Individuals had a filial responsibility or social obligation to ensure that eldercare services were adequately provided, and the resident's rights and needs were being respected. Family members and caregivers were loosely dependent on one another and were major decision makers in deciding which QoL interventions should be used in the eldercare practices (Figure 2.0).

A study in the Netherlands reported the feasibility of using A-SARs by interviewing family members about their responses to seeing elderly family members hugging the A-SAR (Bemelmans et al., 2016). The study found that PARO, as a therapeutic tool, supported social visits and could be used to provide a shared focus point to increase the attractiveness of visits (Bemelmans et al., 2016). Family members experienced Justocat as "something that could break the vicious circle of constant repetitive behaviour" (Gustafsson et al., 2015, p. 52). The A-SAR use, was not equally adopted by all, depended on personal experiences with animals, awareness of socially assistive robot functionality, and the amount of filial and financial obligation the family members had towards the elderly resident (Bemelmans et al., 2016; Birks et al., 2016). A-SARs were used to creates safe spaces to share memories of animals.

A-SARs were used for communicative purposes providing a mutual topic of interest between family members, residents, and caregivers. PARO was a good talking point and something that allowed both the elderly residents and family members to enjoy the company of each other without feeling pressured to engage in a direct conversation (Berrios & Markova, 2016). Having the A-SAR fulfilled the need for a common point of interest to mutually relate to. One participant's son expressed: "now we have something to talk about – the robot cat! Conversations about the weather and meals are meaningless; the robot cat has given us meaning in our communications" (Gustafsson et al., 2015, p. 51). Another Australian study reported that the A-SAR was used to improve relationships between family and recall memories, "both mother and daughter had a good laugh at the way her mother was talking to

George; [the] daughter [said] 'it reminds me [of] when I was little, she spoke to us like that, it's funny it makes me laugh'" (Birks et al., 2016, p.4). The use of A-SAR improved the quality of conversation. Participants in this PARO study observed that family members used it in a way that recognized the value of the A-SAR. In one case, the daughter of a resident concerned that her mother would be distressed that she could not make her regular visit, specifically asked her mother be given some time with PARO (Birks et al., 2016).

Alternatively, some family members used the A-SAR to express their frustrations with eldercare quality. In an Australian study a family member said*:* 'oh, I have seen someone carrying that around; they are like a complete idiot.' (Birks et al., 2016, p.7). Concerns about the A-SAR being used to deceive or infantilize elderly individuals was raised by family members who were reluctant to use any type of robot for eldercare (Birks et al., 2016). Family members who dismissed the A-SAR outright was noted to be more negative in their choice of language, such as commenting that they thought it was a waste of money. They also communicated paranoid fears that PARO monitored their behaviour at work for quality evaluation (Birks, et al., 2016). Family members were also concerned that the A-SARs would be used to perpetuate elder abuse through neglect. The use A-SARs to remind residents of loss were raised as negatived outcomes of using PARO when the scheduled sessions with therapy animals or PARO were concluded (Bemelmans et al., 2016).

Family members also implied A-SARs were used as a symbol of social status and group identity (Gustafsson et al., 2015). Time spent with an expensive and attractive A-SAR was used to attract others' attention (Gustafsson et al., 2015). The family members tried a wide repertoire of verbal and nonverbal communications with the JustoCat and attempted to attract the A-SAR's attention and the resident's attention (Libin & Libin, 2004). Rather than standoffishly rejecting A-SARs as a threating mechanical robot, attempts to mimic the ways residents interacted with A-SARs allowed residents to enter the A-SAR user group category.

As a user group, family members were identified because of the direct reference to their involvement in eldercare and explicit use of A-SARs. When the elderly resident was determined by the institution to be incompetent of decision-making, the substituted decision making of family members and informal caregivers was required. The consent and interest of this group

of users impacted the relationships and capabilities of caregivers to use A-SARs in the delivery of care. Refusal or miscommunication with this group could lead to barriers in technology implementation. This group was central to the identified articles and consent was necessary to use A-SARs in eldercare services.

2.2.4 Researchers

The fourth group of users were the researchers who invented and used the A-SARs to measure research outcomes. This group is not directly concerned with the delivery of eldercare, but their research questions and methodology will impact the available QoL interventions and funding decisions. Measured outcomes include neuropsychological changes, validation of past hypotheses, and determining user-technology fit.

Researchers used A-SARs as a research tool to measure physiological changes in biochemical markers related to QoL or to validate previous studies that suggested blood and hormonal differences before and after the intervention (Kanamori et al., 2003; Liang et al., 2015). The New Zealand study suggests that residents who interacted with PARO for 12 weeks in comparison to a control group has significant changes in systolic and diastolic blood pressure (Robinson et al., 2015). Planned comparisons for repeat measures revealed that when the residents had the robot, systolic blood pressure significantly decreased from baseline, $F(1,16) = 4.6$, $p = 0.048$. Repeated planned comparisons also revealed that when the residents had the robot, diastolic blood pressure also significantly decreased from baseline, $F(1,16) = 4.4$, $p = 0.05$ (Robinson et al., 2015). When AIBO, the robotic dog, was used to measure stress hormones in nursing homes, researchers found that participants had lower cortisol-related stress levels after 1 hour of interaction and felt less lonely after 20 sessions over seven weeks (Kanamori et al., 2003). These results were supported by a study that demonstrated stress levels decreased by measuring urine 17-ketosteroid sulfates (17 KS-S) values before and after PARO's introduction into eldercare (Wada, Shibata, & Saito, & Tanie, 2007).

A-SARs were used to validate research hypotheses. One Japanese study hypothesized that 3-6 months of 15-minute PARO intervention sessions would reduce the cognitive decline associated with age-related diseases (Takayanagi et al., 2014). For users with severe dementia, engagement interventions were more effective with PARO than the Lion-like plush toy

(Takayanagi et al., 2014). Researchers reported a marginally significant difference in the time users spent laughing between PARO and Lion in both the moderate dementia group (p=0.081) and the severe dementia group (p=0.054) (Takayanagi et al., 2014). Users with severe dementia were more affective with PARO than with Lion-like stuffed toys (Takayanagi et al., 2014). The results suggest the range in A-SAR motion will impact usability.

For a novel innovation to be useful, the alignment of the user-technology fit should be high (Pino, Boulay, Jouen, & Rigaud, 2015). Researchers used A-SARs to discern whether the physical appearance of A-SARs impact human wellbeing outcomes. An English study found that researchers reported variable levels of interest in PARO and more recognizable A-SARs like Justocat were more popular in the target population (Baisch, 2017). The A-SAR was also used to discern gender differences. Women had more direct interaction with PARO and were more likely to engage with the A-SAR as if it were alive (Chang, 2015). Women used personality traits rather than physical attributes to assess whether A-SARs were good matches for their goals of care. By contrast, men were indirect and attached a great deal of importance to the physicality, movements, and technological components of the A-SAR (Chang, 2015).

As a user group, researchers were identified because their selection of participants, measured outcomes, and reported observations impacted the discussion of A-SAR use. This group, however, was not central to the identified articles and was peripheral to provision of eldercare (Figure 2.0).

2.3 Quality of Selected Studies

The quality of the available literature was quite variable. Institutional and individual resident participation in A-SAR interventions was unique to their context and population (Moyle et al., 2019). Furthermore, Šabanović & Chang (2016) state that their PARO study relied heavily on observational data self-reported by caregivers. Studies did not report on if, or how they tried to minimize the consequences of both overt and hidden biases (cultural, professional, experiential) of caregivers or researchers. Furthermore, results are not generalizable due to the differences in gender ratios of elderly residents who participated in the A-SAR studies. Life expectancies differ between men and women, women live longer than men (Pruchno, 2017). The gender ratio for those 65 years old and over is highly female, and

gendered individuals respond differently to therapeutic innovations (Daly & Szebehely, 2012). In most studies, the number of female participants greatly outnumbered the male participants (Robinson et al., 2015). Identified articles had a varied sample size: less than 5 for pilot studies, and as high as 91 due to being a multi-institute study (Gustafsson et al., 2015; Moyle et al., 2015). Research with elderly populations has additional difficulties due to complex recruitment and increased likelihood of losing participants due to a decline in health or death (Yu et al., 2015). The small size of participants may suggest some selection bias as the type of elderly individuals who participate in these studies may be initially more receptive to the use of technology and robotics in their care. Further, the research studies themselves (independent of the intervention) may have introduced a bias in that the process of informed consent with preference given to residents who were more engaged and had dedicated families. It was unclear whether the residents used the A-SARs as a tool to continue answering study inquiries which may have given the seniors more attention and opportunity to engage in conversation.

Another limitation of the published evidence is that a significant proportion of the studies were with the seal PARO only, limiting the ability to generalize or record the variety of results possible. In Thodberg et al., (2016) reported a conflict of interest as they received additional PAROs for their study and had professional affiliation with PARO inventors.
The challenges involved with conducting empirical research with elderly individuals in institutionalized eldercare may be reflected in the low number of articles identified for final inclusion. Elderly individuals are categorized as a vulnerable population. The methodological challenges of eldercare include determining whether individuals aged 65 and over with various cognitive capabilities can give informed consent without the assistance of a substitute decision maker. The increased dependence of elderly individuals on others can dictate 'gatekeepers,' which can make the recruitment process more time consuming and difficult (Kolb, Rehmann, Karbe-Voigt, & Wostmann, 2015). Elderly populations have high mortality and high attrition rates, affecting study power (Ridda, Lindley, & MacIntyre, 2008). Recruitment strategies effective in other populations may not be successful among frail older people; there is considerable disagreement among the best strategies (Benraad et al., 2016). The high prevalence of dementia in elderly populations also makes it difficult to determine if the

responses and observed benefits are due to the active recognition of the A-SARs as animal-like or whether the SAR is perceived as just another physical stimulus (Lewis & Informat Resources Management, 2017).

2.4 Conclusion

A-SARs had various uses that were not constrained to its initial purpose, namely, to increase the QoL of institutionalized elderly individuals while alleviating the caregiver workload (Wada, Shibata, Saito, & Tanie, 2002). The four groups of users (elderly residents, caregivers, family members, and researchers) were keen to use the A-SAR that moved and engaged with them. The individual life history of each user had an impact on the usage of A-SARs. Each group perceived that A-SARs could improve mood, reduce agitation, provide comfort, and create opportunities for communication.

Elderly residents used A-SARs to fulfill their own unmet needs. Having A-SARs in QoL activities provided engagement opportunities for the resident to nurture and develop human-human relationships. The use of A-SARs to fulfill emotional and social needs was like earlier studies by Abdi et al., 2018 and Royakkers & Est, 2015. However, the imaginative engagement was unexpected, as other studies had not directly considered this form of use. The meaning of the imaginative engagement needs to be further explored. The articles were not clear as to what extent the residents were aware that the A-SAR were inanimate objects. Nor did it seem to matter in some studies. Similar to the universal need for attachment, which was underscored by Harlow's studies of the cloth vs. wire mesh surrogate monkeys, the soft touch provided by the A-SARs may have provided an opportunity to elicit sensations of attachment (Sefidger et al., 2016). Future studies could measure what factors influence how residents feel their sense of dignity is impacted when they use A-SARs for imaginative engagement.

In terms of caregivers, the ways they used it depended on the practicability of implementation and self-image. It was used it mainly as another therapeutic tool to improve QoL outcomes. Interestingly, few mentioned the use of A-SARs' impact on their workload other than identifying the need for additional training. They recognized that eldercare quality was unsatisfactory for some residents and the A-SAR could evoke emotions and conversations. The use of A-SARs to improve the quality of care was an intended and unintended outcome. For

example, caregivers in a QoL cluster-randomized controlled trial for elderly individuals with dementia in PARO-activity spent greater amounts of time conversing with the units' participants than they would have in their daily work routine (Joranson, Pedersen, Rokstad, Aamodt, et al., 2016). A-SARs were invented to be used as therapeutic tools by caregivers but when they are given to different user groups, they take on additional roles and significance.

Family members used A-SARs in ways that promoted communication and maintained relationships. QoL interventions experienced by family members and residents together provided opportunities to enable "the expression of positive emotions towards the robotic cat and engaging in humor and play, promoting dialogue between relatives and the participants, and providing a diversion from usual conversations" (Gustaffson et al., 2015, p. 54). Future studies could examine whether A-SARs required substitute decision maker consent before use or whether it would be accepted as any other therapeutic tool.

Researchers used A-SARs for peripheral uses indirectly affecting the provision of eldercare. The main results were focused on neuropsychological effects and user-technology fit. The A-SAR was used to validate their hypothesis or previous researcher's results on institutionalized eldercare effects. The studies' weakness in having an unbalanced gender ratio has been noted in previous reviews (Chang, 2015). Another weakness is that each research study used a different methodology and results cannot be generalized. Furthermore, researchers suggested the positive results could have stemmed from the extra attention participants received from participation, rather than the A-SAR intervention itself. Research results remained inconclusive. Future studies are required to examine how research methods and gender ratios affect A-SAR use.

This literature review implies that the use of A-SARS was highly interdependent and that for such technological innovations the cooperation and interest of the related parties is required. The literature review conducted for Chapter 2 discerned that focusing on the way that A-SARs impact QoL outcomes and caregiver workload is too narrow of an approach. Scenarios related to the use of technology in advanced age-related diseases could become more common in institutionalized eldercare. Whether there is enough support to increase A-SAR implementation or advocacy in institutionalized eldercare settings is still undecided. While A-

SARs might not necessarily be an immediate consideration for eldercare services, it may become central to further discussions if technological uptake increases.

CHAPTER 3: Ethical Considerations of A-SARs for Eldercare: A Critical Interpretive Review

> Techno-moral imagination allows us to see how our interpretations of capabilities might change as new technologies are integrated into our lives and open new possibilities for us.
> (Misselhorn, Pompe, & Stapleton, 2013)

3.0 Introduction

Animal-like Socially Assistive Robots (A-SARs) are designed to provide a calming presence like that of therapy animals (Naganuma et al., 2015). Many studies have examined how A-SARs can be used in eldercare settings (Bedaf et al., 2018; Kachouie et al., 2014; Robinson, MacDonald, & Broadbent, 2015); their effectiveness (Bemelmans et al., 2012); what factors influence older adults' acceptance or rejection of care robots (De Graaf & Allouch, 2013); and older adults' attitudes toward SARs (Vandemeulebroucke et al., 2019). An examination of ways A-SARs are used suggests there are four different groups of A-SAR users: residents, caregivers, family members, and researchers (see Chapter 2). These groups use the A-SARs to meet personal needs, caregiving expectations, and other communicative purposes (see Chapter 2). Vandemeulebroucke et al., (2018) has identified a need to critically examine the existing ethical discussions that have been presented in the literature. For example, some family members spoke of dignity as a concern when they saw residents using PARO, a seal-like A-SAR (Birks et al., 2016).

Past studies have suggested that many ethical theories concerned with A-SARs overlap and are concerned about 1) the authenticity of relationships between humans and robots; 2) good care; 3) respecting the autonomy of the elderly individual; and 4) best practices to uphold human dignity, and wellbeing (Johansson, 2013, van Wynsberghe, 2016). Indeed, ethical theories used to analyze the greater category of Socially Assistive Robots (SARs) have been identified (Vichitvanichphong et al., 2018). Despite select analyses on general SARs, there is a lack of literature that focuses specifically on how the application of A-SARs in eldercare is discussed in theory and by those implicated in the use.

This chapter aims to identify and extract ethical insights that have been raised in academic literature. This chapter's research question is: What ethical insights have been published on the use of A-SARs in eldercare? The ethical theories that were used in the literature for discussing A-SAR use will also be extracted. The resulting considerations for the

four specific user groups, identified in Chapter 2, will also be examined. The sections of the chapter will assist with the overall goal, which is to examine ethical considerations for the use of A-SARs for eldercare.

3.1 Methods

Literature Review Method - The methods used for this critical interpretative review are based on normative literature using Dixon-Woods et al. (2006). This approach reviews articles sensitive to the demands for effectiveness in systematic reviews and integrates qualitative and quantitative evidence through an interpretive process (Dixon-Woods et al., 2006). This approach allows for the flexibility to explore a wide range of interdisciplinary topics, typical of bioethics research. This literature review style offers a thorough and rigorous approach to scan literature to glean 'key ideas' in a particular area of study, and theorize around this knowledge, to answer a specific research question (McDougall, 2014; Torraco, 2005). The Preferred Reporting Items for Systematic Review and Meta-analyses (PRISMA) flow diagram (Liberati et al., 2009) were used to organize and report the key steps, starting from the initial electronic database search to the final selection of the publications for review.

The three main inclusion criteria for publications were: 1) the intervention was a robot that had an animal-like form for use in eldercare; 2) the context was institutionalized eldercare, the elderly individual required assistance for ADL, and the primary intended user was elderly individuals aged 65 years and older; and 3) the analysis appealed to bioethical theories (McCullough, Coverdale, & Chervenak, 2007). The articles were written in English or French (the two official national languages of Canada). Since the first A-SARs were invented in Japan, articles in Japanese were considered. However, since most academic journals in Japan are published in English, it was reasoned that these sources would be included in the above criteria. Publications that focused exclusively on robot design, military weapons, surgical robots, or A-SARs for children were excluded. Editorials, book chapters, position papers, ethics policies, ethics codes, and conference proceedings were excluded. Additionally, articles that focused on the complexity of the technology rather than the ethics-based discussion were excluded. Years were restricted to 2002 and later since the popularization of robotics with socially assistive

programming occurred around this time; 2001 was when PARO, the robotic seal, first hit the commercial markets (Wada, Shibata, Saito, Tanie, 2002).

The databases Pubmed, Web of Science, Philosophers Index, Embase, Scopus, Cinahl, the IEEE Explore Digital Library, and AgeLine were chosen to capture pertinent publications. The database search was in October and November of 2019. The articles from 2002 onwards were included. The database search query was composed of three search concepts: 1) the population (elderly individuals), 2) the intervention (robots), and 3) the dimension/limiter (ethics). The Pubmed search string was created and adapted for each database. The publication's citations, abstract, and full article texts were consolidated in a reference manager (Endnote version X0., Clarivate Analytics Philadelphia, PA, USA). Duplicates were removed before screening candidate article titles, abstracts, and full text. The details for each database search are reported in Table 3.0. These details include each database, the date that each database was searched, the specific search strategy, and the resultant number of articles identified. A total of 816 articles were identified in the first stage of the literature review. A hand search was considered but not done since the particular topic of A-SARs for institutionalized eldercare from an ethics-based approach was already quite narrow.

The data abstraction and synthesis process consisted of re-reading, isolating, comparing, categorizing, and relating the data to each other. The process involves identification, analysis, and representation of themes. For example, the author was interested in the ethical considerations for using A-SARs in institutionalized eldercare. Thematic analysis and discourse analysis were used. Discourse analysis is a problem-oriented interdisciplinary research approach that recognizes the relationship between language and society (Fairclough & Wodak, 1997). The data was extracted by identifying the name of the theory that the authors specifically identified as central to their article. Then, groupings were made of the themes and connections into broad, socially produced patterns related to the provision of eldercare, social companionship, and related terms about A-SAR users. The researcher is actively positioned in the analysis while recognizing that discourse is socially constitutive as well as socially shaped: it constitutes a recognition of possible biases and over-emphasis on particular considerations (Fairclough & Wodak, 1997). The process of critical interpretive literature involved both

inductive and deductive analysis (Fereday & Muir-Cochrane, 2006). The author also familiarized herself with the data separately, coding unique features in the data set, collating these into potential themes, and generating a thematic table, culminating in the selected topics. At the last stage, the author synthesized all the conceptual schemes to present them in the results.

Table 3.0 Search Strategy by Database for Ethical Considerations on the Use of A-SARs in Institutionalized Eldercare.

8 databases	Date	Search Strategy	Number of Articles
Ageline	10.01.2019	(elderly or aged or older or elder or geriatric or elderly people or old people or senior) AND (robot or robotic or artificial intelligence or companionship) AND (ethic or ethics or ethical or moral)	53
Pubmed	10.01.2019	((((((aged[mesh] OR elder*[tiab] OR senior[tiab] OR seniors[tiab] OR geriatric*[tiab] OR older adult*[tiab] OR old age[tiab] OR frail*[tiab] OR older people[tiab] OR older person*[tiab])) AND (robotics[mesh] OR robot*[tiab] OR robopet*[tiab])) AND (compassion*[tw] OR care[tw] OR caregiv*[tw] OR companion*[tw] OR social*[tw] OR loneliness[tw] OR exclusion[tw] OR well being[tw])) AND English[lang])) AND (((((((ethics*) OR machine ethics*) OR deception*) OR moral) OR philosophy) OR biomedical ethics) AND English[lang]	104
Philosopher's Index	10.01.2019	(aged OR elder* OR older people OR senior* OR geriatrics) AND (robot* OR care robot* OR service robot* OR assistive*_) AND (ethic* OR deception OR "machine ethics" OR moral)	19
Scopus	10.01.2019	(aged OR elder* OR older people OR senior* OR geriatrics) AND (robot* OR care robot* OR service robot* OR assistive*_) AND (ethic* OR deception OR "machine ethics" OR moral)	25
Web of Science	10.01.2019	TS =(aged OR elder* OR "older people" OR senior* OR geriatrics) AND TS= (robot* OR "care robot" OR "companionship" OR "socially assistive") AND TS= (ethics OR ethic* OR (caregiver AND ethics*) OR "Machine Ethics" OR philosoph* OR deception OR "ethical issues" OR moral)	324
IEEE (advanced search)	10.25.2019	Elderly* OR Senior citizen AND robot* AND ethics*	24
Embase	10.25.2019	(aged or elder* or "older people" or senior* or geriatric or frail or "old age" or vulnerable).mp. [mp=title, abstract, heading word, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word, candidate term word] AND (robot* or "companionship robot" or "care robot" or "service robot" or robo* or "socially assistive" or "companionship").mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word, candidate term word] AND (ethic* or "machine ethics" or moral).mp. or *ethic/ [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word, candidate term word]	247
Cinal	10.25.2019	((MH "Aged, 80 and Over") OR "(elderly or aged or geriatric or elderly people or old people or old people)) AND (ethic or ethics or ethical or moral) AND (robot or robotic)	20
		Total	816

3.2 Results

There was an initial identification of 816 articles (see Figure 3.0). There were 713 articles after de-duplication. From this set, articles that were excluded had a community or home-based care approach, focused on surgery, monitoring, or military, were in languages other than English or French, and did not fit the year limitations. The second step was to exclude types of literature that were books, editorials, or conferences, and the ones in which full texts were not found (n = 546). The third step was to screen the abstracts and exclude articles that did not fit this thesis's pre-established definitions of A-SARs and institutionalized

eldercare nor included ethics concepts (n = 74). Finally, the texts were read for the full review. The articles that did not address ethics, discussed elderly in independent living situations, and those that focused more on vulnerable groups such as children were excluded (n = 71). These articles were read again to exclude those that did not have a sufficient focus on A-SARs (n = 9) (refer to Chapter 1 for definition). The final set of articles that fit all inclusion criteria consisted of 13 articles. Publications dates of the remaining articles were from 2010 to 2018. Ethical considerations about A-SARs in institutionalized eldercare overlapped and were approached from different standpoints. After reading each article's full text, the leading ethical theory was identified and extracted with the ethical considerations by the user group it corresponded to. Table 3.1 reports this data, the identified articles are presented alphabetically by last name and year.

The results from the literature are divided into themes, which arose from the articles: 1) insights derived from four areas of ethical theory: duty-based deontology, virtue ethics, ethics of care, and the Capabilities Approach (CA), 2) ethical considerations addressed themes specific to four user groups: residents, caregivers, family members, and researchers.

The 13 articles each emphasized different priorities and relied on one or more ethical concept or theory to ground their ethics-based considerations. Out of the thirteen articles, four responded to the concept of duties (Mansouri et al., 2017; Sharkey, 2014; Sharkey & Sharkey, 2011a; Sparrow, 2002), which is typical of deontological approaches to ethics. Four authors mainly draw from the ethical theory of virtues (Coeckelbergh, 2010; Sharkey, 2014; Sorell & Draper, 2014; Vallor, 2011). Three articles mainly analyzed the topic through the ethics of care theory (Coeckelbergh, 2016; Johansson, 2013; Preus & Legal, 2017). Four used the CA (Archibald & Barnard, 2018; Coeckelbergh, 2010; Sharkey, 2014; Vallor, 2011). Three authors used more than one dominant theory in their discussions to provide a holistic argument (Johansson, 2013; Coeckelbergh, 2010; Vallor, 2011). These ethical theories are presented in Table 3.1.

Figure 3.0 Electronic Search Strategy for Literature Identification and the Selection Process for Ethical Considerations on the Use of A-SARs in Institutionalized Eldercare based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)

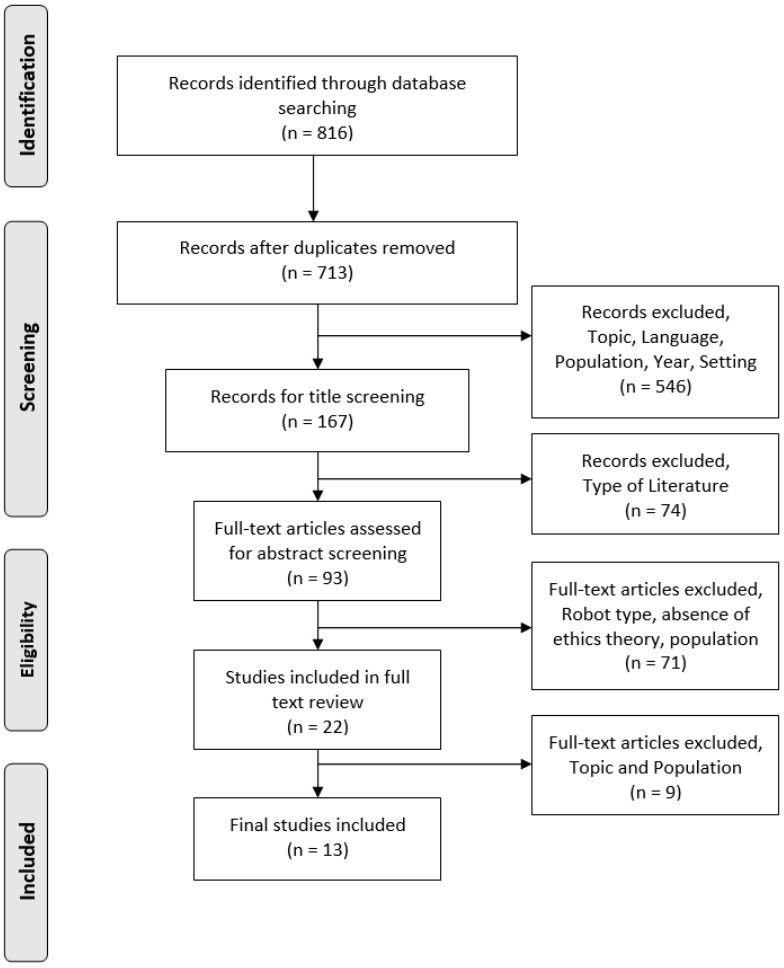


Table 3.1 Ethical Theories and Corresponding Authors

Duty-based Deontology	Virtues	Ethics of Care	Capabilities Approach
Mansouri et al., 2017 Sharkey, 2014 Sharkey & Sharkey, 2011 Sparrow, 2002	Coeckelbergh, 2010 Sharkey, 2014 Sorell & Draper, 2014 Vallor, 2011	Coeckelbergh, 2016 Johansson, 2013 Preus & Legal, 2017	Archibald & Barnard, 2018 Coeckelbergh, 2010 Sharkey, 2012 Vallor, 2011

Table 3.2 A-SAR Use Groups Corresponding to Articles Discussing Ethical Considerations in Institutionalized Eldercare.

Number	Reference Author, Year	Residents	Caregivers	Family Members	Researchers
1	Archibald & Barnard, 2018		☒	☒	
2	Coeckelbergh, 2010		☒	☒	☒
3	Coeckelbergh, 2015	☒			
4	Coeckelbergh, 2016	☒	☒	☒	
5	Johansson, 2013		☒	☒	
6	Mansouri, Goher, & Hosseini, 2017	☒			☒
7	Preus & Legal, 2017	☒			
8	Sharkey & Sharkey, 2011	☒			
9	Sharkey, 2012	☒	☒		
10	Sharkey, 2014	☒			
11	Sorell & Draper, 2014	☒	☒	☒	
12	Sparrow, 2002	☒	☒		
13	Vallor, 2011	☒	☒	☒	

These ethical theories provided varying approaches to examine the various ethical considerations for A-SAR use in institutionalized eldercare (Mansouri et al., 2017). Duty-based deontology emphasized doing actions that aligned with what is required by professional duties. One article associated it with a need for the individual to comprehend the mechanical inner workings of A-SARs and to avoid unnecessary suffering (Archibald & Barnard, 2018). Virtue ethics suggests caregivers cultivate empathy and would be able to choose the ethically justified decision based on their understanding of what a virtuous person in the same circumstances would do (Sharkey, 2014). The ethics of care emphasizes that the relationships are mutual and

interdependent (Johansson, 2013). The CA goes beyond healthcare obligations and developing virtues to ask what opportunities individuals should be capable of to achieve a life worth living (Coeckelbergh, 2010).

3.2.1 Duty-Based Deontology

In four articles, authors applied a duty-based deontological ethical approach (Mansouri et al., 2017; Sharkey, 2014; Sharkey & Sharkey, 2011a; Sparrow, 2002). The word 'deontology' is derived from the Greek words 'deon', which means duty, and 'logos', which can mean study and refers to the rational capacity of humans. Judgements of obligation concern what individuals ought to do. Authors who used duty-based deontology were concerned with how individuals ought to behave and conduct themselves. It is a top-down approach deriving actions from universal norms. Top-down ethical theories attempt to be clear, economical, comprehensive, and coherent (Elliott, 1992). The preference for the top-down approach comes from assuming universal norms and reason to simplify the process required to understand one's duty-based actions. The concepts of autonomy, beneficence, non-maleficence, and justice may focus intuitions into categories upon which to determine the best course of action. Priorities are placed on doing what duty requires with other considerations minimalized in the decision-making process.

Sparrow (2002) interprets duty-based deontology to suggest that the ethical consideration of truth-telling should be central to examining A-SAR use. For an individual to benefit significantly from A-SAR use they must systematically delude themselves regarding the real nature of their relationship with the A-SAR (Sparrow, 2002). Insofar as A-SARs remain robotic, they cannot provide genuine interpersonal companionship; they cannot share experiences with humans because they do not have experiences. Accordingly, users might feel betrayed or hurt if they realize that the A-SAR does not love them back. The usage of an 'ersatz companion' is hence deceptive and individuals must be reminded that this A-SAR is not living, nor its behaviour genuine (Sparrow, 2002). Each A-SAR has complicated internal machinery, and a user should be provided information on what behaviour can be expected. Sparrow (2002) holds that it is ethically necessary to understand A-SAR intricacies before users use it, because

false promises contribute to a general mistrust and the eventual collapse of a valuable social practice of truth-telling within the restricted confines of institutionalized eldercare.

3.2.2 Virtue Ethics

In three articles, the authors applied a virtue based ethical approach (Coeckelbergh, 2010; Sharkey, 2014; Sorell & Draper, 2014; Vallor, 2011). Virtue ethics are not directly related to action. These are judgements not about what to do but about what is good or has value. The bottom-up approach situates the theories within the applied practice and the moral intuitions about a case (Elliott, 1992). Personal judgements of value involve considering how to respect human dignity and rights and how things such as gratitude, hurt feelings, embarrassment, and love are appreciated and upheld (Gardiner, 2003). These emotions are intertwined with culture and individual personalities (Elliott, 1992). The most fundamental claim of virtue ethics is its criterion of rightness "a right action is only so if it is what an agent with a virtuous character would do in the circumstances" (Hursthouse, 1991, p.22). From a virtue ethics perspective, health care professionals are required to cultivate personality traits such as empathy, openness, and honesty (Gardiner, 2003). When a moral problem can be resolved in two different ways, either by following a general code or virtuous character, the decision based on virtues is good (Pellegrino & Thomasma, 1993).

Sharkey & Sharkey (2011) suggest that the ethical consideration of how human-human caring relationships should be cultivated is central to examining A-SAR use. Attention is placed on the suggestion that "dull tasks in the context of robot care often provide the opportunity for social interaction and bonding" (Sharkey & Sharkey, 2011, p.64). The display of caring virtues increases social interactions and intellectual stimulation. Caregivers are motivated to act in certain ways because they perceive themselves to be exemplars. A-SAR aligned with good care, depends on whether the caregivers feel comfortable using A-SAR and has a positive outlook on the outcome. The preferences and agency of elderly residents to choose their own participation is not prioritized in this ethical theory. When the formal caregivers see themselves as providing a therapeutic tool that maintains the elderly individual's dignity, they feel that the use of the A-SAR is in line with their code of ethics; the A-SAR is just one of the many therapeutic tools (Vallor, 2011). However, when the A-SAR is not a tool but rather an infantilizing toy it robs

dignity and “violates the virtuous relationship that should exist between human beings” (Sharkey, 2014, p.65).

3.2.3 Ethics of Care

Four articles embodied the ethics of care approach (Johansson, 2013; Vallor, 2011; Coeckelbergh, 2015; Coeckelbergh, 2016) to address the use of A-SARs in institutionalized eldercare. Ethics of care was developed by several different feminist thinkers, including Gilligan (1982), Nodding (1984), and Held (2006). Like virtue ethics, ethics of care orientation is towards the positives internal to practices rather than external moral criteria, e.g., goods or mechanistic values. Yet unlike virtue ethics, it focuses on the fundamental caring practices and relationships. Rather than holding the virtues themselves to be ethical desiderata, ethics of care takes virtues to be an outgrowth of the caring relation rather than the primary goal of care. This approach recognizes care as both a value and a practice and leaves the interpretation of ethical behaviour to the individuals involved (Held, 2006). By drawing attention to the caregivers, it aims to render visible, the invisible aspects of caregiving (Held, 2006) and can offer insights into the ethical implications of A-SARs.

Johansson (2013) suggests that ethics of care is nurturing a mosaic of ethical insights that are sensitive to contextual nuances and the unique experiences of users rather than making universal claims. Ethics of care values sympathy, empathy, and responsiveness because this theory accentuates human beings' natural caring attitudes, prototypically found in women and children (Held, 2006). Ethics of care can guide choices of when to care, for whom, and to what extent (Gilligan, 1982). Identifying such decisions ensures the support needed to sustain the caregivers and care receivers emotionally, physically, and morally is delivered. Two human beings, the one caring and the cared-for, enter into a relationship where the first response to a need is manifested by the second, thus establishing a commitment that is ontologically grounded in a moral virtue like compassion (Sorell & Draper, 2014). Even if an elderly individual were to ascribe a personality onto an A-SAR, it should not affect the caregiving virtues between human-human relationships. True caretaking is possible between and among human persons, since human relationships can shape moral decisions in a way in which the experience is shared (Held, 2006). Glances, hugs, and silences are among the elements that shape the caring

relationship and transmit compassion, participation, happiness, or other such emotions. Inherent in the ethics of care framework is that relationships between those interacting with each other in A-SAR interventions are constantly shaped and reshaped. An algorithm cannot accomplish this human behaviour with the same intricacy as a caregiver who can experience suffering and thus can emphasize institutionalized eldercare experiences (Coeckelbergh, 2015). Additionally, Sharkey (2012) suggests that the use of A-SARs encourages sympathy. This approach works well when individuals can clearly articulate their preferences and past stories with animals or animal-like objects. The caring relationships being promoted in the ethics of care act are to socially buffer distress and show desired therapeutic outcomes (Sharkey, 2012).

3.2.4 Capabilities Approach

Three authors used the CA (Archibald & Barnard, 2018; Coeckelbergh, 2010; Sharkey, 2012). In contrast to dominant approaches, the starting point of the CA is to ask what supports the basic functioning and capabilities of people at a level sufficient to maintain human dignity (Sen, 2006). Rather than asking whether individuals accept certain QoL interventions, the capabilities view asks what it required for individuals to be capable to having a life worth living. The CA theorizes what basic human requirements must be put in place for social justice (Sen, 2006). In this approach, care is a set of activities that may differ depending on those receiving it. The relationships, needs, or preferences of the institutionalized elderly resident population are different from other groups involved in their care, such as caregivers or family members. The CA holds that the key question to ask when comparing societal ties and assessing basic capabilities is what is each person able to do and to be? In other words, the approach takes each person as an end, asking not just about the total wellbeing but about the opportunities available to each person (Nussbaum, 2011). Nussbaum (2011) has ten capabilities that include internal, external, and combined capabilities integral to a life with dignity (and necessary for a just society). The ten capabilities are: life; bodily health; bodily integrity; senses, imagination, and thought, emotions; practical reason; affiliation; other species; play; and control over one's environment (Nussbaum, 2006). The CA centers ethical considerations around choice, holding that the crucial good societies should be promoting is a set of opportunities that people may exercise: the choice is theirs. The impact of A-SAR use in eldercare setting is considered

alongside the background of individual persons, persons' particular contexts, the organizations that implement them, and the overall society's legislation and values.

Vallor (2011) uses the CA to call for a case-by-case evaluation of A-SAR use before applying them in eldercare settings. The premise is that the use of A-SARs should create opportunities to fulfill the human capabilities of the user. The A-SAR must help one to reach, sustain, and enhance certain capabilities for justified use and investment (Coeckelbergh, 2010). Vallor suggests external pressures will constrict the practicality of A-SARs in completing caregiving tasks (2011). The ideal scenario would be when a personal investment in eldercare outcomes would be rewarded (emotionally, socially, and reciprocally) as a fulfillment of an expected and beneficial part of eldercare (Coeckelbergh, 2010).

In the CA, caring for people with disabilities (which can include institutionalized elderly individuals) is connected to affirming personal capabilities and protect personal dignity. CA's goal is to have the freedoms and opportunities to live in a way that provides life with meaning (Nussbaum, 2011). Having the opportunity to do simple things like stroking a pet can provide fulfillment and pleasure (Akiyama, Holtzman, & Britz, 1987). The researchers recognize that they are limited by their funding opportunities. Caregivers and family members are limited by their own work limitations. The A-SAR functionality is pre-programmed. Furthermore, the broader legislation determines what is legal and what approach should set care expectations (Coeckelbergh, 2010). Recognizing that opportunities exist within practical limitations is important. Hence, the "threshold of caregiving expectations should not be set so high that no-one could ever achieve it" (Coeckelbergh, 2010, p.184).

3.3 Theoretical Discussions

The identified authors used ethical theories and approaches prevalent in Western academia and healthcare. The limited variety of theories identified suggest that although the user groups were the same, a richer discussion comes from a combination of theories. It also suggests that the dominant ethical theory in the region will impact what ethical expectations are in guidelines or codes of ethics. All authors did not dismiss the applied settings as empirical research and anecdotes from previous studies were included in the articles to provide support to the identified ethical considerations and insights. The focus of this chapter, however, was

on the ethical insights raised specifically about A-SAR use in institutionalized eldercare settings.

Duty-based deontology recognizes that caregiver and family member have great decisional power in using QoL interventions for elderly residents. There is an emphasis on maintaining trusting relationship during A-SAR use (Sparrow, 2002). Filial relationships are important because family members are directly involved in the illness of their loved ones. Hence, the approach reposes authority onto decision-makers and respects present social norms (Mansouri et al., 2012). The family members discern and provide instruction to whether the resident would want to participate in an A-SAR intervention. The family's assessment of whether QoL interventions are well aligned with the goals of providing good eldercare is duty-bound. Family members are assumed to have access to intimate details about an elderly resident's past history with animal-based interventions. They can act as gatekeepers to decide whether resident would respond positively to A-SARs and moderate how often the QoL intervention should be provided. The study by Moyle et al., (2019) had family members report on their knowledge about the resident's past experiences with animals before introducing PARO as a companion seal-like SAR the results were that family members correctly inferred that residents would appreciate the A-SAR's softness and cooing movements.

The problem of duty-based deontology is that the assumption that patient's relatives have an "intimate understanding of the resident's medical attitudes and general world views" (McKeever, 1996, p.206) could be flawed. The emphasis on universal standards is not necessarily one that can reflect individual constraints by caregiver and institutional capabilities. Indeed, creating a health care environment in which deception of any form was unethical would disallow all QoL interventions (Johansson, 2013; Coeckelbergh, 2010)[3]. Reminding elderly residents about their poor health and the mechanized nature of A-SARs could violate trust in the institution to provide good care (Johansson, 2013; Coeckelbergh, 2010).

The virtue ethics approach taken by Vallor concluded that A-SARs properly designed and implemented, might be able to improve the lives of both cared-fors and

[3] QoL is a personal perception that is a broad ranging concept, affected in a multi-faceted way by a person's physical health, psychological state, personal belief, social relationships, and their relationship to their environment (WHO, 2004). QoL interventions vary widely and can include simple group activities, such as bingo or drawing, to more complicated activities such as individual counselling and therapy sessions (Rahimzadeh, 2014).

caregivers in ways that would be ethically desirable and, in the absence of acceptable alternatives, ethically mandated (2011). The moral agent focuses on users' needs, based on the relationships of caring for others to different degrees and in different ways, implicating that eldercare provision should be variable according to levels of social and emotional connectedness (Johannson, 2011). According to Johansson's understanding of good care provision, caregivers should act in ways they think is expected of them. Yet, when caregiver workload increases caregivers may become fearful or apathetic or withdrawn from the emotional virtues expected of caregivers (Bramble, Duerk, & Baltes, 2019).

By itself, the use of A-SARs does not establish what boundaries a virtuous caregiver could place to protect themselves from compassionate fatigue. An exemplary caregiver may pressure themselves to be completely truthful, honest, and responsive to resident needs. Virtue ethics places onus on specific individuals proximal to the eldercare experience to choose what virtues they will cultivate and whether A-SARs are within their understanding of ethical eldercare expectations. Perhaps directly assessing A-SAR value in enriching the opportunities to cultivate personal virtues is a better eldercare approach. Coeckelbergh (2014) suggests the implementing a variation of a best interests' standards to ask whether A-SARs will advance the current and future wellbeing of residents and caregivers. Assessing and discerning possible interests in replicating AAT using A-SARs requires caregivers and family members to evaluate the resident's subjective state, and ultimately, to decide whether a more virtuous person would make the same decision as them. The novelty of A-SARs places onus on current users to set a standard of eldercare within the ethical boundaries of good care. The question is not how the elderly person would feel when participating in A-SAR interventions, but whether these experiences cultivate human virtues such as kindness and compassion.

The ethics of care approach was used by Coeckelbergh (2015;2016), Johannsson (2013), and Preus & Legal (2017) to suggest that a focus on the caregiving relationship can provide ethical insight. This approach includes considerations on how care is personalized. Ethical considerations are examined in relation to the interconnectedness and interdependency of

individuals within the care setting. The domain of caregiving is rendered visible and problems are acknowledged (Held, 2006). The difficulty lies in discerning resident interest in participating as obtaining reliable information about a resident's subjective experiences can be difficult in eldercare situations (Preus & Legal, 2017). Demands on caregivers to be personally invested into providing good eldercare can expose the challenges of providing ADL without A-SAR tools. Obtaining and evaluating data about the resident and determining the impact on the relationship is surmountable in many cases (Johannsson, 2013). Evidence bearing on resident's perceptions of pain and other physical sensations, ability to interact with other person and the environment, and ability to engage in cognitive activity are all necessary to examining what care is needed or justified. Johannsson suggests that "robots never get tired, disgusted, or never sensitive to bribery or flattery" and thus might be better than humans at adhering to ethics of care (2013, p.77). In the discussions about ethical considerations around the use of A-SARs when there is an absence of caring relationships: the impact of adding A-SARs was unclear or not discussed.

The CA is most likely to protect residents and give situational context to ask whether A-SARs serves the resident's best interests for meaningful living. The CA's focus on the particularity of social context denies a *priori* refusal of A-SAR use in eldercare institutions. Coeckelbergh (2010), Sharkey (2014), and Vallor (2011) call for a case-by-base evaluation of A-SAR use, starting from the premise that the use must create capabilities to fulfill one or more of the 10 capabilities listed by Nussbaum (2011). This approach includes considerations on how the social contexts, i.e., practical constraints, availabilities, and sensitivities, can affect the examination of ethical considerations (Vallor, 2011). The stakeholders in the topic are viewed to be interconnected and interdependent. A-SARs are not viewed as replacements for caregivers. They are a component of eldercare practice as a tool to help users reach, sustain, and enhance QoL when used appropriately (Sharkey, 2014). If A-SARs would serve resident interests but would impose heavy burdens on caregivers, family members, or the institution, then certain capabilities can be prioritized over others. Society's commitment to an ethical position which takes in the real lived experience of all A-SARs can be reaffirmed or modified based on the social context and limitations. The approach is specific to the context of eldercare and will

encourage the opportunity to have the choose interventions that make life meaningful (Nussbaum, 2011). The resident or caregiver can abstain from providing A-SARs, for example, when the resident cannot reasonably be said to have any continued interest in A-SARs because their level of awareness is so minimal that the resident is unable to react. For life to be of sufficient quality to be meaningful, some capability to interact with the environment must be present (Nussbaum, 2011). Coeckelbergh (2015) suggests that A-SARs could provide opportunities for users to feel more control over their own environment and find moments of meaningful living through exercising opportunistic freedoms to participate in available interventions.

Balancing resident QoL with other caregiver interests, such as workload, can be considered a taboo topic in examining what interventions constitute good eldercare practices. Since care decisions are inevitably made, it is preferable to openly make them, as opposed to arbitrarily rejecting existing therapeutic tools. Immediate rejection of interventions based on mal-intentioned fear or protectionism is a conceptually flawed approach that allows care decisions to be made covertly, thus risking even greater likelihood of deteriorating resident-caregiver relationships. The use of A-SARs to assist in socially supportive ways has potential to expand eldercare experience to be more inclusive and stimulating for all four types of users (see Chapter 2). When given the option, diversifying rather than constraining the number and types of companions will allow for users to have more social connections to choose from. Instead of placing value on the relationships themselves, chosen social connectedness with chosen people seems desirable, with the user deciding, as most adults routinely do, whom to include and whom not to include in their social circle as companions (Sorell & Draper, 2014).

Within the four identified ethical theories and approaches, the approach with the most reluctance to broaden the ethical landscape was the duty-based deontological approach in Mansouri et al., 2017, Sharkey, 2014, Sharkey & Sharkey, 2011a, and Sparrow, 2002. The ethical insights pertained to how human users could decide whether A-SAR use or participation was inside the theory specific standards of good care practice. Consequently, these approaches seem to lead to an ethical assessment of A-SARs instead of an open reflection about their use. Thinking forward Sorell & Draper (2014),

Coeckelbergh (2016), Johansson (2016) suggested that the A-SARs can be used ethically, and a broader application of ethics ought to be discussed as these SARs become more prevalent. Although the different ethical approaches described in this literature review address similar concepts and topics related to eldercare expectations for good care (e.g., dignity, deception, objectification, care), they differ in how A-SARs influence the boundaries of the ethical landscape.

3.4. Ethical Considerations by User Groups

The second objective of this chapter was to discuss the identified ethical insights in connection to the four primary user groups; elderly residents, caregivers, family members, and researchers (see Table 3.2 and Table 3.3). Ethical considerations for researchers were limited in the literature. However, because they were mentioned by Mansouri, Goher, & Hosseini (2017) they were included. The categories proposed can provide a more nuanced understanding to the applied use of A-SARs which identify commonalities between the various theories. Not all categories of users were mentioned in each of the articles. The ethical considerations were not always grouped by theoretical approach. Identified articles acknowledged that not all A-SARs were used in the same way nor did applied settings use ethical theories consistently or understand its concepts in the same way.

3.4.1 Elderly Residents

Elderly residents are the primary intended users of A-SARs and were more directly addressed (see Table 3.2). The review identified that the main ethical considerations were how the use of A-SARs would impact concepts of dignity and consequential sense of well-being and belonging of the residents. Considerations around how the use of A-SARs would impact dignity of the residents was a major ethical consideration in Mansouri et al., (2017), Sharkey (2014), Sparrow (2002), Sorell & Draper (2013), Vallor (2011), Preus & Legal (2017), Coeckelbergh (2010), and Sharkey (2012). Focus centered on how A-SARs would promote resident's sense of personal identity and dignity. "The dignity we attach to ourselves as integrated and autonomous person, persons with a history and persons with a future with our relationships with other human beings" is often used in eldercare discussions (Nordenfelt, 2004, p.75).

Table 3.3 The Main Ethical Considerations of Using A-SARs in Institutionalized Eldercare by User Group.

	Users	Main Ethical Considerations of Using A-SARs in Institutionalized Eldercare
1	Elderly Residents	Impact on - Dignity, wellbeing, sense of belonging and identity - Autonomy and independence - Cultivation of reciprocity and empathy - Chosen relationships with persons or objects that have personal meaning and importance
2	Caregivers	Requirements to - Facilitate the care relationship - Accommodate resident requests for communication and social engagement - Include residents and others in determining goals of care and decision-making process - Balance their professional and personal demands on their physical and mental health Professional Expectations to - Cultivate caregiving virtues and nurture the caregiver-resident relationship - Express professional virtues and expected personality traits such as kindness and honesty - Have caregiver health maintained and respected - Feel empowered over their working environment
3	Family Members	Decision-making based on obligations to - Respect the decisions and wishes of residents - Participate in decision-making and communication - Balance family members wellbeing and resources with necessities for care - Advocate for equity of elder care - Collaboratively build common ground
4	Researchers	Responsible for - Recruit and conduct studies that are just - Declaring conflict of interest - Improving the various care tools and building greater academic understanding

The institutionalization process can cause residents to grieve about their change in life status. Going from independent living to dependent living may be a shock for residents. They may seek out ways to reaffirm personal values and identity. Many pet owners miss being associated with their pet and status as an animal-lover (Pres & Legal, 2012). Some residents may wish to retain their pet owner identity, despite loosing pet ownership, their interests should be respected and responded to within practical limits (Coeckelbergh, 2012). Animals are often treated as household members and people at any age can choose to buy a pet or interact with animals (Cherniack & Cherniack, 2014).

How A-SARs would impact a resident's autonomy and independence were raised by Sorell & Draper (2014). They describe autonomy as the ability to choose for oneself and act per one's choices (Sorell and Draper, 2014). In elderly residents, autonomy can co-exist with dependence, such as when elderly residents require additional support for accessing and using A-SARs. Institutionalized living is different from independent living as choices of the residents often need to be realized through the efforts of others (Sorell & Draper, 2014). Elderly individuals may feel more comfortable with relying on others to introduce an A-SAR as good companion. Even if decision making is deferred to another, the elderly individual still chooses to engage or refuse participation at the start of the QoL intervention.

The use of A-SARs to provide the freedom to develop cultivate virtues was raised as a positive consequence by Vallor (2011) and Sharkey (2014). Two virtues considered as particularly relevant in human-robot relationships are reciprocity and empathy. Reciprocity is a primitive biological impulse which functions as the seed of human sociality and the unifying feature of all forms of friendship (Vallor, 2011). A-SARs can provide behaviour that seems reciprocal to the attention and care it gets from its users or as a tool offered as a gesture of reciprocity. Empathy is an emotive/perceptual capacity that develops in most humans from a basic biological impulse that expresses itself fully in the highest forms of companionship. When cultivated, it constitutes a virtue (Vallor, 2011). A-SARs create opportunities to engage in social interaction and increase the prospects for attachments to things that may have distinct consideration for use (Sharkey, 2014). Sharkey & Sharkey (2014) note that the provision of any type of intervention is better than the alternative of no intervention; Sharkey & Sharkey (2014)

note: "… improvements could have been found because the alternative was so dire and unstimulating. Someone in solitary confinement might benefit from being given a robot companion, but they would benefit far more if offered a friendly social environment. It is not clear the same relative improvements would result if the control group received some other individual attention… (p. 34)." Providing robots that facilitate conversation may function as an attractor for visitors (Sharkey & Sharkey, 2014). There is potential that an increase in a person's sense of control over their environment from using A-SARs, for instance, by reducing their dependence on other people or creating opportunities to use stored knowledge of their previous experiences customizes caregiver attentions (Sharkey, 2014).

Residents centered their ethical considerations and insights on how their sense of dignity and identity would be impacted when relationship building with A-SAR use. Preus & Legal (2017) says residents are capable of discerning how they want to engage with A-SAR. People who "build a relationship with robots interact with the robot for longer periods, while those who view the robot first and foremost as a machine soon discontinue their use" (Preus & Legal, 2017, p. 408).

3.4.2. Caregivers

Caregivers are major user group of A-SARs in institutionalized eldercare and their professional roles are governed by both codes of ethics and institutional policies. The ethical obligation to provide good eldercare was a major ethical consideration (see Table 3.2). Caregivers hold responsibility for providing interventions to promote residents' wellbeing, function as facilitators, and have responsibilities in the care relationship.

Providing eldercare is not an easy task and balancing workload is vital. Vallor (2011) suggests that "reducing the care burden on caregivers is a desideratum, even a collective moral obligation, assuming that it can be accomplished by ethical means" (p.255). Caregivers provide their care services as part of their profession. Caregiving is a value which is predominantly characterised as a "burden, requirement, or social expectation that non-elderly individuals (especially women) bear" (Sharkey & Sharkey, 2010, p. 28). Even the provision of companionship and emotional support is characterized as a task; a necessity that cares about (subjective state) and caring for (activity to safeguard the interests of the resident) (Johansson,

2013). Ultimately, they do have a large role in the decision-making process of any QoL intervention in the eldercare settings when they are responsible for the wellbeing of residents.

An ideal state of caregivers would then be "those who… have the freedom to choose the extent, type, and manner of caregiving" (Vallor, 2011, p. 256). A-SAR provision is dependent on whether the caregiver chooses to use it in their practice. Caregivers are motivated by a sense of persona and non-transferrable duty, such that one would rather suffer the burdens of giving care than the guilt of shirking them. Some also might be motivated by external rewards that outweigh the burdens of care, such as monetary compensation or gratitude expressions and admiration by residents and observers (Vallor, 2011). The personal investment that caregivers place into their work can also provide opportunities to display the virtues expected of them, e.g., kindness, truth, empathy.

The shared lived experience of caregivers with residents confined to institutionalized living expects that they have some privileged insight into discerning what interventions would be beneficial, harmful, or deceptive. Sparrow (2002) raises the concern that the deception involved in introducing an A-SAR as a real creature could damage the trusting caregiver-resident relationship. Nurses and staff who introduce it as a tool felt conflicted when the elderly spoke as if it was a living animal (Preus & Legal, 2017). When A-SARs are intentionally presented as alive and have innate personalities, this asks the elderly individuals to participate in the delusion (Sharkey & Sharkey, 2012; Sparrow, 2002). From this perspective, Sparrow (2002) is concerned that the sentimentality of relations between institutionalized elderly with A-SARs leads to a fake relationship that violates the commitment to honesty about inherent relationships that exist when the caregiver introduces the A-SAR. Beneficial effect of robot pets or companions can be a consequence of deceiving the elderly person into thinking that the robot pet is something with which they could have a relationship, and caregivers can discern how best to be truthful about the mechanistic and therapeutic nature of A-SARs. Sparrow (2002) describes his ethical concern by stating "in most cases, when people feel happy, it will be because they (mistakenly) believe that the robot has properties which it does not. These delusions cause people to feel loved or cared for, and thus to experience the benefits of being cared for" (p.52). The SARs are suggested to perpetuate ageist beliefs of elderly residents as

homogenous and vulnerable. In later articles, Sparrow & Sparrow (2006) are concerned that the amount of human contact would decrease as robots become more sophisticated.

The caregiver is a person with personal goals and interests outside of their caregiving role. Requiring eldercare interventions that overwhelm the mental and physical wellbeing of elderly individuals is neither ethical nor reasonable. Caregivers have the professional right to be partial about who they care for. They are also able to limit the extent of care they choose to provide. The permission to be partial prevents the negative consequences of overwhelming caregivers. An over-emphasis on the resident can lead caregivers to cease caring due to forced responsibilities and duties. (Johannson, 2013). There are, within limits, practical constraints on caregivers, and a host of environmental, social, or institutional conditions that can constrain and improve an ethical ideal.

The introduction of A-SARs into eldercare practices could have some purpose in being "essential to sustaining the caregivers, so that they do not face the degradation of their own moral being" (Vallor, 2011, p. 261). The A-SARs can distract or encourage social behaviour between residents (Moyle et al., 2016). Hence, A-SARs could provide caregivers with greater independence and the capabilities of the caregiver may be enhanced, promoting the ability of residents to express reciprocity or thankfulness to caregivers in return. The A-SAR's function as a tool to build common ground allows the caregivers to meet their moral obligations without destroying their emotional health (Vallor, 2011).

Any tool that allows users to feel more in control over their environment is encouraged (Archibald & Barnard, 2017). For example, the caregiver would still be acting under ethical expectations if they were to use the A-SAR as a type of attractant or motivator to prevent residents from leaving their rooms. Suppose the caregiver were to use the A-SAR knowing that the resident would enjoy the petting action in order to attend to task-oriented care, such as administering medication, or documenting care activities. In that case, it is like any other enjoyable distraction such as turning on the television. Coeckelbergh (2010) suggests its use is not inherently unethical, it is the motivation and way it is used that may raise ethically suspect considerations.

3.4.3. Family Members

Family members have the filial obligation to respect the resident and acknowledge the individual's needs and preferences as best as possible (see Table 3.3). The relationships between family members and residents can be emotionally complex and diverse. Ideally the relationship would be loving and compassionate however, the ethical considerations for this group often reveal tensions between protecting the resident, desiring to respect their wishes, and preserving at least a minimum standard of QoL.

The decision to use A-SARs can lead users to re-examine the value of caring between resident, caregivers, and family members. The addition of an A-SAR into the elderly individual's environment may function as an attractor for visitors. It can provide a topic of mutual conversation between estranged family members (Sharkey & Sharkey, 2014). Children may want to role-play with the A-SAR and have fun caring for the A-SAR with their grandparent. Kanamori et al., (2002) reports the case of an 84-year-old man with cerebral apoplexy sequelae. He talked much more to his children after the introduction of an AIBO robot dog. It gave both him and them a focused object to talk about. The opportunity to care about something, together with others and feel rewarded lead to greater appreciation of others. Through giving care family members learned to recognize the signs of need in another and "became habituated to responding to need, and [they] came to fully appreciate the goodness of the caring role, and the importance (and challenge) of caring well" (Vallor, 2011, p.264).

Providing eldercare is a strenuous experience and the work of formal caregivers can become invisible to family members. Family members can come to expect caregivers to be consistently providing good care without acknowledging the hard work and effort put into eldercare. Until they have taken on the caregiving role and experienced its challenges and rewards, they do not fully grasp the goodness of having others support them in providing care (Vallor, 2011). Without engaging in caregiving practices the sense of fulfillment and goodness of caring relations remains impoverished and one-sided. Benefits could be obtained from altered care dynamics. The socially assistive function of A-SARs brings forth new questions and could be used to encourage family members to spend longer periods in the institutionalized eldercare setting.

Sharkey (2012) suggests family members may invest in technology as a companion for their loved one to alleviate their guilt for providing insufficient companionship themselves, stating: “do not worry about Granny, she has got the robot to talk to” (p. 35). The availability of companionship A-SARs may be very appealing to those who have not become comfortable cultivating empathy in caregiving practices, leading them to abandon or significantly limit the exposure to institutionalized care (Vallor, 2011). Sharkey and Sharkey (2010) note that providing an A-SAR may allow caregivers to feel that they are satisfying their caring obligations to not leave their family members alone. The availability of A-SARs could be used to tempt people into further neglecting those they should care for. Family members and informal caregivers may avoid taking on the psychogeriatric weight of caregiving at a personal level if they believe that a tool would replace them. The concern, then, is “the availability of A-SARs may be very appealing to those who have not yet become comfortable with the cultivation of empathy in caregiving practice, leading them to abandon or greatly limit their exposure to such practices” (Vallor, 2011, p. 259).

Furthermore, family members are sometimes tasked with being substitute decision makers and will provide consent for participation in A-SAR activities. They are assumed to have a greater understanding of the existing needs and preferences of residents and to make good decisions. What is required of family members to fulfill their care-related obligations is ambiguous. Tasks and expectations[4] can vary across social and cultural eldercare institutions. Family members are tasked with maintaining a relationship of trust with the elderly resident. Although elder abuse is defined as any action or inaction that harms the resident, gestures of care from a physical distance could also provide beneficial eldercare.

The provision of eldercare can be an emotionally charged and anxious experience. There may be temptations to use A-SARs as an intermediary buffer from the fear of becoming too attached to the resident (i.e., being vulnerable to the possibility of their loss and caregiving grief) (Vallor, 2011). Residents have fears of becoming too dependent on the family, showing

[4] In Canada, the social expectations are that eldercare is not neglectful nor abusive. In Canada, the Department of Justice defines senior abuse as “any action, or deliberate inaction, by a person in a position of trust that harms the health or wellbeing of an older person. The person in a position of trust could be a spouse, a family member a paid caregiver, a staff member at a long-term care facility, etc.” (Advocacy Center, 2002). Institutionalized care requires that family members still uphold their financial and contractual obligation to care for the elderly resident.

vulnerability, pained by the loss of beloved pets or social connections; or angry, frustrated, or exhausted by the lack of respect or dignity they feel deserving of (Band-Winterstein, 2015). Providing something for the family members and residents to care for together allows them to confront their fears and builds common ground.

3.4.4. Researchers

Researchers, as a group of A-SAR users, were identified from two of the ethics articles (Mansouri, Goher, & Hosseini, 2017; Coeckelbergh, 2010). The relationship that researchers had to the delivery of eldercare was not directly addressed. This is a peripheral group (see Figure 2.0). As an A-SAR use group, their studies have an impact on evaluating the evidence-based efficacy and impact on A-SAR intervention outcomes. The ethical considerations identified were related to the social responsibility, consent, and role conflict. The ethical responsibilities of the researchers and choice in research questions required for technological uptake impact the studies.

Researchers innovate and expand the knowledge about possible QoL interventions in elderly care while upholding research ethics principles. Confusion around how to uphold ethics in clinical research have recognized elderly population participation in clinical trials have communicative and logistic solutions (Denson & Mahipal, 2014). Addressing problems with technology that do not meet the needs of the users can reduce the intervention's potential to be harmful or carry additional risk. Studies on hearing-aid use routinely report that a stigma associated with old age is among the major reasons that people with hearing problems are reluctant to adopt these assistive devices (Erler & Garstecki, 2002). A US study found people aged 75 and older represented 37 percent of patients with heart attacks in the US but just 9 percent of patients enrolled in randomized controlled trials (Lee et al., 2001). Another British study of upper age restriction for participating in biomedical research concluded that over half of the limitations were unjustified and unnecessary (Bayer & Tadd, 2000). Elderly individuals are also disproportionally less likely to be involved in biomedical research (Gendron et al., 2016). The disproportionately low representation of elderly individuals is in part the result of negative stereotypes about competence, reliability, and commitment to and compliance with the requirements for research participation (Bayer & Tadd, 2000: Lee et al., 2001).

Researchers can also be hesitant to recruit institutionalized elderly individuals citing administrative or logistical considerations (Gendron, 2018). Research with and for elderly populations has identified that studies in the effectiveness of robotics is ethically required to provide caregiving services that are justified and appropriate. Evidence based research is lacking in institutionalized eldercare settings. The lack of research and evidence can also restrict legislative response to solve eldercare problems (Mansouri, Goher, & Hosseini, 2017).

Technical developments in SARs have created new opportunities for users to learn and cope with new modern technology and systems (Mansouri, Goher, & Hosseini, 2017). Technology is to be invisible when assisting users. Technology users are not required to gain knowledge about the inner workings of the technology. They should be provided information on how to be aware of the advantages and disadvantages of A-SAR use in their lives (Mansouri, Goher, & Hosseini, 2017). The empirical argument establishes that research with elderly populations in their lived environment is necessary to develop effective social and psychological programs and sound gerontological social policy.

The role of caregivers diverges significantly from that of the researcher, though the same person can have the dual role with respect to a research project. All groups of A-SARs collaborate with each other to validate the efficacy of A-SARs. Research ethics states that conflicts of interest must be made clear. Care goes beyond the standard of care, participants are observed, and consent processes are facilitated. The Tri-Council Policy Statement 2 (2018) requires that researchers disclose any real or perceived conflicts of interests to the Research Ethics Board. Further, the institutional conflicts of interest or community conflicts of interest shall determine the appropriate steps to manage the conflict. To preserve and not abuse the trust on which many professionals rest, researchers should be fully cognizant of conflicts of interest that may arise from their dual or multiple roles, their rights and responsibilities, and how they manage the conflict.

3.5 Limitations of Selected Articles due to Topic Specificity

The use of A-SARs in eldercare is an emerging area of research. While the literature review sought to identify relevant literature published since 2001 (the year that PARO, the robotic seal, first hit the commercial markets (Wada, Shibata, Saito, Tanie, 2002), most

publications included were after 2010. Because A-SARs are not widely implemented in institutionalized eldercare, few commentators have addressed the ethical considerations of their use. The fact that there is limited information about this field can, in itself, be a limitation. However, this field of study continues to grow, meaning that articles could have been published after the literature review search was concluded in 2019. This topic's specificity led to the identification of numerous articles that did not meet our inclusion and exclusion criteria addressed other topics involving SARs and the elderly population. For example, a 2017 review looked at holistic approaches to studying human-robot interactions in later life (Zafrani & Nimrod, 2019). A 2018 study looked at the use of care robots (which have a primarily assistive function and non-animal-like appearance) in aged care through a systematic review of argument-based ethics literature (Vandemeulebroucke, de Casterle, & Gastmans, 2018). Some excluded articles focused on nursing ethics and assistive robots' monitoring role with data capacities (Lee et al., 2018). Other excluded articles examined the engineers' obligations to program robots using algorithms based on technology ethics (Sharts-Hopko, 2014). Exploring, even tentatively, a broader set of literature could have revealed additional ethics themes to consider in our analysis, but this was not considered given the specificity of our research question.

3.6 Conclusion

This critical interpretive review aimed to gain insight into ethical considerations for using A-SARs for institutionalized elder care. There were four major ethical approaches used by the authors to organize their considerations. The emergent issues from the identified authors were then organized into the four categories of users to discuss how the usage of A-SARs should be evaluated on how the use affects the dignity of individuals, and how the caregiving relationship is altered and what relational expectations are created. The review shows that there is more than one dominant form of ethics being used. The ethical considerations were based on ethical assessments of what is expected in good care and a reflection on the impact of A-SAR use on personal values.

The ethical considerations focused less on the physiological changes or the physical risks of using the technology. Rather, resolving possible ethical tensions was a central consideration.

There are disagreements about evaluating the moral risk and benefits of introducing these robots into actual care settings for all theories and user groups. In general, these disagreements involve conflicting judgements about whether A-SARs will improve or degrade the quality of eldercare. The considerations recognized that each individual should have the freedom to choose and make independent decisions while being aware that accessibility to A-SARs was interdependent on the consent and cooperation of others.

Although the different ethical theories identified in the review addressed similar concerns related to the provision of good eldercare with the use of A-SARs (e.g., dignity, values, deception, caregiving relationship, communication) they differ when it comes to suggesting how A-SARs change the ethical landscape. Applying the reasoning process of one ethical theory to determine the alignment of A-SARs to all future uses seems unlikely. The use of the ethical considerations determined in the review can be implemented in legislative criteria when evaluating institutional decisions on whether A-SAR use aligns with ethical expectations in eldercare practice.

Additionally, this review implies that the representation of users had an impact on the way that the ethical consideration was framed. Ageist images of elderly residents as lonely, socially isolated, or cognitively impaired motivated considerations about infantilization and objectification fears. The importance of formulating A-SAR interventions in a way that could respect the dignity of identity suggests that the expectations of what is necessary for the delivery of good care changes with the introduction of new technology. Robot technology influences ethical reflection. Coeckelbergh (2015) is critical about introducing socially assistive care robots, but his approach broadens ideas about what good care means in eldercare practices, now and in the future.

Future studies could be conducted to consider the ethical consequences of creating approaches to help present A-SARs to the users. The expansion of values is central to each group when they choose or refuse to integrate A-SARs into their caregiving practices and could build tools that go beyond a yes-or-no answer to the A-SAR care issue.

Chapter 3 discussed the dominant ethical considerations and the primary tensions for each of the A-SAR users, as found in the literature. Chapter 4 examines the legislative and

ethical expectations of caregiving in the Resident Bill of Rights in the Long-Term Care Homes Act using the PCC clinical approach and expands the critique and analysis of ethical considerations involving the use of A-SARs with supplementation from valuable insights identified in Chapter 3.

CHAPTER 4: Using the PCC Clinical Method to Examine Ethical Expectations for the Caregiver-Resident Relationship within the Resident Bill of Rights and A-SAR Use

> The strong bonds people have with their pets are a valuable resource to primary health care providers, enabling care implementation.
> (Hodgeston et al., 2017)

4.0 Introduction

By putting the resident at the center of care planning, Patient-Centered Care (PCC) demands significant changes in eldercare expectations. PCC is recognized as a clinical method and ideal model for patient-health professional relationships. This method is responsive to the patient's preferences, needs, and perspectives to ensure that individual values guide the delivery of care (McCormack et al., 2011). Most Canadian healthcare institutions embrace PCC ethics and the PCC clinical method (Hudon, Fortin, Haggerty, Lambert, & Poitras, 2011; Stewart et al., 2014). The Long-Term Care Homes Act (2007) is an exemplar legislature that codified PCC values. It provides some standardizing expectations of resident rights in eldercare across eldercare institutions.

The goals of Chapter 4 are first to examine the alignment of A-SAR use to ethical expectations on caregivers through the PCC clinical method and second to demonstrate how the Capabilities Approach (CA) provides additional insights for A-SAR use. This chapter has two sections. The first section is organized by the PCC clinical method and the Resident Bill of Rights. It will examine the use of A-SARs using adapted components of the PCC clinical method from the method by Stewart et al., (2014) and Clarke, Ells, Thombs, & Clarke (2007). The four components of the PCC clinical method are 1) exploring health, disease, and the illness experience, 2) understanding the patient as a whole person, 3) finding common ground, and 4) enhancing the patient-doctor relationship (see Table 1.3). Each step of the method aligns with a relevant article in the Resident Bill of Rights (see Table 1.1 sections 3.1, 3.23, 3.14, and 3.18). The second section adds to the ethical analysis with a discussion of how the CA can support PCC delivery. The CA focuses on cultivating capabilities, presenting an alternative way of understanding what caregivers are obliged to deliver. The unique CA concept of play is also

examined in relation to A-SARs. The two sections examine the legislative and theoretical implications of applying ethics concepts to PCC delivery in institutionalized eldercare.

4.1 Choosing the PCC Clinical Method for Examination

The PCC clinical method is appropriate for analyzing caregiving practices in Canadian eldercare facilities. It is a theory of ethical health care practice with defined moral motivations, intentions, and goals (Epstein & Street, 2011; Mead & Bower, 2000). PCC is increasingly influential in professional codes of ethics, medical education curricula, and quality assurance assessments (Epstein & Street, 2011). It represents a turn away from a clinical method that focused solely on the disease or condition to build upon a holistic view of the patient, including "the patient's psychological, spiritual, and emotional needs" (Reynolds, 2009, p.133). PCC presupposes that several changes in the mindset of the professionals will occur with its implementation. The patient will have a greater voice in healthcare decisions. Healthcare professionals will acknowledge that patients have a unique configuration of elements compromising their identity, illness experience, and situational context (Ells, Hunt, and Evans, 2011). A PCC health care context will encourage a relationship that is reciprocal and empathetic (Stewart et al., 2014).

Leading authors in PCC have recognized that the caregiver-resident relationship impacts levels of communication, partnership, and the decision-making process in eldercare (Braithwaite et al., 2018). Thus, the caregiver-resident relationship presents itself as an ideal area for improving eldercare. The PCC clinical method by Stewart et al. (2014) is suitable for examining caregiving-resident relationships because it is a method that suggests managing the patient-professional relationship is central to providing care that accurately responds to the patient's needs (Stewart, 2005). The PCC method emphasizes the relational aspects of relationship building (Stewart et al., 2014; Clarke, Ells, Thombs, & Clarke, 2007). It focuses on how to provide care that aligns with factors patients and families identify to satisfy patient needs and preferences (Stewart et al., 2013). The expected standard of eldercare is one in which QoL interventions reduce fragmentation and enhance existing trust and relationships. Within the PCC clinical method, patients' rights are respected and supported. The Four Interactive Components of the Patient-Centered Clinical Method by Stewart et al., (2014) has

four components that are more specific to the broader healthcare clinician-patient relationship. The four components are 1) exploring health, disease, and the illness experience, 2) understanding the patient as a whole person, 3) finding common ground, and 4) enhancing the patient-doctor relationship (see Table 1.3). Clarke, Ells, Thombs, and Clarke (2007) also identified elements of PCC for therapeutic relationships. The six elements by Clarke, Ells, Thombs, and Clarke (2007) are 1) engaging the patients as a whole person, 2) recognizing and responding to emotions, 3) fostering a therapeutic alliance, 4) promoting an exchange of information, 5) sharing decision-making and 6) enabling continuity of care, self-management, and patient navigation. All the elements, the four by Stewart et al. (2014) and the additional two by Clarke, Ells, Thombs, and Clarke (2007), are central to this thesis's examination of A-SAR use on resident-caregiver relationships in PCC eldercare contexts.

PCC values shape Canada's current healthcare legislation and clinical healthcare practice (Epstein & Street, 2011; Threapleton et al., 2017). Guidelines on how human rights should be better respected and enforced in institutionalized eldercare arose alongside the push for emotional and holistic care in the early 1950s (OARC, n.d.). The resultant advocacy and outcry led to 27 distinct rights (OARC, n.d.) The 27 distinct rights within the Ontario Residents' Bill of Rights are embedded in the Ontario Legislation, the LTCHA (2007), and accompanying Regulations. It is a prime example of current eldercare policy.

The Resident Bill of Rights outlines and protects residents' dignity, interests, safety, wishes, beliefs, and values. All long-term care homes in Ontario (including those formerly known as nursing homes, municipal homes for the aged, and charitable homes) are governed by the LTCHA (2007). The requirements in the LTCHA (2007) ensure that residents of these homes receive safe, consistent, and high-quality resident-centered care in settings where residents feel at home, are treated with respect and have the supports and services they need for their health and wellbeing. The rights of residents are guaranteed by law and must be displayed for transparency within the care home. They remind everyone, including residents, formal caregivers, friends, family, and neighbors, that residents of institutionalized eldercare are valued members of the community (CLEO, n.d.). Inspectors from the Ministry of Health and Long-Term Care are tasked with enforcing the Bill of Rights during their yearly inspections or

when someone makes a complaint. When new technology such as A-SARs are introduced, it is the direct users (e.g., residents, caregivers, family members, and researchers) who are tasked with determining if the use aligns with the goals of good eldercare. Additionally, PCC is suitable for examining A-SARs because leading authors in PCC recognize that technology impacts the interaction of patients with health care professionals in a way that "alters the nature of communication, relationships, and physicians' sense of professional role" (Stewart et al., 2014, p. 13).

4.1.1 Exploring Individual Values within the Institutionalized Experience

According to The Bill of Rights section 3.1, "every resident has the right to be treated with courtesy and respect and in a way that fully recognizes the resident's individuality and the resident's dignity" (LTCHA, 2007). The corresponding PCC clinical method component is respecting the individual, their needs, and preferences (Clarke et al., 2017). This is an appreciation of the uniqueness of individuals (including understanding the unique meaning an illness has) by offering care that is custom to a patient's illness needs and experiences (Ells, Hunt, Chambers-Evans, 2011). A-SARs can be used in a way that respects resident dignity. Exploring health and disease allows for a recognition of individuality, affirmation of dignity, and discernment of health status.

The PCC method starts with recognizing resident individuality. The category of elderly residents encompasses a full spectrum of the human condition – from those who have daily visitors or those who have none, from the slightly impaired or physically frail, from slight delirium or severe dementia. Individuals who fall within this elderly category are sufficiently heterogenous that institutions should acknowledge that the illness experience would differ for each resident. Illness is experienced in various ways where the internal psychosocial experience of pain, loneliness, or regret can affect resident behaviour. Other QoL studies have suggested that good QoL outcomes require more than just mechanistic care to encompass social, emotional, and or spiritual needs (Rahimzadeh, 2014). When using an A-SAR, questions could be directed to how engaging with the A-SAR feels or if they feel satisfied or respected during the intervention. When the caregivers ask what health means to each individual then, the response will reveal previously unknown dimensions in the resident's life; and will expose their

attitude towards the benefits and barriers to health consciousness behaviours (Stewart et al., 2013).

The definition of health is unique to each resident and encompasses not only the absence of disease but also the meaning to the resident and the ability of the resident to realize aspirations and purpose in their lives (Stewart et al., 2014). Institutionalized living does not imply that elderly residents have lost the characteristics that make them unique. The move to an institutionalized eldercare facility could result in a rupture of bonds from an established social network (Abdi et al., 2018; DeWall et al., 2011; Scharf & Keating, 2012). The resident may have lost ownership of their pet and feel constricted by a loss of control over their own life. The need to request additional assistance to complete tasks can affect how independent or autonomous they see themselves to be. A study by Odetti et al. (2007) found that the reported self-image of users had a large impact on robot acceptability. The researchers concluded that when residents had the belief that A-SAR users were weak, infirm, child-like, they were more likely to refuse the intervention and feel that their self- identity and dignity had been violated (Odetti et al., 2007).

Not only the medical condition but, uncovering anything in how an individual experiences good health within their expectations of what good PCC eldercare requires, to make life worth living, is vital. Fulfilling caregiver expectations to provide good care requires that the necessary tools to meet resident needs are provided (Johansson, 2013). Each individual will experience illness differently, and one intervention will not necessarily have the desired effect on QoL. If A-SARs could be a therapeutic tool to evoke a sense of control and life meaning, similar to experiences by animal lovers and pet owners, standards of eldercare may encourage resident participation in A-SAR activities (Moyle, 2019).

4.1.2 Understanding the Resident as a Whole Person

According to the Resident Bill of Rights, section 3.23 “every resident has the right to pursue social, cultural, religious, spiritual and other interests, to develop his or her potential and to be given reasonable assistance by the licensee to pursue these interests and to develop his or her potential” (LTCHA, 2007). Similarly, PCC values are built upon the appreciation that the resident is uniquely made of their history (e.g., personal and development issues), the

proximal context (e.g., family, employment, and social support), and the distant context (e.g., culture, community) (Ells, Hunt, & Chambers-Evans, 2011). The position of elderly residents in the life cycle, the tasks they assume, and the roles they ascribe to will influence resident understanding of dignity and rights to pursue interests.

A-SARs can be used by caregivers to broaden their own knowledge about the life history of the resident. The process of sharing personal interests could reverse the problems of objectification. For example, an Australian qualitative study reported "…[the caregivers] came in, and they observed him, and they could not believe what he was doing, like singing all these songs- they have never heard this cranky man in their life sing, smile as much. They never saw his teeth, and here he is, smiling, and his face lights up…PARO made him come out of his shell [and made] the staff more aware of what was happening…" (Birks et al., 2016, p.3). Through observing the resident's interest in singing, the caregivers re-discovered that the resident had the potential to engage in musical pursuits.

A-SARs can be a tool for residents to pursue animal-related interests, like pet-keeping. Residents in eldercare are likely to have had experiences with animals or animal-like objects. They may express interest in AAT, but most institutions do not allow pets (Coppola, 2006; Walsh, 2009). The A-SAR alternative uses SARs that not only interacts with the user but allows the resident to indulge in the experience of taking care of an animal (Mansouri, Goher, & Hosseini, 2017). Through the caring action towards the A-SAR, residents could continue to develop their affections towards animals. Identifying whether the resident has an interest in animals may be particularly helpful when the resident's response to A-SARs appears exaggerated or of character.

A-SAR use can encourage caregivers to develop an evolving understanding of the social and developmental interests that make up essential pieces of a resident's identity. This information is not gathered in a single encounter as part of formal medical history. Instead, more comprehensive caregiver-resident interactions build trust. Learning about each other's life interests creates emotional intimacy by bonding over past experiences with animals. Information may help tailor personalized responses to resident requests. Respecting residents

as multifaceted persons can deepen the caregiver's knowledge of the human condition, especially the nature of suffering and responses to illness or institutionalization.

4.1.3 Recognizing and Responding to Emotions to Find Common Ground

The Resident Bill of Rights section 3.14 says, “every resident has the right to communicate in confidence, receive visitors of his or her choice and consult in private with any person without interference” (LTCHA, 2007). For PCC to be recognized as a uniquely moral approach, attention is placed on the ability of the relationship of the caregiver and resident to recognize emotions that communicate interest, establish common ground, and recognize emotional attachment.

Residents have the right to communicate their thoughts and emotions to others in privacy without interference. Attaining the confidence of residents starts the process of building common ground and reciprocal caring relationships. While not every A-SAR interaction may evoke emotional responses, residents may be more likely to participate in QoL interventions when they feel social permission to be more expressive. Residents may not feel comfortable being expressive to other people, but they could feel more expressive with animal-like objects. PARO and Justocat are considered safe to use in contexts where there are no caregivers present (Shibata & Wada, 2011; Libin & Libin, 2004). Some studies had residents request for individual one-to-one sessions with PARO rather than group interventions (Hung et al., 2019). In a PARO study, some elderly men admitted that gender roles restricted their willingness to express emotionally charged care to their son or daughter, but they were less hesitant to pamper or cuddle with unfamiliar animal-like objects in the privacy of their own room (Prato-Previde, Fallani, & Valsechi, 2016; Libin & Libin, 2004).

Trust is required to seek consultation about unmet needs or concerns confidently. Establishing a common ground between caregivers and residents builds a sense of closeness and lowers levels of distrust. Stewart et al. consider the common ground as a mutual understanding and mutual agreement in three key areas: (1) defining the problem, (2) establishing the goals and priorities of treatment, and (3) identifying the roles to be assumed by both the patient and the clinician (2014). Residents and caregivers may not necessarily agree about the goals and priorities of treatment. However, they could find agreement on other

topics such as animal behaviour. Animals are a common neutral topic to find commonality (Dembicki & Anderson, 1996). The uniform predictability of A-SAR responses to stimuli could be used as a politically safe topic to ask direct questions. PARO blinks and shakes its head in the same way to all users. Residents feel a sense of power by witnessing that the A-SAR does not react preferentially to caregivers (Libin & Libin, 2004).

The users have the right to guide how QoL intervention takes place, but residents also have the right to consult in privacy with any person without interferences (LTCHA, 2007). Within the imaginative story-writing study, caregivers facilitated the activity and encouraged the residents to choose how the plot would be developed (Iacono & Marti, 2016). The imaginative discussions afterwards raised requests to take PARO back to their own rooms for conversation and comfort (Iacono & Marti, 2016). In one study, residents re-named PARO the seal-like SAR as "George… or Sally" (Birks et al., 2016, p.73). The re-naming of the A-SARs was encouraged by caregivers rather than limiting resident's freedom to call the seal-like SAR PARO by a different name. A "willing suspension of disbelief" allowed caregivers to abstain from interfering with resident's creative freedom and re-naming consultations within resident groups (Sharkey & Sharkey, 2012, p.64).

Residents have the right to choose who or what they want the company of (LTCHA, 2007). Residents may refuse the company of other residents in lieu of A-SARs. If residents do not want visits with family members, hence, offering alternative communication tools could allow residents to consult with objects instead (Sharkey & Sharkey, 2012). Providing opportunities to maintain attachments to preferred objects could encourage a sense of wellbeing. Sorell and Draper (2014) suggest that people form morally acceptable bonds with objects or fictional characters, and these relationships are often personal to those individuals. Indeed, many people have lucky charms that they will ascribe emotions to or will carry toys or trinkets with them on travels as travel companions. An English study report that A-SARs can be a source of comfort for users by providing a feeling of connectedness to loved ones (Bradwell et al., 2019). These therapeutic "objects serve as reminders of people, places, events or experiences of significance in a person's biography" (Cohen, 2000, p. 548). Overall, the

preference for objects may be because objects will not interrupt or treat residents in a way that is humiliating or violates their sense of dignity (Coeckelbergh, 2010).

4.1.4 Enhancing the Caregiver-Resident Relationship for Continuity of Care

The Resident Bill of Rights 3.18 states, "every resident has the right to form friendships and relationships and to participate in the life of the Home" (LTCHA, 2007). The PCC clinical method promotes the cultivation of patient-doctor relationships. The focus on relationships is important because good care is linked with reaffirming "spirituality and love… in a [healthcare] context… valuing science of art; valuing technological solutions over wisdom" (Stewart et al., 2014, p.143). Building a good relationship requires that the necessary factors of good relationships are maintained.

The PCC clinical method suggests the mutual leaning towards relationship contains hopes for "restorative goodwill… and mindfulness of what matters most" in a time of vulnerability (Stewart et al., 2014, p.143). The relationship between caregivers and residents is like that of a doctor and patient; it requires an oscillation between objective observation and empathetic identification (Stewart et al., 2014).

Relationships are based on trust. Trusting relationships require personal continuity (Mercer, 2012). The problem with institutionalized eldercare is that news about senior abuse cases in institutionalized eldercare has meant many residents are already distrustful of caregivers when they become institutionalized (Nelson, 2005). The tools caregivers are provided to deliver the standard of care expected of them should be reasoned out with PCC values. Unfamiliar A-SARs have been suggested to be able to limit the misattributions of what these SARs are able to do. PARO is purposefully designed to resemble the Canadian harp seal (Shibata & Wada, 2011). In addition to the cute appearance, the animal-like form was chosen because few people are likely to have previous expectations of what a seal would do. Therefore, even if PARO is unable to replicate seal-like behaviour, users would not be disappointed in the A-SAR actions. The animal-like form can lead to more unfamiliar users to learn what actions A-SARs are capable of. The limited behaviour of A-SARs can ensure that caregivers are able to trust A-SARs to have replicable and reliable behaviour. For example,

Justocat will not suddenly jump up nor injure the resident, how a living animal might (Libin & Libin, 2004).

Authors in PCC have described the caregiver-resident relationship as being akin to gift-giving (Kleinman, 2014). The person receiving care shares her experiences and story with the caregiver in reciprocal for practical assistance. Some caregivers continue caregiving as a profession because they want to feel validated and rewarded for their efforts (Keidel, 2002). In gift-giving, the aspects of friendship are mutual and provide opportunities to respond in kind. The moral responsibility, emotional sensibility, and social capital of the relationship are exchanged (Kleinman, 2013). Through the actions of gift-giving, in exchanging both time and objects with others, the interconnectedness of the caregiver and residents becomes apparent when reflecting on the reciprocity of meaningful actions. Residents have the right to have friendships and choose not to be alone. Chosen friendships include the individuals into a shared group. A-SARS can facilitate the creation of friendships by being a creative stimulus for making new memories and shared experiences (Iacono & Marti, 2016). The shared stories, like PARO as a sea-faring captain, create a sense of belonging to a new group, e.g., A-SAR users. A-SARs are conventional icebreakers between staff and residents, a social mediator, or an impetus towards social interaction between residents (Klein, Gaedt, & Cook, 2013; Marti et al., 2006). The PCC clinical method suggests that A-SARs could be a communicative tool that provides informational resources, helps patients evaluate, utilizes resources, and improves patient education (McCormack et al., 2011).

Caregiving is a continual process, and both parties, i.e., the caregiver and resident, are joint partners in eldercare delivery. Care is a collaborative process where individual voices are recognized. Asking caregivers or residents to collaborate can be difficult in institutionalized eldercare settings. Sometimes asking direct questions or expecting full conversations is not possible in the eldercare setting. A range of communicative tools may be necessary. Although caregivers are responsible for some of the decisions (such as whether to use institutional funds to buy A-SARs), using an accommodating communication style will help residents feel they have some control over QoL interventions. Elderly residents may be suffering the loss of their central purpose, that is, a sense of control over themselves and their world, or loss of control of their

life (Stewart et al., 2014), and A-SARs could restore a sense of control. The degree to which residents treat A-SARs as if it were a real animal depends on the resident.

The caregivers and resident are dependent on each other for the long-term success of the QoL intervention. The PCC clinical method suggests that sharing control means patients should be engaged in their healthcare delivery (Epstein et al., 2005). In the applied context of A-SARs in eldercare, the impact of discontinuing A-SAR use on a resident was a concern. For example, when an A-SAR intervention ended, the family members expressed concern that the absence of routinely scheduled A-SAR interventions would reverse the gained benefits (Moyle at al., 2016).

Residents expect a standard quality of care that allows for care that is continuous and reliable. Within PCC, the dedication of caregivers to caregiving is essential to delivering unfragmented care (Clarke et al., 2017). Achieving continuity requires direct communication with residents about their care plans (Goodrich, 2009). It likewise requires explicit communication amongst caregivers involved with carrying out that plan, ideally in a seamless manner (from the resident's perspective). PCC creates the expectations that caregivers will enable resident self-management, whereby residents self-manage some aspects of their condition. For example, caregivers may guide residents on adjusting or utilizing specific durations to use A-SARs for replicating benefits of AAT. The number of people in the group social activity with A-SARs would vary as the resident becomes more social and develops stronger relationships (Wada, Shibata, Saito, & Tanie, 2007). For example, residents could develop more meaningful relationships with their grandchildren when PARO was an attractant (Kanamori et al., 2003). An Australian study reported that "PARO helps to build interpersonal relationships and of PARO replacing family as it takes them back into a memory where they feel loved, and it gives them a sense of belonging and warmness and builds up their confidence" (Moyle et al.,2018, p. 332). Such positive outcomes might not have been possible if resident rights to build relationships were not upheld or supported by the Resident Bill of Rights. Caregivers are expected to ensure resident rights to communicate in confidence, receive visitors of his or her choice, and consult in private with any person without interference is upheld. The four components of the PCC clinical method by Stewart et al. (2014) combined with

the six elements of PCC for therapeutic relationships by Clarke, Ells, Thombs, & Clarke (2017) are exemplars of patient-centered guides for healthcare practice (refer Table 1.3 and Table 1.4). The elements of both were combined through examining the 10 concepts separately and identifying which concepts were similar and were applicable to the topic of A-SARs in institutionalized eldercare. The components mostly center around how to enhance the caregiver-resident relationship in eldercare. Each component was examined with correlation to the Resident Bill of Rights codified in the LTCHA (2007). Examination revealed that A-SARs could be a potential tool in supporting the practice of caregivers to fulfill institutional expectations. It did not state that the use of A-SARs was the only way to uphold resident rights, but only that the introduction of A-SARs could be an icebreaker tool for relationship building (Klein, Gaedt, & Cook, 2013; Marti et al., 2006).

4.2 Supplementary Capabilities Approach Examination

The PCC clinical method and elements offer valuable contributions in examining Canadian PCC eldercare practice. However, how caregivers should understand their own ethical obligations in eldercare lacks clarity. Entwistle & Watt (2013) recognized that PCC has the problem of being ambiguous about how caregivers should deliver eldercare in specific situations. Indeed, Epstein and Street (2011) note that concepts in the PCC are so broadly interpreted they are misleading. When there is a standard procedure to implement generally effective interventions, it can undermine the range of choices available to caregivers. There is the danger that tacit acknowledgment of the concepts within the PCC clinical method will feel more important than addressing the value of positive patient experiences. Some caregiving professionals may interpret PCC as superficially responsive to the preferences of individual residents. The flaws of the PCC approach were that caregivers can feel pressured to believe their duties involve superficially agreeing to what the residents say they want. If caregivers equate PCC with merely doing what residents say, the deep intrinsic worth of the PCC concept can be lost (Epstein & Street, 2011). Caregivers may feel their professional obligation to provide a good standard of care will be limited by spontaneous decisions-making by elderly patients.

Furthermore, caregivers are currently being directed to follow a plethora of clinical practice guidelines. Having legislative acts imposed can be overwhelming and daunting when

the best practices are unclear because of insufficient evidence (Stewart et al., 2014). The Resident Bill of Rights is codified but, when it needs to be applied to specific QoL interventions, such as A-SARs, its application should be geared to the individual needs and context of the healthcare. If it is too restrictive or too general, healthcare professionals can think PCC is instrumentally inappropriate and unachievable (Epstein & Street, 2011).

Values of PCC practice is balanced with expected outcomes of improved quality of life. Hence, Entwistle & Watt (2013) propose that the “CA can re-characterize PCC to provide eldercare that recognizes and cultivates the person-al capabilities" (p. 35). The PCC clinical method can encourage a tendency to focus on the instrumental value of having a method.

The CA was chosen by ethicists to examine ethical considerations of using A-SARs (Archibald & Barnard, 2018; Coeckelbergh, 2010; Sharkey, 2012; Epstein & Street, 2011). Among the other possible ethical theories, the ethical approach is concerned with evaluating the QoL in terms of the individual's actual ability to achieve various valuable functioning as part of living a meaningful life (Nussbaum & Sen, 1993). The approach begins with the respect for persons as they are. It holds that by virtue of possessing an inherent worth and dignity, persons deserve the opportunity to choose to live a life of human dignity. The CA emphasizes the importance of acknowledging personal preferences even when such requests are not well informed, stable, firm, or practical to different groups (Sen, 2006). Consideration of capabilities can also be useful when evaluating the effectiveness and appropriateness of health-related interventions. It can encourage an expansive view of outcomes that reflect what people say they value in life and appreciate from service provision (Entwistle & Watt, 2013).

The CA stipulates that human wellbeing is associated with living a good life, i.e., eudaimonia. Eudaimonia entails preparedness for living a fully human life without unfair risks, being healthy, satisfying the basic need for nourishment, shelter, and sexuality, using and developing one's senses and capacities to imagine and think, studying an extensive cognitive world view, bonding with other people, participating in the planning of one's own life and life of one's community, and living in well-balanced relation to nature. One of the leading CA theorists, Martha C. Nussbaum (2006), suggests it focuses on how the functioning of a person must factor into the eventual outcome of care interventions. The CA is a broad normative

framework that provides an alternative to welfare economic approaches to achieve human flourishing, focusing on an individual's ability to achieve unique valuable functioning in life (Nussbaum & Sen, 1993). Hence, the CA is "not exhaustive of the moral issues at stake with [A-SARs] and can be used as one way to evaluate whether any caregiving practice qualities are sufficient for good care" (Coeckelbergh, 2011, p.186).

Nussbaum's list of ten capabilities presents itself as an evaluative standard of healthcare in various contexts, including eldercare (2006). The ten capabilities are as follows: life; bodily health; bodily integrity; senses, imagination, and thought; emotions; practical reason; affiliation; other species; play; and control over one's environment (Nussbaum, 2006). Within the CA, good treatment is one that upholds human dignity and the recognition of patients and professionals as unique human beings. Both PCC and CA have similar intended outcomes. Both residents and caregivers can reflect on their capabilities and their places in intersecting biological narratives. What central opportunities provide a meaningful living for residents and caregivers are dependent on individual relationships with others and situational contexts.

Each of Nussbaum's list of ten capabilities could be examined further in the context they are applied. For example, Pirhonen (2015) re-examined the ten capabilities of CA for long-term care for elderly individuals. Capabilities such as 1) play, 2) sense, imagination, and thought 3) emotions, or 4) other species could be reasonably examined within the context of A-SARs. Capabilities of play and sense, imagination, and thought are elaborated on below.

4.2.1 Ethical Consideration of Play

Amongst these capabilities listed, the capability that adds a unique ethics-based insight, differing from PCC, is "play – being able to laugh, to play, to enjoy recreational activities" (Nussbaum, 2011, p.34). It is associated with other capabilities such as "other species" being able to live with concern for and with animals, plants, and the world of nature" and "emotions" which is "being able to have attachments to things and people outside ourselves; to love those who love and care for us, to grieve at their absence; in general, to love, to grieve, to experience longing, gratitude, and just anger" (Nussbaum, 2011, p.76-77). The CA recognizes that the capability of play provides opportunities to engage in role-playing and highlights changes in wellbeing by discerning unexpected or irregular behavioural responses to stimuli.

Play includes role-play, an experiential technique that develops empathy through pretending to be someone else (Stokoe, 2011). It involves communicating collaboratively. Successful role-play requires foresight and the ability to rely on previous memories when creating an imaginative story. For example, residents may imagine they are younger versions of themselves playing with a childhood pet cat when, in reality, they are petting a Justocat (Libin & Libin, 2004). Attributing behaviours to an A-SAR evokes memories and encourages exploring new topics not directly related to their care or the institutionalized care setting (Iacono & Marti, 2016). Techniques of active listening and conflict training develop in role-play (Ray, 2004). Playing can highlight changes in wellbeing by discerning unexpected or irregular behavioural responses. Play through using A-SARs allow for individuals to recognize when others are acting unexpectedly. For example, a caregiver noticed an irregularity when a normally enthusiastic resident suddenly asked PARO if he felt neglected and if his back hurt (Birks et al., 2016); these comments had not been directed towards his caregivers.

When individuals are in the mindset that they are playing, they are more forgiving of unfamiliar objects or ideas. In the past, playing with technology as if it were a responsive and expressive partner was unthinkable. It would seem unreasonable to say that a mechanical object such as a toaster could be played with. Nevertheless, residents build relationships and ascribed personalities to A-SARs (Moyle et al., 2016). Peoples' relationships with robots change as technology evolves. Technology is a cultural artifact. Its form is understood by the specific generation of the population (Gallagher, Nåden, & Karterud, 2016).

Playing with A-SARs has different expectations from what playing with other residents or caregivers would entail. Residents role-playing with another resident cannot predict how the other resident will react. The creative process is not pre-determined. Meanwhile, if a resident were to play with an A-SAR, its actions are predictable and consistent. A-SAR movements are dependent on the complexity of their programming. AIBO, for example, has limited responses despite the 18 degrees of freedom (see section 1.1). The ways A-SARs are used depends on the individual user and the situational context.

4.2.2 Sense, Imagination, and Thought

A-SAR could support the capability of "senses, imagination, and thought – being able to use the senses, to imagine, think and reason […] in ways protected by guarantees of freedom of expression with respect to both political and artistic speech, and freedoms of religious exercise" (Nussbaum, 2011, p.33). It is also associated with other capabilities such as "other species - being able to live with concern for and with animals, plants, and the world of nature" and "affiliation" which is "being able to live with and towards others[…] and having the social bases of self-respect and non-humiliation; being able to be treated as a dignified being whose worth is equal to that of others" (Nussbaum, 2011, 76-77).

Imaginative engagement allows for communication that can take place through means other than just words (Pedersen, 1994). Nonverbal behaviour can consist of communicative words and emotions (Kiesler, 1988); it can offer the caregiver and resident cues regarding the relationship dynamics. Kalff (2003) has made the argument that even "highly articulate adults are at risk of pushing away their real feelings with the facile use of words" (p.xii). Play that intentionally uses non-verbal communication tools improves the caregiver-resident relationship by evoking a mixture of nonverbal and verbal social cues. By having an interest in the same object, Pedersen (1994) says a group mentality or culture is created. Associative thinking can help bridge the cultural and intergenerational gap that can exist between residents and others around them.

Opportunities to stimulate tactile senses, such as petting the soft fake fur of an A-SAR, could help satisfy a resident's desire to engage with an animal. The ethical expectation is still that they facilitate a resident's desire to spend time with an animal or share animal-related stories with other people. Introducing Justocat or AIBO could provide residents with genuine opportunities to at least access animal-like robots that have a socially assistive function.

The capability of "thought" and freedom to think is a capability of something that feels violated when it is restricted or oppressed. A resident may still benefit from Animal-Assisted Interventions (Aarskog et al., 2019; Filan & Llewellyn-Jones, 2006). One benefit of A-SARs is that animals encourage communication with users, being enabled to talk about one's feelings without interruptions. Caregivers are under ethical expectations to make access to animal-like

interventions possible. Accommodation for resident requests for opportunities to make friendships and relationships is necessary. It is dignified to arrange the life of a resident on the basis of her desires, not according to the needs of the institution (Pirhonen, 2015). Residents can be imaginative with the tools they are given. People ascribe importance and personality to objects by imagining it as a companion or friend (Gustafsson et al., 2015; Mansouri, Goher, & Hosseini, 2017). Objects that have a socially assistive role can also be therapeutic. A-SARs can be similar to immobile souvenirs; these are "objects… [that] serve as reminders of people, places, events or experiences of significance in a person's biography" (Cohen, 2000, p. 548). The preference for objects may be because objects will not treat residents in a way that is humiliating or violates their sense of dignity (Coeckelbergh, 2010).

Overall, the CA is broadly compatible with previous definitions and characterizations of PCC that encourage individualizing care beyond the particularities of pathology and genes (Epstein & Street, 2011); the adoption of biopsychosocial perspectives (Mead & Bower, 2000); the seeking of an integrated understanding of the patient's whole person, emotional needs, and life issues (Stewart, Brown, & Donner et al., 2000); the addressing of the person's specific and holistic properties and difficulties in everyday life (Leplege et al., 2007). The CA can contribute to and is congruent with broader interpretations of shared decision-making and clinical support for the self-management of long-term conditions (Entwistle et al., 2013). In cases where the goal of eldercare is to restore the capabilities of play, imagination, or control over environments, there is "nothing wrong with using technology as an aid within a care practice that aims at capability restoration" (Coeckelbergh, 2010, p.188).

4.3 Conclusion

The goals of Chapter 4 were to first to examine the alignment of A-SAR use to caregivers' ethical expectations through the PCC clinical method and second to demonstrate how the Capabilities Approach (CA) provides additional insights for A-SAR use. The PCC clinical method reinforces the ideal caregiving practice as one where the patient-health professional relationship is enhanced. This chapter identified that each of the four components of the PCC clinical method (Stewart et al., 2014) had a corresponding right within the Resident Bill of Rights in the LTCHA (2007).

Both residents and caregivers can struggle to affirm their own rights and opportunistic freedoms of opportunity in eldercare. There are ethics-based expectations of caregivers to provide good QoL, sometimes through A-SAR. Caregivers, too, expect residents to be reciprocal and sympathetic to the challenges of caregiving (Vallor, 2011). The *Guide to the Long-Term Care Homes Act 2007* and *Regulation 79/10* (Ontario Health) stipulated "The Resident Bill of Rights may be enforced as though the resident and the Home had entered into a contract, both parties agree to fully respect and promote all of the resident's rights" (p.21). The care contract elderly residents or their substitute caregivers sign by entering into institutionalized eldercare living means they acknowledge evidence-based practice means making clinical decisions based on the most current and valid research findings (Ontario Health, p.2-8). The resident's plan of care is communicated with the resident's substitute decision-maker but, "if care set out in the plan has not been effective, different approaches must be considered in the revision of the plan of care" (Ontario Health, p.13).

The CA by Nussbaum and Sen (2010) is used to supplement the PCC approach. It adds a focus on providing opportunities to add personal value to living a meaningful life. Capabilities are not necessarily seen as a central consideration in the other ethical theories. The ethically grounded ends-oriented approach offers a way of unifying thinking about the various processes that can be associated with PCC. Nussbaum's list of central capabilities reinforces that central capabilities are not merely instrumental but constituent parts of a worthwhile human life (Nussbaum, 2011, p. 36).

Attention to the impact on capabilities can help explain why PCC has intrinsic value. Personal capabilities, like the broader range of capabilities that health care can support, are theoretically ethically significant and practically widely valued. Nussbaum (2011, p.67) suggests that when individuals feel a sense of enjoyment, the nonverbal and verbal social cues that are exchanged during this time can aid in rehumanizing residents for a culture of care. Future implementation of A-SARs will likely lead to several issues which require more theoretical, empirical, and methodological exploration.

To be of practical use in the future, the examination here will need to be introduced and explained carefully to health service leaders, caregivers, and family members or informal

caregivers, many of whom will be unfamiliar with both PCC and CA. Ethics support is needed to train and educate healthcare personnel to acquire the skills needed to respond to ethical issues. Promotion of ethics-based practice in eldercare can be fostered by using ethical theory to interpret the experiences of the caregiver's everyday work. When caregivers understand PCC and the components of the PCC clinical method better, they can appropriately participate in eldercare delivery; affirming their identities and broader wellbeing (Entwistle et al., 2010; 2012). The Resident Bill of Rights is also suggested to be too general. The Ontario Ministry of Health & Long-Term Care may find it useful to create a Policy for SARS, hence, expanding the existing *Policies and Procedures Manual for the Assistive Devices Program* (2016).

Chapter 4 examined the legislative and ethical expectations of the caregiving in the Resident Bill of Rights in the LTCHA (2007) using the PCC clinical method. The four components of the PCC clinical method were expanded up in relation to A-SAR use. Second, the CA, identified in Chapter 3, was used to supplement the concepts in the PCC clinical approach to expand the analysis of ethical considerations involving the use of A-SARs. Finally, Chapter 5 will discussion the future implications of the above chapters to conclude.

CHAPTER 5: Implications and Conclusion

> Once we have created the tools, it is impossible to say how a new generation will use them. Our care homes could become automated care factories with slogans like 'robot care is better than no care.' Let us hope it does not come to that…. Once the toothpaste is out of the tube, there is no getting it back in again.
>
> (Sharkey, 2012, p.287)

5.0 Concluding Ethics-Based Implications of A-SARs use

Gains in life expectancy have created a large population of individuals aged 65 and older who will require specialized eldercare in institutionalized settings. Alongside their caregivers, these residents face challenges in living a dignified life. Specifically, the move to eldercare facilities can result in the rupture of bonds from an established social network and declining wellbeing (Abdi et al., 2018) currently and into the future. One proposed solution to challenges in eldercare are A-SARs which can mediate interactions between human users by stimulating the effects of AAT. The advancement in A-SAR technologies have meant that there are ethical considerations that previous eldercare literature has not identified or examined. This thesis introduced and presented an examination of the ethical considerations surrounding the current or future use of A-SARs for institutionalized eldercare practices. The earlier chapters aimed to contribute further insight on what ethical considerations exist around the use of A-SARs for institutionalized eldercare settings. This chapter concludes the thesis with future considerations.

The implications on future A-SAR use were identified in Chapter 4 with the resulting ethics-based insights on theories and group-based considerations. Existing ethics literature did not answer whether the use of A-SARs was ethical. Rather, the focus was on what ethical concepts should be considered and what insights their use could have on good eldercare. In eldercare setting that centered on ethics of care and the CA A-SAR use expanded the ethical boundaries of dignified eldercare and caregiving expectations. The emotional, social, and imaginative functions of A-SARs shaped the interactions residents had with others and how good QoL could be experienced. Coeckelbergh (2010) stated the standard of care should not be placed too high when examining A-SAR use; the useability depends on discerning what central ethical considerations were discussed around the ways A-SAR could meet the needs and

interests of users. A-SAR use to stimulate conversation and building of relationships highlighted that technology use is valuable when participation aims to improve the caregiver-resident relationship. How much and how long a resident participates in QoL interventions will vary greatly depending on the individual's values, their history, and emotional responses to animals (see Chapter 4). An A-SAR, like an unusual object of art, may be a focus of interest between family members and residents or a subject of casual conversation between residents. Some residents can regain a sense of control and wellbeing when given the opportunity to play imaginatively (see section 2.2.1). It is difficult to suggest that the desire of residents to have a communication tool or desire to be relied upon by A-SARs should not be respected or accommodated. Coming to a mutual agreement about diagnoses and treatment plans has been recognized to be critical in achieving patient adherence (Stewart, Brown, & Donner, 2000) in Canadian eldercare systems.

5.1 The PCC Clinical Method and Therapeutic Elements in Institutionalized Eldercare

Canadian healthcare systems are actively transitioning towards implementing PCC guided practices into healthcare departments. Ontario and British Columbia have mandated that their ministry of health incorporate PCC initiatives (ON Ministry of Health, 2015; BC Ministry of Health, 2015). Alberta Health Services has mandated PCC values in their healthcare systems (Alberta Health Services, n.d.). In addition, professional healthcare associations have started to implement PCC initiatives, e.g., the 2018 Strategic Plan for the Canadian Medical Association to empower patient voices (Canadian Medical Association, 2018). Each level, from local institutions to professional organizations to provincial and national governments are emphasizing the importance of aligning Canadian healthcare system values to PCC. Further discussions on what exactly PCC value expectations entail is needed to reduce caregiver confusion.

PCC remains a poorly defined theory with many variations in its theoretical development, practice guidelines, and measurement tools (Clarke et al., 2017). Tools that measure elements of PCC at the level of therapeutic relationships have been developed to impact aspects of PCC in patient-health professional relationships. The PCC clinical method by Stewart et al. (2013) with elements from Clarke et al. (2017) was applied to the specific context

of eldercare and A-SAR provision. These two approaches focus on the caregiver-resident relationship in the pursuit of improved eldercare outcomes.

Formal caregivers in institutional eldercare are often strong advocates for PCC, as many of these principles are already integrated into their professional code of ethics. Formal and informal caregivers also advocate for an individual's nonmedical needs and play a key role in communicating the preferences to other staff members. Caregivers are a part of the organizational structure and must comply with facility regulations and procedures, in addition to professional practice standards, including codes of ethics (see section 1.2). When the position on A-SAR use is ambiguous, this creates additional problems of interpretation. Professional ambiguity in delivering the PCC clinical method are also being explored (Epstein & Street, 2011). Canadian legislation has passed the LTCHA (2007) and the Resident Bill of Rights in attempt to codify ethical eldercare expectations across all long-term care facilities. PCC is well positioned since it is effective across all levels on the socioeconomic spectrum (Jani et al., 2012). An examination of the LTCHA (2007) and the PCC clinical method demonstrate that the use of A-SARs does not go against PCC values. There is legislative justification for implementing A-SARs into eldercare practices. Canadian policies encourage QoL interventions that support the recognition of resident's uniqueness, holistic identities, find common ground, and support continuity of care (LTCHA, 2007). PCC can contribute to positively reshaping health policy (Toronto, 2013). Policies for PCC have support and will likely continue to guide healthcare practices in Canada.

The CA is particularly well suited to supplement the PCC approach for elderly populations. In contrast to dominant approaches, the starting point of the CA is to ask what supports people's basic functioning and capabilities at a level sufficient to maintain human dignity (Nussbaum, 2011). Rather than asking whether individuals accept certain QoL interventions, the CA asks what it required for individuals to be capable of having a life worth living. It allows shifting or unclear preferences to still be recognized. It also suggests that not all elderly individuals pursue the same capabilities. The opportunities to play or sense or imagine are aligned with the values of improved living. These are well suited to evaluate A-SAR

impacts on human flourishing. In practical terms, the purpose of eldercare is to support meaningful living within practical constraints.

5.2 Implications for Eldercare in the COVID-19 Pandemic Context

In March 2020 and continuing further into 2020, the spread of SARS-CoV-2, the virus that causes COVID-19 disease, led to a global pandemic. The highest rate of deaths was reported for those in the elderly population 65 years old and older (Dowd et al., 2020). The main harms to the elderly population are not only the increased likelihood of premature death than being diagnosed positive with SARS-CoV-2 has, but it is also the isolation and seclusion from time with loved ones. Social contact and gestures of physical intimacy are heavily restricted. Indeed, as a protective measure, long term care homes and residential treatment centers restricted visits to only 'essential visitors' to reduce the threat posed by SARS-CoV-2. The ministry of health in Ontario defines essential visitors as those visiting residents who are dying or very ill (Kennedy, 2020).

The concerns are based on the probability of viral transmission as the proximity and community in which these residents live can cause additional issues as it is possible for the caregivers to become infected as well. In times of public emergency, caregivers are tasked with attempting to continue their daily process of caring while taking the extra precautions of protecting those they work for and with but also their families at home. The provision of ADL, such as hygiene, will take priority over supplemental QoL interventions.

The emotional and social needs of human touch and engagement are required to maintain wellbeing despite the social distancing requirements from public health (Collie, 2020). Eldercare facilities have recognized that technology could be a solution to communication challenges. "Those who fail the screening test will not be permitted to enter. No other visitors should be permitted to enter these premises. Instead, they should be asked to keep in touch with loved ones by phone or other technologies, as available" (Ministry of Health, 2020). Despite continued advocacy, very few institutionalized care homes are currently expected to provide communication devices to its residents, although that is advocated by some (Williams, Ahamed, & Chu, 2014). The technology that is currently available is difficult for elderly users (Adami, Antona, & Stephanidis, 2016). The low level of familiarity with technology, including

lack of knowledge of technical terminology and physical challenges such as small buttons, can make it difficult for residents to use it without some sort of assistance by caregivers (Livingston, 2019). Even if institutions or family members were to provide a computer, the resident would need to be taught how to use it.

The spread of SARS-CoV-2, in institutionalized eldercare facilities have made it ever more important to acknowledge that eldercare is a collaborative process. The quality of eldercare depends on the resident-caregiver relationship and should be responsive to the needs of both groups. Treatment that is apathetic or uses A-SARs as a replacement tool to avoid caregiving duties is unethical. Yet, providing alternative animal-like objects that have been discerned to be well-suited to the resident's past experience with pets falls within expectations of good care (Johansson, 2012). Acknowledging the uniqueness of the current pandemic context, residents may start to feel more relatively safe with SARs than with other people. Eldercare facilities are continuing to limit the number of family and informal caregivers permitted into the facility. Taken further, we may come to live in a fully digitized institution where we will be provided with an A-SAR upon entry into eldercare as part of Sharkey & Sharkey's (2012) idea of an elderly factory. Social obligations to socially distance from other humans during a pandemic will require alternative means to mitigate the feelings of neglect or abandonment of residents. Legislature based on Resident Rights has limited application if it is unable to comply with public health demands. Perhaps A-SARs will be used as one of the short-term or long-term solutions to elderly individual's sense of isolation, loneliness, and instability where any human contact is reduced. The ways A-SARs were used before this pandemic suggest that it can provide comfort in a time when physical contact with other humans is a source of fear.

5.3 Conclusion

The thesis objective, which examined ethical considerations for using A-SARs in eldercare, was achieved by examining the ethics-based insights and the legislature. The literature review identified that more than one ethical theory was used to examine A-SARs. User-based considerations can provide insights into how ethical-boundaries can be expanded.

Furthermore, the thesis contributes to an examination of how the use of A-SARs impacts the caregiver-resident relationship within the PCC clinical method and LTCHA (2007).

As the body of ethical and clinical research knowledge about SAR technology will foreseeably grow and evolve, eldercare institutions and each user will likely decide whether A-SARs are suitable for them. Technological development and ethics literature may be bound in a back-and-forth discussion. Robots and robotic technology will raise considerations that expand the ethical landscape and concerns about technology's role in dignified human-human care will question the use of new interventions. Studies with A-SARs, e.g., AIBO, PARO, JustoCat, shows that these A-SARs can interact with people and will impact the context in which they are used (Abdi et al., 2018). When correctly used these A-SARs can replicate the positive effects of AAT. Identifying the ethical considerations associated with A-SARs in eldercare is a necessary first step in ensuring that their introduction and continued use will examines the breadth of ethics concepts to be discussed, rather than immediate user dismissal (Coeckelbergh, 2010).

The unique aspects of institutionalized eldercare and socially assistive technologies allow for unique ethics analysis at the intersection of these two domains. Legislatively, the LTCHA (2007) is an important means to guide ethical caregiving expectations to promote improved outcomes in institutionalized eldercare. In Canada most provinces have a resident bill of rights but, Ontario is leading research and policy changes by incorporating SARs into their eldercare facilities (Globe & Mail, 2018). The LTCHA (2007) is not perfect. Despite the obligation of eldercare institutions in Ontario to implement the LTCHA (2007), it has failed many residents and caregivers. The many deaths during the COVID-19 pandemic have further demonstrated that processes are not in place to protect nor properly manage problems in institutionalized eldercare (Kenney, 2020). There is an imminent need for national goals on providing good eldercare that measures participation, achievement, and wellbeing. Whether access to technology should be legislatively mandated could be further explored. An acknowledgment of the broader research needed for aging that is clearly focused on improvable areas related to the eldercare experience -not just disease etiology- would be valuable.

Globally, institutionalized eldercare is headed towards using technology in everyday life to support elderly individuals and caregivers. Even without a global pandemic, the institutionalization of elderly individuals is leading academics and caregivers to identify and discuss what potential solutions could exist to alleviate the harms of compassionate fatigue, social exclusion, and ruptures of bonds from an established social network (Yaffe et al., 2002, Abdi et al., 2018; DeWall et al., 2011; Scharf & Keating, 2012). Currently, the loss of companionship and heightened loneliness levels will lead to an unsatisfied need for interventions that can provide both social and emotional stimuli. Humans are social animals, and in an ideal world, it would be possible to have a good end to a good life surrounded by chosen friends and family with whom one has meaningful relationships. Despite that, the current state of institutionalized eldercare is one in which one spends much time without engagement. In the absence of caregivers or family who can provide engagement, A-SARs may be a viable socially assistance device in the short term. Long-term care centers in Japan, Netherlands, and Australia have started to approve of A-SARs to be used in their institutionalized care (Bemelmans et al., 2015a). The approach acknowledges that situations that appear equal are often layered with complex differences.

The use of A-SARs pushes on the ethical boundaries of what good eldercare is. As more sophisticated A-SARs are developed, they could take on additional roles in the eldercare context. Social interactions have expanded from being human-human to human-technology. The use of socially assistive robots in eldercare practice will impact how the ethics-based healthcare landscape will change. Future discussion on whether perceptions that using A-SARs is offensive or infantilizing could be mitigated. Whether financial resources should be placed into purchasing and training staff to use expensive A-SARs when there is a lack of staff and other proven therapy tools should also be considered (Libin & Libin, 2014). Authors have suggested hiring more caregivers, that the focus on technological solutions is short-sighted (Lin, Abney, & Bekey, 2014). Other SAR with non-animal-like forms could also be discussed. Isolated living situations at an advanced age can be frightening. If living pets are not permitted into eldercare facilities, carefully considered ethical use of A-SARs may be the next best solution.

Works Cited

Aarskog, N.K., Hunskar, I., & Bruvik, F. (2019). Animal-Assisted Interventions With Dogs and Robotic Animals for Residents With Dementia in Nursing Homes: A Systematic Review, *Physical and Occupational Therapy in Geriatrics, 37*(2), 77-93.

Abbott, R., Orr, N., McGill, R., Whear, R., Bethel, A., Garside, R., Stein, K.,… & Thompson-Coon, J. (2019). How do 'robopets' impact the health and well-being of residents in care homes? A ystematic review of qualitative and quantitative evidence, *International Journal of Older People Nursing, 14*(3), 1-23.

Abdi, J., Al-Hindawi, A., Ng, T., & Vizcaychipi, M.P. (2018). Scoping review on the use of socially assistive robot technology in elderly care, *British Medical Journal , 8*(2), 1-20. e018815.

Adam, M. (2020, March 6th). A dog has died after testing positive for coronavirus. Should pets of COVID-19 patients be quarantined? [Online]. *https://www.cbc.ca/news/health/coronavirus-dog-spread-humans-1.5487621.*

Aday, R. H., Wallace, B., & Krabill, J. J. (2019). Linkages Between the Senior Center as a Public Place and Successful Aging. *Activities, Adaptation and Aging, 43*(3), 211-231.

Advocacy Centre for the Elderly. (2002) Abuse Education, Prevention and Response: A Community Training Manual for those who want to address the Issue of the Abuse of Older Adults in their Community. www.advocacycentreelderly.org/elder/pubs.html.

Agrigoroaie, R. M., & Tapus, A. (2016). Developing a healthcare robot with personalized behaviors and social skills for the elderly, In *2016 11th ACM/IEEE International Conference on Human-Robot Interaction (HRI),* 2016(1), 589-590.

Akiyama, H., Holtzman, J. M., & Britz, W. E. (1987). Pet ownership and health status during bereavement, *OMEGA-Journal of Death and Dying*, *17*(2), 187-193.

Algase, D.L., Beattie, E.R., Bogue, E.L., & Yao, L. (2001). Algase Wandering Scale: Initial psychometrics of a new caregiver reporting tool, *American Journal of Alzheimer's Disease & Other Dementias, 16*(3), 141-152.

Archibald, M.M., & Barnard, A. (2018). Futurism in nursing: Technology, robotics and the fundamentals of care, *Journal of Clinical Nursing, 27*(11-12), 2473-2480.

Armstrong, D., (2009). Stabilising the construct of health related quality of life: 1970-2007. *Science & Technology Studies,* 22(2),102-115.

Bacsu, J., Jeffery, B., Novik, N., Abonyi, S., Oosman, S., Johnson, S., & Martz, D. (2014). Policy, Community and Kin: Interventions That Support Rural Healthy Aging, *Activities, Adaptation and Aging, 38*(2), 138-155.

Baisch, S., Kolling, T., Schall, A., Ruhl, S., Selic, S., Kim, Z.,… & Knopf, M. (2017). Acceptance of Social Robots by Elder People: Does Psychosocial Functioning Matter?, *International Journal of Social Robotics, 9*(2), 293-307.

Ballard, S. (2016). *Adapting the Elder Abuse Suspicion Index for use in the geriatric long-term care setting.*(Master's Thesis). McGIll University.

http://digitool.Library.McGill.CA/R/?func=dbin-jump-full&object_id=143743 WorldCat.org database.

Banks, M. R., Willoughby, L. M., & Banks, W. A. (2008). Animal-assisted therapy and loneliness in nursing homes: use of robotic versus living dogs, *Journal of American Medical Director Associations, 9*(3), 173-177.

Banville, L. P. (2017). Seniors Abusing Each Other in Nursing Homes. [Online]. https://banvillelaw.com/seniors-abuse-each-other/.

Barcaro, R., Mazzoleni, M., & Virgili, P. (2018). Ethics of Care and Robot Caregivers, *Prolegomena, 17*(1), 71-80.

Barker, S. B., & Wolen, A. R.(2008). The benefits of human–companion animal interaction: A Review, *Journal of Veterinary Medical Education, 35*(4), 487-495.

Band-Winterstein, T. (2015) Health care provisions for older persons: The interplay between ageism and elder neglect. *Journal of Applied Gerontology*, 34(3). 113-117.

Baun, M.M., Oetting, K., & Bergstrom, N. (1991). Health benefits of companion animals in relation to the physiologic indices of relaxation, *Holistic Nursing Practice*, *5*(2), 16-23.

Beck, A. M., & Katcher, A. H. (2003). Future directions in human-animal bond research, *American Behavioral Scientist, 47*(1), 79-93.

Bedaf, S., Marti, P., Amirabdollahian, F., & de Witte, L. (2018). A multi-perspective evaluation of a service robot for seniors: the voice of different stakeholders, *Disabilty Rehability Assistive Technology, 13*(6), 592-599.

Bedaf, S., Marti, P., & De Witte, L. (2019). What are the preferred characteristics of a service robot for the elderly? A multi-country focus group study with older adults and caregivers, *Assistive Technology, 31*(3), 147-157.

Bemelmans, R., Gelderblom, G. J., Jonker, P., & de Witte, L. (2012). Socially Assistive Robots in Elderly Care: A Systematic Review into Effects and Effectiveness, *Journal of the American Medical Directors Association, 13*(2), 114-120.e111.

Bemelmans, R., Gelderblom, G. J., Jonker, P., & de Witte, L. (2015). Effectiveness of Robot Paro in Intramural Psychogeriatric Care: A Multicenter Quasi-Experimental Study, *Journal of American Medical Directive Association, 16*(11), 946-950.

Bemelmans, R., Gelderblom, G. J., Jonker, P., & de Witte, L. (2016). How to use robot interventions in intramural psychogeriatric care; A feasibility study, *Applied Nursing Research, 30(1)*, 154-157.

Benraad, C. E. M., Kamerman-Celie, F., van Munster, B. C., Oude Voshaar, R. C., Spijker, J., & Rikkert, M. (2016). Geriatric characteristics in randomised controlled trials on antidepressant drugs for older adults: a systematic review, *International Journal of Geriatric Psychiatry, 31*(9), 990-1003.

Bernabei, V., De Ronchi, D., La Ferla, T., Moretti, F., Tonelli, L., Ferrari, B., … & Atti, A. R. (2013). Animal-assisted interventions for elderly patients affected by dementia or psychiatric disorders: a review, *Journal of Psychiatric Research, 47*(6), 762-773.

Bernstein, P., Friedmann, E., & Malaspina, A. J. (2000). Animal-assisted therapy enhances resident social interaction and initiation in long-term care facilities, *Anthrozooz. 13*(4), 213-224.

Berrios, G. E., & Markova, I. S. (2016). The temporalization of madness in the 19th century. *Rivista Sperimentale di Freniatria: La Rivista della Salute Mentale, 140*(3), 13-27.

Birks, M., Bodak, M., Barlas, J., Harwood, J., & Pether, M. (2016). Robotic Seals as Therapeutic Tools in an Aged Care Facility: A Qualitative Study, *Journal of Aging Research, 2016(1)*, 107.

Bolin, K., Lindgren, B., & Lundborg, P. (2008). Your next of kin or your own career?: Caring and working among the 50+ of Europe, *Journal of Health Economics, 27*(3), 718-738.

Bradwell, H. L., Edwards, K. J., Winnington, R., Thill, S., & Jones, R.B. (2019). Companion robots for older people: importance of user-centred design demonstrated through observations and focus groups comparing preferences of older people and roboticists in South West England, *Bmj Open, 9*(9), e032468.

Braithwaite, J., Mannion, R., Matsuyama, Y., Shekelle, P. G., Whittaker, S., & Al-Adawi, S. (Eds.). (2018). Healthcare systems : future predictions for global care (First). CRC Press.

Brayer, A., & Tadd, W. (2000) Unjustified Exclusion of Elderly People from Studies Submitted to Research Ethics Committee for Approval: Descriptive Study. *British Medical Jourrnal*. 321. 992-3.

British Columbia Ministry of Health, (2015). The British Columbia Patient-Centered Care Framework. [Online]. http://www.health.gov.bc.ca/library/publications/year/2014/Setting-priorities-BC-HealthFeb14.pdf .

Broadberry, S.N, & O'Rouke, K.H. (2010). The Cambridge economic history of modern Europe. Volume2, 1870 to the present. Cambridge University Press.

Broadbent, E. (2017). Interactions With Robots: The Truths We Reveal About Ourselves. In S. T. Fiske (Ed.), *Annual Review of Psychology, 68*(1), 627-652.

Broekens, J., Heerink, M., & Rosendal, H. (2009). Assistive social robots in elderly care: a review, *Gerontechnology*, *8*(2), 94-103.

Brown, L.T., Shaw, T.G., & Kirkland, K.D. (1972). Affection for people as a function of affection for dogs, *Psychological Reports*, 31(1), 957-958.

Buettner, L. L., & Fitzsimmons, S. (2003). Activity calendars for older adults with dementia: What you see is not what you get. *Pub Med. 18*(4), 215-226.

Canadian Association of Social Workers. (2005) Canadian Association of Social Workers Code of Ethics and Scope of Practice.http://www.casw-acts.ca/en/Code-of-Ethics%20and%20Scope%20of%20Practice.

Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, and Social Sciences and Humanities Research Council of Canada, *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans*, December 2018. [Online]. https://ethics.gc.ca/eng/documents/tcps2-2018-en-interactive-final.pdf

Canadian Medical Association (2020). *Canadian Medical Association Code of Ethics and Professionalism.* [Online]. https://www.cma.ca/cma-code-ethics-and-professionalismde of Ethics and Professionalism.

Canadian Nurses Association, (2017). Canadian Nurses Association. 2017 Edition. Code of Ethics for Registered Nurses. [Online]. http://www.cna-aiic.ca/-/media/cna/page-content/pdf-en/code-of-ethics-2017-edition-secure-interactive.pdf.

Canadian Union of Public Employees Ontario. (2017). Time to Care -Long-Term Care. [Online]. http://cupe.on.ca/archivesub331/.

Calasanti, T. M., & Slevin, K. F. (2006). *Age matters : realigning feminist thinking*. New York: Routledge.

Cavallo, F., Esposito, R., Limosani, R., Manzi, A., Bevilacqua, R., Felici, E., … & Dario, P. (2018). Robotic Services Acceptance in Smart Environments With Older Adults: User Satisfaction and Acceptability Study, *Journal of Medical Internet Research, 20*(9), e264. doi:10.2196/jmir.9460.

Chappell, N., & Hollander, M. (2011). An Evidence-Based Policy Prescription for An Aging Population, *Healthcare Pap*, 11(1), 8-18.

Chang, W. L., & Sabanovic, S., (2015). Interaction Expands Function: Social Shaping of the Therapeutic Robot PARO in a Nursing Home. In *2015 10th ACM/IEEE International Conference on Human-Robot Interaction (HRI).*343-350.

Cherniack, E. P., & Cherniack, A. R. (2014). The benefit of pets and animal-assisted therapy to the health of older individuals, *Current Gerontological Geriatratric Research,* 623203. 2014(1), 1-10.

Clarke, S., Ells, C., Thombs, B. D., & Clarke, D. (2017). Defining elements of patient-centered care for therapeutic relationships: A literature review of common themes, *European Journal for Person Centered Healthcare*, *5*(3), 362-372.

Coeckelbergh, M. (2007). Imagination and principles: An essay on the role of imagination in moral reasoning, *Palgrave Macmillian*. Springer.

Coeckelbergh, M. (2010). Health Care, Capabilities, and AI Assistive Technologies, *Ethical Theory and Moral Practice, 13*(2), 181-190.

Coeckelbergh, M. (2015). Good Healthcare Is in the 'How': The Quality of Care, the Role of Machines, and the Need for New Skills, *Machine Medical Ethics*. *74(1),* 33-47.

Coeckelbergh, M. (2016). Care robots and the future of ICT-mediated elderly care: a response to doom scenarios, *AI & Society, 31*(4), 455-462.

Cohen, E. (2000). Souvenir, *Encyclopedia of Tourism, Annals of Tourism Research.* 15(3), 546-548.

Cohen-Mansfield, J., Marx, M. S., Dakheel-Ali, M., Regier, N. G., Thein, K., & Freedman, L. (2010). Can Agitated Behavior of Nursing Home Residents with Dementia Be Prevented with the Use of Standardized Stimuli? *Journal of the American Geriatrics Society, 58*(8), 1459-1464.

Cohen, L. W., Zimmerman, S., Reed, D., Sloane, P. D., Beeber, A. S., Washington, T., … & Gwyther, L. P. (2014). Dementia in relation to family caregiver involvement and burden in long-term care, *Journal of Applied Gerontology : the official journal of the Southern Gerontological Society, 33*(5), 522-540.

Collie, M., (2020) 'Skin hunger' is real, and it can severely harm your mental health. Global News. Lifestyle.

Community Legal Education Ontario. (2015). Every Resident: Bill of Rights for people who live in Ontario Long-term Care Homes. *Advocy Centre for the Elderly and Community Legal Education Ontario*. [Online]. http://www.cleo.on.ca/en/publications/everyres.

Coughlan R. & Ward L. (2007) Experiences of recently relocated residents of a long-term care facility in Ontario: assessing quality qualitatively. *International Journal of Nursing Studies.* 44, 47-57.

Coppola, C., Grandia, T., & Enns, R.M. (2006). Human interactions and cortisol: can human contact reduce stress for shelter dogs?, *Physiology & Behavior, 87(3)*, 537-541.

Cutler, S.K., Ageism and Technology. (2005) *Generations*., 67-72.

Czaja, S.J., Charness, N., Fisk, A.D., Hertzog, C. Nair, S.N., Rogers, W.A., & Sharit, J. (2006). Factors from the center for research and education on aging and technology enhahncement (create). *Psychology and Aging*., 21(2), 333-352.

Daly, M., & Silver, H. (2008). Social Exclusion and Social Capital: A Comparison and Critique, *Theory and Society, 37*(6), 537-566.

Daly, T., & Szebehely, M. (2012). Unheard voices, unmapped terrain: care work in long-term residential care for older people in Canada and Sweden, *International Journal of Social Welfare, 21*(2), 139-148.

Dangerfield, K. (2018). Veterinary pricing: Costs for services and procedures vary widely, here's why. *Global News*. [Online]. https://globalnews.ca/news/4041536/veterinary-pricing-costs-vary-wildly/.

Dautenhahn, K. (2007). Methodology & themes of human-robot interaction: A growing research field, *International Journal of Advanced Robotic Systems, 4*(1), 15.

Day, J. R., Anderson, R. A. (2011). Compassion fatigue: an application of the concept to informal caregivers of family members with dementia, *Nursing Research and Practice, 2011(1)*, 1-11.

Delta Society, (n.d.) About animal-assisted activities and animal assisted therapy [Online]. http://www.deltasociety.org/aboutaat.html.

Dembicki, D., & 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.

Denson A.C., & A. Mahipal. (2014). Participation of the Elderly Population in Clinical Trials: Barriers and Solutions. *PubMed.* 21(3). 209-214.

DeWall, C. N., Deckman, T., Pond, R. S., Bonser, I., Anderson, C. A., Bushman, B. J., … & Zajonc, R. B. (2011). Belongingness as a Core Personality Trait: How Social Exclusion Influences Social Functioning and Personality Expression. *Journal of Personality, 79*(6), 1281-1314.

Dixon-Woods, M., Cavers, D., Agarwal, S., Annandale, E., Arthur, A., Harvey, J., … & Sutton, A. J. (2006). Conducting a critical interpretive synthesis of the literature on access to healthcare by vulnerable groups, *BMC Medical Research Methodology, 6*(1), 1-13.

Doctor R. (Producer), J. Rivera (Director). (2009) . UP [Walt Disney Studios]. United States: Walt Disney Pictures.

Dorries, A., Simon, A., Neitzke, G., & Vollmann, J. (2010). Implementing clinical ethics in German hospitals: content, didactics and evaluation of a nationwide postgraduate training programme, *Journal of Medical Ethics*, *36*(12), 721-726.

Dowd, J. B., Andriano, L., Brazel, D. M., Rotondi, V., Block, P., Ding, X., … & Mills, M. C. (2020). Demographic science aids in understanding the spread and fatality rates of COVID-19, *Proceedings of the National Academy of Sciences, 117*(18), 9696-9698.

Duffin, E. (2019). Average Life Expectancy' in North America for Those Born in 2019, by Gender and Region (in Years). *Statistic Inc.* [Online]. https://www.statista.com/statistics/274513/life-expectancy-in-north-america/.

Eachus, P. (2001). Pets, people and robots: The role of companion animals and robopets in the promotion of health and well-being. *International Journal of Health Promotion and Education, 39*(1), 7-13.

Edelman, P., Fulton, B.R., Kuhn, D., & Chang, C.H. (2005). A comparison of three methods of measuring dementia-specific quality of life: Perspectives of residents, staff, and observers, *The Gerontologist, 45*(1), 27-36.

El-Qushayri, A.E., Kamel, A. M., Faraj, H.A., Vuong, N.L., Diab, O. M., Istanbuly, S., … & Huy, N. T. (2020). Association between pet ownership and cardiovascular risks and mortality: a systematic review and meta-analysis, *Journal of Cardiovascular Medicine*, *21*(5), 359–367.

Elliott, C. (1992). Where Ethics Comes from and What to Do about It, *Hastings Center Report, 22*(4), 28-35.

Ells, C., Hunt, M. R., & Chambers-Evans, J. (2011). Relational autonomy as an essential component of patient-centered care, *International Journal of Feminist Approaches to Bioethics, 4*(2), 79-101.

Entwistle, V. A., Carter, S. M., Cribb, A., & McCaffery, K. (2010). Supporting patient autonomy: the importance of clinician-patient relationships, *Journal of General Internal Medicine*, *25*(7), 741-745.

Entwistle, V. A., Cribb, A., & Watt, I. S. (2012). Shared decision-making: enhancing the clinical relevance, *Journal of the Royal Society of Medicine*, *105*(10), 416-421.

Entwistle, V. A., & Watt, I. S. (2013). A capabilities approach to person-centered care: response to open peer commentaries on 'Treating patients as persons: a capabilities approach to support delivery of person-centered care', *The American Journal of Bioethics : AJOB, 13*(8), 1-4.

Epstein, R.M., Franks, P., Fiscella, K., Shields, C.G., Meldrum, S.C., Kravitz, R.L. & Duberstein, P.R. (2005). Measuring patient-centered communication in Patient Physician consultations: Theoretical and Practical issues, *Social Sciences & Medicine.* 61(7), 1516-1528.

Epstein, R. M., & Street, R. L.(2011). The values and value of patient-centered care, *Annals of Family Medicine, 9*(2), 100-103.

Erler, S.F., and Garstecki, D.C. (200). Hearing Loss and Hearing Aid Related Stigma: Perceptions of Women with Age-Normal Hearing, *American Journal of Audiology*. 11 (1). 83-91.

Esposito, F., Rochat, L., Van der Linden, A.C. J., Lekeu, F., Charnallet, A., & Van der Linden, M. (2014). Apathy in aging: Are lack of interest and lack of initiative dissociable?, *Archives of Gerontology and Geriatrics, 58*(1), 43-50.

Fairclough, N., & Wodak, R. (1997). Critical Discourse Analysis, *Discourse Studies: A Multidisciplinary Introduction*, *2(1),* 357-378.

Feil-Seifer, D., & Mataric, M. J.(2005). Defining Socially Assistive Robotics. *Paper presented at the 9th International Conference on Rehabilitation Robotics, 2005.IEEE Robotics & Autonomation Magazine.* 24-31.

Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development, *International Journal of Qualitative Methods. 5*(1), 80-92.

Filan, S. L., & Llewellyn-Jones, R. H. (2006). Animal-assisted therapy for dementia: a review of the literature, *International Psychogeriatrist, 18*(4), 597-611.

Fong, T., Nourbakhsh, I., & Dautenhahn, K. (2003). A survey of socially interactive robots, *Robotics and Autonomous Systems, 42*(3-4), 143-166.

Gallagher, A., Naden, D., & Karterud, D. (2016). Robots in Elder Care, *Nursing Ethics, 23*(4), 369-371.

Gardiner, P. (2003). A Virtue Ethics Approach to Moral Dilemmas in Medicine, *Journal of Medical Ethics, 29*(5), 297-302.

Garrity, T. F., Stallones, L. F., Marx, M. B., & Johnson, T. P. (2015). Pet ownership and attachment as supportive factors in the health of the elderly, *Anthrozoös*, *3*(1), 35–44.

Gendron, T. L., Inker, J., Welleford, E. A., & Bowers, B. J. (2018). A Theory of Relational Ageism: A Discourse Analysis of the 2015 White House Conference on Aging, *The Gerontologist, 58*(2), 242-250.

Gilliagan, C., (1982). In a different voice: psychological theory and women's development. Cambridge Mass. Harvard University Press. [Online]. http://www.gbv.de/dms/bowker/toc/9780674445437.pdf.

Globe & Mail, Barton, A. (2018) Cyclons, they are not. These intelligent and friendly robots are designed to help the elderly live a better life. [Online]. https://www.theglobeandmail.com/life/health-and-fitness/article-cylons-they-are-not-these-intelligent-and-friendly-robots-are/

Goodrich, J., (2009). Exploring the wide range of terminology used to describe care that is patient centered, *Nursing Times. 105*(20) 14-17.

Gomi, T., & Griffith, A. (1998). Developing intelligent wheelchairs for the handicapped. *Assistive Technology and Artificial Intelligence: Applications in Robotics, User Interfaces and Natural Language Processing* Berlin, Heidelberg: Springer (1) 150-178.

Gruman, G. J., Beard, G. M., Osler, W. S., & Crichton-Browne, J. (1979). *The 'Fixed period' controversy : prelude to ageism.* New York: Arno Press.

Gustafsson, C., Svanberg, C., & Mullersdorf, M. (2015). Using a Robotic Cat in Dementia Care: A Pilot Study, *Journal of Gerontological Nursing, 41*(10), 46-56.

Health Ontario, (2008). A Guide to the Long-Term Care Homes Act, 2007 and Regulation 79/10. [Online]. http://www.health.gov.on.ca/en/public/programs/ltc/docs/ltcha_guide_phase1.pdf.

Heitmueller, A., & Inglis, K. (2007). The earnings of informal carers: Wage differentials and opportunity costs, *Journal of Health Economics, 26*(4), 821-841.

Held, V. (2006). "The Ethics of Care: Personal, Political, and Global. *The Oxford Handbook of Ethical Theory.*Oxford: Oxford University Press.

Hudon, C., Fortin, M., Haggerty, J. L., Lambert, M., & Poitras, M. E. (2011). Measuring patients' perceptions of patient-centered care: a systematic review of tools for family medicine, *Annals of Family Medicine, 9*(2), 155-164.

Hursthouse, R. (1991). Virtue theory and abortion. *Philosophy & Public Affairs, 20*(3), 223-246.

Iacono, I., & Marti, P. (2016). Narratives and emotions in seniors affected by dementia: a comparative study using a robot and a toy. In *2016 25th Ieee International Symposium on Robot and Human Interactive Communication, 2016*(1), 318-323.

Ienca, M., Wangmo, T., Jotterand, F., Kressig, R. W., & Elger, B. (2018). Ethical Design of Intelligent Assistive Technologies for Dementia: A Descriptive Review, *Science and Engineering Ethics, 24*(4), 1035-1055.

Johansson, L. (2013). Robots and the Ethics of Care, *International Journal of Technoethics, 4*(1), 67-82.

Joranson, N., Pedersen, I., Rokstad, A. M., Aamodt, G., Olsen, C., & Ihlebaek, C. (2016). Group activity with Paro in nursing homes: systematic investigation of behaviors in participants, *International Psychogeriatratric, 28*(8), 1345-1354.

Jorgenson, J. (1997). Therapeutic use of companion animals in health care*. Journal of Nursing Scholarship. 29*(3), 249-254.

Kachouie, R., Sedighadeli, S., Khosla, R., & Chu, M.T. (2014). Socially Assistive Robots in Elderly Care: A Mixed-Method Systematic Literature Review, *International Journal of Human–Computer Interaction, 30*(5), 369-393.

Kalff, D. M. (2003). *Sandplay: A psychotherapeutic approach to the psyche*. Temenos Press.

Kanamori, M., Suzuki, M., Oshiro, H., Tanaka, M., Inoguchi, T., Takasugi, H., ... & Yokoyama, T. (2003, July). Pilot study on improvement of quality of life among elderly using a pet-type robot. In *Proceedings 2003 IEEE International Symposium on Computational Intelligence in Robotics and Automation. Computational Intelligence in Robotics and Automation for the New Millennium.* 2003(1), 107-112.

Kane, R.A., (2001). Long-term care and a good quality of life: bringing them closer together. *The Gerontologist.* 41, 293-304.

Kane, R.A. (2003). Definition, measurement and correlates of quality of life in nursing homes: towards a reasonable practice, research, and policy agenda. *The Gerontologist*. 43(2), 28-36.

Kang, H. S., Makimoto, K., Konno, R., & Koh, I. S. (2019). Review of outcome measures in PARO robot intervention studies for dementia care. *Geriatric Nursing*. *41(3)*, 207-214.

Kazerooni, H. (2005). Exoskeletons for human power augmentation. *Paper presented at the 2005 IEEE/RSJ International Conference on Intelligent Robots and Systems.* 2005(1), 3459-3464.

Kearney, R. (1998) Poetics of Imagining: Modern to Post Modern. Edinburgh: Edingburg University Press.

Keidel, G. C. (2002). Burnout and compassion fatigue among hospice caregivers, *American Journal of Hospice and Palliative Care. 19*(3), 200-205.

Kennedy, B. (2020, March 15). *Visits to long-term care homes and other facilities restricted due to COVID-19.* [Online]. https://www.thestar.com/news/gta/2020/03/14/visits-to-long-term-care-homes-and-other-facilities-restricted-due-to-covid-19.html.

Kiesler, D.J. (1988). Therapeutic metacommunication: Therapist impact disclosure as feedbackin psychotherapy. Palo Alto CA: Consulting Psychologist Press .

Klein, B., Gaedt, L., & Cook, G. (2013). Emotional robots: Principles and experiences with Paro in Denmark, Germany, and the UK, *Gerontology Psychology: The Journal of Gerontopsychology and Geriatric Psychiatry, 26*(2), 89-99.

Kleinman, A. (2013). From illness as culture to caregiving as moral experience, *The New England Journal of Medicine, 368*(15), 1376-1377.

Kokkonen, T.M., Cheston,R.L., Dallos,R., & Smart, C.A. (2014). Attachment and coping of dementia care staff: The role of staff attachment style, geriatric nursing self-efficacy, and approaches to dementia in burnout, *Dementia, 13*(4), 544-568.

Kolb, G., Rehmann, P., Karbe-Voigt, N., & Wostmann, B. (2015). Are old patients not fit for clinical trials, or do clinical trials not fit to old patients? A survey in 35 pharmaceutical companies, *European Geriatric Medicine, 6*(4), 354-357.

Koren, M. J. (2010). Person-centered care for nursing home residents: The culture-change movement, *Health Affairs*, *29*(2), 312-317.

Kramer, S. C., Friedmann, E., & Bernstein, P. L. (2009). Comparison of the effect of human interaction, animal-assisted therapy, and AIBO-assisted therapy on long-term care residents with dementia, *Anthrozoos, 22*(1), 43-57.

Kurrle, S. E., Day, R., & Cameron, I.D. (2004). The perils of pet ownership: a new fall-injury risk factor, *Medical Journal of Australia. 181*(11), 682-683.

Lakoff, G., & Johnson, M. (1980). The metaphorical structure of the human conceptual system, *Cognitive Science*, 4(2), 195-208.

LaJoie, K.R. (2003). *An evaluation of the effectivness of using animals in therapy*. [Doctoral dissertation]. McGill University.

Lane, G. W., Noronha, D., Rivera, A., Craig, K., Yee, C., Mills, B.,… & Villanueva, E. (2016). Effectiveness of a social robot, 'Paro,' in a VA long-term care setting, *Psychological Services, 13*(3), 292-299.

Lee, J. Y., Song, Y. A., Jung, J. Y., Kim, H. J., Kim, B. R., Do, H. K.,… & Lim, J. Y. (2018). Nurses' needs for care robots in integrated nursing care services, *Journal of Advanced Nursing*, 74(9). 2094-2105.

Lee, P.Y., et al., (2001). Representation of Elderly Persons and Women in Published Randomized Trials of Acute Coronary Sybdromes. *Journal of the American Medical AssociationI.* 286(1). 708-13.

Leplege, A., Gzil, F., Cammelli, M., Lefeve, C., Pachoud, B., & Ville, I. (2007). Person-centredness: conceptual and historical perspectives, *Disability and Rehabilitation*, *29*(20-21), 1555-1565.

Lewis, L. (2017). Using narrative with avatars and robots to enhance elder care. In *Healthcare Ethics and Training: Concepts, Methodologies, Tools, and Applications* 10(14), 744-763.

Liang, A., Piroth, I., Robinson, H., MacDonald, B., Fisher, M., Nater, U. M., … & Broadbent, E. (2017). A Pilot Randomized Trial of a Companion Robot for People With Dementia Living in the Community, *Journal of the American Medical Directors Association, 18*(10), 871-878.

Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P., … & Moher, D. (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration, *Journal of Clinical Epidemiology, 62*(10), 1-34.

Libin, A., & Libin, M., (2004). Person-robot interactions from the robopsychologists' point of view: the robotic psychology and robotherapy approach. *Proceedings of the IEEE, 92*(11), 1789-1803.

Libin, A., & Cohen-Mansfield, J. (2004). Therapeutic robocat for nursing home residents with dementia: preliminary inquiry, *American Journal of Alzheimers Disease and Other Dementia, 19*(2), 111-116.

Limbu, D.K., W.C.Y.A. Wong, T.H.J.Dung, T.A., Kee, T.Y., Dat, T.H., … & L. Jun,2013, November). Affective social interaction with CuDDler robot. In 2013 6th *IEEE Conference on Robotics, Autonation and Mechatronics (RAM) 179-184.*

Loe, M. (2015). Comfort and medical ambivalence in old age. *Technological Forecasting and Social Change*, *93(1)*, 141-146.

Mani, I., & Maguire, J.H. (2009). Small animal zoonoses and immuncompromised pet owners, *Topics in Companion Animal Medicine, 24*(4), 164-174.

Mansouri, N., Goher, K., & Hosseini, S. E. (2017). Ethical framework of assistive devices: review and reflection, *Robotics and Biomimetics, 4*(1), 1-9.

Marin, R.S., Biedrzycki, R.C., & Firinciogullari, S. (1991). Reliability and validity of the Apathy Evaluation Scale. *Psychiatry Research,* 38(2), 143- 162.

Marti, P., Bacigalupo, M., Giusti, L., Mennecozzi, C. ,… & Shibata, T. (2006). Socially assistive robotics in the treatment of behavioural and psychological symptoms of dementia. *Paper presented at the The First IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechatronics,* 2006 (1).

McCullough, L. B., Coverdale, J. H., & Chervenak, F. A. (2007). Constructing a Systematic Review for Argument-Based Clinical Ethics Literature: The Example of Concealed Medications, *The Journal of Medicine and Philosophy: A Forum for Bioethics and Philosophy of Medicine, 32*(1), 65-76.

McCormack, L.A., Treiman, K., Rupert, D., Williams-Piehota, P., Nadler, E., Arora, N.K., Lawrence, W., … & Street, R.L. (2011). Measuring patient-centered communication in cancer care: A literature review and the development of a systematic method, *Social Sciences & Medicine,* 72(7), 1085-1095.

McDougall, R. (2014). Systematic reviews in bioethics: types, challenges, and value, *The Journal of Medicine and Philosophy, 39*(1), 89-97.

McKeever, P. (1996). The family: long-term care research and policy formulation, *Nursing Inquiry*, *3*(4), 200-206.

McGlynn, S. A., Kemple, S., Mitzner, T. L., King, C. A., & Rogers, W. A. (2017). Understanding the Potential of PARO for Healthy Older Adults, *International Journal of Human Computing Studies, 100*(1), 33-47.

Mead, N., & Bower, P. (2000). Patient-centredness: a conceptual framework and review of the empirical literature, *Social Science & Medicine*, *51*(7), 1087-1110.

Metzler, T. A., & Barnes, S. J. (2014). Three dialogues concerning robots in elder care, *Nursing Philosophy, 15*(1), 4-13.

Michelazzi, M., Besana, F., Santarato, D., & Giudici P., Verga, M. (2007). AAA and AAT projects in a geriatric institute: effects on the patients welfare, *Journal of Veterinary Behavior,* 2(3), 83-102.

Ministry of Health & Long-Term Care. (2016). Policies and Procedures Manual for the Assistive Devices Program. [Online]. http://www.health.gov.on.ca/en/pro/programs/adp/policies_procedures_manuals/docs/pp_adp_manual.pdf.

Ministry of Health, (2020). COVID-19 Outbreak Guidance for Long Term Care Homes (LTCH) [Online]. http://health.gov.on.ca/en/pro/programs/publichealth/coronavirus/docs/LTCH_outbreak_guidance.pdf

Misselhorn, C., Pompe, U., & Stapleton, M. (2013). Ethical Considerations Regarding the Use of Social Robots in the Fourth Age, *Journal of Gerontopsychology and Geriatric Psychiatry, 26*(2), 121-133.

Moyle, W., Cooke, M., Beattie, E., Jones, C., Klein, B., Cook, G., & Gray, C. (2013). Exploring the effect of companion robots on emotional expression in older adults with dementia: a pilot randomized controlled trial, *Journal of Gerontology Nursing, 39*(5), 46-53.

Moyle, W., Beattie, E., Draper, B., Shum, D., Thalib, L., Jones, C., … & Mervin, C. (2015). Effect of an interactive therapeutic robotic animal on engagement, mood states, agitation and psychotropic drug use in people with dementia: a cluster-randomised controlled trial protocol, *Bmj Open, 5*(8). 1-6.

Moyle, W., Jones, C., Sung, B., Bramble, M., O'Dwyer, S., Blumenstein, M., & Estivill-Castro, V. (2016). What Effect Does an Animal Robot Called CuDDler Have on the Engagement and Emotional Response of Older People with Dementia? A Pilot Feasibility Study, *International Journal of Social Robotics, 8*(1), 145-156.

Moyle, W., Arnautovska, U., Ownsworth, T., & Jones, C. (2017). Potential of telepresence robots to enhance social connectedness in older adults with dementia: an integrative review of feasibility, *International Psychogeriatrics, 29*(12), 1951-1964.

Moyle, W., Bramble, M., Jones, C., & Murfield, J. (2018). Care staff perceptions of a social robot called Paro and a look-alike Plush Toy: a descriptive qualitative approach, *Aging & Mental Health, 22*(3), 330-335.

Moyle, W., Jones, C.,Murfield, J., Thalib, L., Beattie, E., Shum, D., & Draper, B., (2019a.). The promise of technology in the future of dementia care, *Nature Reviews Neurology, 15*(6), 353-359.

Moyle, W.,Bramble, M., Jones, C. J., & Murfield, J. E. (2019b.). 'She Had a Smile on Her Face as Wide as the Great Australian Bite': A Qualitative Examination of Family Perceptions of a Therapeutic Robot and a Plush Toy, *Gerontologist, 59*(1), 177-185.

Murphy, K., O'Shea, E., & Cooney, A. (2007) Quality of life for older people living in long-stay settings in Ireland. *Journal of Clinical Nursing*. 16, 2167-2177.

Naganuma, M., Ohkubo, E., & Kato, N. (2015). Use of Robotic Pets in Providing Stimulation for Nursing Home Residents with Dementia, *Studies of Health Technology Information, 217 (1)*, 1009-1012.

National Union of General Employees (2012) *Dignity Denied: Long-Term Care and Canada's Elderly*. [Online]. http://nupge.ca/sites/default/files/publications/Medicare/Dignity_Denied.pdf.

Nelson, T. D. (2005). Ageism: Prejudice against our feared future self, *Journal of Social Issues*, *61*(2), 207-221.

Nerenberg, L., Davies, M., & Navarro, A. A. (2012). In Pursuit of a Useful Framework to Champion Elder Justice, *Generations, 36*(3), 89-96.

Neven, L. (2010). 'But obviously not for me': robots, laboratories and the defiant identity of elder test users. *Sociology of Health & Illness*, *32*(2), 335-347.

Nierling, L., & Domínguez-Rué, E. (2016). All that Glitters is not Silver–Technologies for the Elderly in Context. Introduction, *Ageing and Technology*.Deutsche Nationabibliothek. Netherlands. 9-27.

Nodding, N. (1984). Caring: A feminine approach to ethics and moral education. Berkeley, CA: University of California Press.

Nordenfelt, L. (2004). The Varieties of Dignity, *Health Care Analysis*, *12*(2), 69-81.

Nussbaum, M. C., & Sen. A., (1993). *The Quality of Life*. In WIDER studies in development economics. [Online]. http://site.ebrary.com/id/10288448.

Nussbaum, M. (2006). *Frontiers of justice : disability, nationality, species membership*. In The Tanner lectures on human values. http://site.ebrary.com/id/10318470.

Nussbaum, M. (2011). *Creating Capabilities: the Human Development Approach*. Harvard University Press. [Online]. https://www.degruyter.com/view/title/125409?tab_body=toc

Odetti, L., Anerdi, G., Barbieri, M. P., Mazzei, D., Rizza, E., Dario, P. (2007). Preliminary experiments on the acceptability of animaloid companion robots by older people with early dementia. In *2007 Annual International Conference of the IEEE Engineering in Medicine and Biology Society, 1(16),* 1816-1821.

Orimo, H., Ito, H., Suzuki, T., Araki, A., Hosoi, T., & Sawabe, M. (2006). Reviewing the definition of 'elderly', *Geriatrics & Gerontology International, 6*(3), 149-158.

OPSWA, n.d. Code of Conduct for Personal Support Workers of Ontario. [Online]. http://ontariopswassociation.com/code-of-conduct/.

Ontario Long Term Care Homes Act (LTCHA) 2007, 2.0. 2007, c. 8. [Online]. The Ontario Legislation Page. [Online]. https://www.ontario.ca/laws/statute/07l08#BK5.

Ontario Health Coalition. (2002). Ownership Matters – Lessons from Ontario's Long Term Care Facilities. [Online]. http://www.ontariohealthcoalition.ca/wpcontent/uploads/Summary-May-27-2002-Ownership-Matters.pdf.

Ontario Ministry of Health and Long Term Care. (2004) Commitment to Care: A Plan for Long-Term Care in Ontario. [Online]. http://oanhssimisdev.etechhosting.ca/oanhss/oanhssdocs/Issue_Positions/External_Resources/MOHLTC_Report_Spring04.pdf.

Pedersen, P. (1994). A handbook for developing multicultural awarenes (2nd ed.) Alexandris, VA: American Counseling Association.

Pedersen, I., Reid, S., & Aspevig, K. (2018). Developing social robots for aging populations: A literature review of recent academic sources, *Sociology Compass*, *12*(6), e12585.

Pellegrino, E. D., & Thomasma, D. C. (1993). *The Virtues in Medical Practice*. New York, Oxford University Press.

Pirhonen, J. (2015) Dignity and the Capabilities Approach in Long-Term Care for Older People, *Nursing Philosophy.* 16(1), 29-39.

Pirhonen, J., Tilikainen, E.L., Pekkarinen, S., Lemivaara, M., & Melkas, H. (2020) Can robots tackel late-life loneliness? Scanning of future opportunities and challenges in assisted living facilities, *Futures.* 124(2020). 1026-1040.

Pino, M., Boulay, M., Jouen, F., & Rigaud, A. S. (2015). 'Are we ready for robots that care for us?' Attitudes and opinions of older adults toward socially assistive robots, *Frontiers in Aging Neuroscience, 7(141)*, 1-15.

Prato-Previde, E., Fallani, G., & Valsecchi, P. (2006). Gender differences in owners interacting with pet dogs: an observational study, *Ethology*, *112*(1), 64–73.

Preus, D., & Legal, F. (2017). Living with the animals: Animal or robotic companions for the elderly in smart homes?, *Journal of the Institute of Medical Ethics, 43*(6), 407-410.

Preus, D., & Legal, F. (2017). Living with the animals: animal or robotic companions for the elderly in smart homes?, *Journal of Medical Ethics, 43*(6), 407-410.

Pruchno, R. (2017). International Aging: Spotlighting the Spotlights, *Gerontologist, 57*(3), 392-395.

Rachels, J. (1998). *Ethical theory*. Oxford: Oxford University Press.

Rahimzadeh, V., (2014) *On the ethics of engagment: health-related quality of life in terminally ill children and adolescents.*(Doctoral dissertation). McGill University.

Ray, D., (2004). Supervision of basic and advanced skills in play therapy, *Journal of Professional Counseling: Practice, Theory & Research,* 32(1), 28-41.

Resident Bill of Rights,(2007). Ontario Association of Residents Council. n.d. [Online]. http://www.ontarc.com/residents-bill-of-rights.html.

Reynolds, A. (2009). Patient-centered Care. *Radiologic Technology, 81*(2), 133-147.

Register, M.E., & Scharer, K.M. (2010) Quality of life revisited: the concept of connectedness in older adults. *Advances in Nursing Science*. 33, 53-63.

Ries, N., & Sugihara, T. (2017). Robot revolution: Why technology for older people must be designed with care and respect. *The Huffington Post*.

Ridda, I., Lindley, R., & MacIntyre, R. C. (2008). Research: The challenges of clinical trials in the exclusion zone: The case of the frail elderly, *Australasian Journal on Ageing, 27*(2), 61-66.

Robinson, H., Macdonald, B., Kerse, N., & Broadbent, E. (2013). The psychosocial effects of a companion robot: a randomized controlled trial, *Journal of the American Medical Directors Association, 14*(9), 661-667.

Robinson, H., MacDonald, B., & Broadbent, E. (2015). Physiological effects of a companion robot on blood pressure of older people in residential care facility: a pilot study. *Australas Journal of Ageing, 34*(1), 27-32.

Robinson, H., Broadbent, E., & MacDonald, B. (2016). Group sessions with Paro in a nursing home: Structure, observations and interviews, *Australas Journal on Ageing, 35*(2), 106-112.

Robottimmies. (2015). Buying a Robot. [Online]. https://pappinen.info/index.php/articles-in-english/buying-a-robot/.

Sabanovic, S., Bennett, C.C., Chang, W. L., & Huber, L. (2013). PARO robot affects diverse interaction modalities in group sensory therapy for older adults with dementia. *IEEE International Conference of Rehabilitative Robot,[Proceedings], 2013(1)*, 6650427-6650427.

Šabanović, S., & Chang, W.L. (2016). Socializing robots: constructing robotic sociality in the design and use of the assistive robot PARO. *AI & SOCIETY : Journal of Knowledge, Culture and Communication, 31*(4), 537-551.

Sabelli, A., Kanda, T., & Hagita, N. (2011) A conversational robot in an eldercare center : an ethnographic study, In 2011 *6th ACM/IEEE international Conference on Human-Robot Interactions (HRI),* 2011(1), 37-44.

Santana, M.G., Manalili, K., Jolley, R.J., Zelomslu, S., Quan, H., & Lu, M. (2018). How to practice person-centered care: A conceptual framework, *Health Expectations,* 21(2), 429-440.

Scharf, T., & Keating, N. (2012). Social exclusion in later life: A global challenge, Springer. 2012(1), 1-16.

Schreier, J. (Director), (2012). Robot & Frank. Park Pictures. Dog Run Pictures. Sony Pictures Releasing.

Sefidgar, Y.E., MacLean, K.E., Yohanan, S., Van der Loos, H.F.E., Croft, E.A., & Garland, E.J., (2016). Design and Evalution of a Touch-Centered Calming Interaction with a Social Robot. IEEE Transactions on Affective Computing. 7(2). 108-121.

Sen, A. (2006). *Identity and violence : the illusion of destiny* (1st ed). Penguin Books, India.

Sen, A. (2010). The place of capability in a theory of justice. *Measuring justice: primary goods and capabilities*, 2010(1), 239-253.

Shankar, K.K., Walker,M., Frost D., & Orrell, M.W. (1999). The development of a valid and reliable scale for rating anxiety in dementia (RAID). *Aging & Mental Health, 3(1), 39-49.*

Sharkey, N. (2008). Computer science. The ethical frontiers of robotics. *Science, 322*(5909), 1800-1801.

Sharkey, N., & Sharkey A. (2010). Living with Robots: Ethical tradeoffs in Eldercare; Close Engagements with Artifical Companions, *Benjamins Semantics.* 18(1), 245-256.

Sharkey, A., & Sharkey, N. (2011a). Children, the Elderly, and Interactive Robots Anthropomorphism and Deception in Robot Care and Companionship. *IEEE Robotics & Automation Magazine, 18*(1), 32-38.

Sharkey, A., & Sharkey, N. (2012 a.). Granny and the robots: ethical issues in robot care for the elderly, *Ethics and Information Technology, 14*(1), 27-40.

Sharkey, N., & Sharkey, A. (2012 b.). The Eldercare Factory, *Gerontology, 58*(3), 282-288.

Sharkey, A. (2014). Robots and Human Dignity: A Consideration of the Effects of Robot Care on the Dignity of Older People, *Ethics and Information Technology, 16*(1), 63-75.

Sharkey, A. (2019). Autonomous weapons systems, killer robots and human dignity, *Ethics and Information Technology, 21*(2), 75-87.

Sharts-Hopko, N.C. (2014). The Coming Revolution in Personal Care Robotics. *Nursing Administration Quarterly, 38*(1), 5-12.

Shibata, T., Inoue, K., & Irie, R. (1996). *Emotional robot for intelligent system-artificial emotional creature project.* Paper presented at the Proceedings 5th IEEE International Workshop on Robot and Human Communication.

Shibata, T., Wada, K., Saito, T., & Tanie, K. (2008). Psychological and social effects to elderly people by robot-assisted activity. In *Animating Expressive characters for social interaction,* 2008(1),177-193.

Shibata, T., & Wada, K. (2011). Robot therapy: a new approach for mental healthcare of the elderly–a mini-review, *Gerontology, 57*(4), 378-386.

Shibata, T. (2012). Therapeutic seal robot as biofeedback medical device: Qualitative and quantitative evaluations of robot therapy in dementia care, *Proceedings of the IEEE*, *100*(8), 2527-2538.

Shiloh, S., Sorek, G., & Terkel, J. (2003). Reduction of state-anxiety by petting animals in a controlled laboratory experiment. *Taylor & Francis. 16*(4), 387-395.

Smith, K.J., & Victor, C. (2019) Typologies of loneliness, living alone and social isolation, and their associations with physical and mental health, *Ageing and Society.* Cambridge University Press. 39(1), 1709-1730.

Sony, (2020). AIBO. [Online]. https://www.sony.com/electronics/support/res/manuals/4724/4736af655a4620ff79443abc51912f69/47246062M.pdf.

Sorell, T., & Draper, H. (2014). Robot carers, ethics, and older people. *Ethics and Information Technology, 16*(3), 183-195.

Sparrow, R. (2002). The March of the Robot Dogs, *Ethics and Information Technology, 4*(4), 305-318.

Sparrow, R., & Sparrow, L. (2006). In the hands of machines? The future of aged care. Minds and Machines, *Journal for Artificial Intelligence, Philosophy and Cognitive Science, 16*(2), 141-161.

Statistics Canada (1967). *Life expectancy trends, 1930-1932 to 1960-1962*. [Ottawa]: Dominion Bureau of Statistics.

Statistics Canada (2011). *Living arrangement of seniors,* 2011 Analytic Products: Families, households and marital status. [Online]. http://www12.statcan.gc.ca.census-recensement/2011/as-sa/98-312-x/98-312-x2011003_4-eng.cfm.

Stevens, N. L., Martina, C. M., & Westerhof, G. J. (2006). Meeting the need to belong: Predicting effects of a friendship enrichment program for older women, *The Gerontologist, 46*(4), 495-502.

Stewart, M., Brown, J.B., & Donner, A.,(2000). The impact of patient-centered care on patient outcome, *Journal of Family Practice, 49 (9)*: 796-804.

Stewart, M. (2005). Reflections on the doctor-patient relationship: from evidence and experience, *The British Journal of General Practice.* 2005(55), 293-801.

Stewart, M., Brown, J. B., Freeman, T. R., McWhinney, I. R., McWilliam, C. L., Weston, W. (2014). Patient-centered medicine: transforming the clinical method (Third). CRC Press.

Stiehl, W. D., Lieberman, J., Breazeal, C., Basel, L., Lalla, L., & Wolf, M. (2005, 13-15 Aug. 2005). *Design of a therapeutic robotic companion for relational, affective touch.* Paper presented at the ROMAN 2005. *IEEE International Workshop on Robot and Human Interactive Communication,* 2005.

Stokoe, E. (2011). Simulated interaction and communication skills training: The 'conversation-analytic role-play method'. In *Applied Conversation Analysis.* Palgrave Macmillan, London. 119-139.

Stull, J. W., Peregrine, A. S., Sargeant, J. M., & Weese, J. S. (2012). Household knowledge, attitudes and practices related to pet contact and associated zoonoses in Ontario, Canada, *BioMed Central Public Health, 12*(553), 1-15.

Suzman, R., Beard, J., (2011). Global Health and Aging. *National Institute on Aging, National Institutes of Health, US Department of Health and Human Services.* [Online]. http://www. who.int/ageing/publications/global_health.pdf.

Takanori, S. (2007). Robot Power Japan: The New Era Dawns - Mentally Soothing Robot 'Paro' - How Developed & How Assisting Therapy. *Japan spotlight: Economy, Culture & History., 26*(1), 21.

Takayanagi, K., Kirita, T., & Shibata, T. (2014). Comparison of Verbal and Emotional Responses of Elderly People with Mild/Moderate Dementia and Those with Severe Dementia in Responses to Seal Robot, PARO, *Frontiers in Aging Neuroscience, 6(*257), 1-5.

Tamura, T., Yonemitsu, S., Itoh, A., Oikawa, D., Kawakami, A., Higashi, Y., … & Nakajima, K. (2004). Is an entertainment robot useful in the care of elderly people with severe dementia?, *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences, 59*(1), 83-85.

Tri- council Policy Statement (2018)-Chapter 7: Conflicts of Interest. [Online]. https://ethics.gc.ca/eng/tcps2-eptc2_2018_chapter7-chapitre7.html.

Thodberg, K., Sorensen, L. U., Christensen, J. W., Poulsen, P. H., Houbak, B., Damgaard, V., … & Videbech, P. B. (2016). Therapeutic effects of dog visits in nursing homes for the elderly, *Psychogeriatrics, 16*(5), 289-297.

Thodberg, K., Sorensen, L. U., Videbech, P. B., Poulsen, P. H., Houbak, B., Damgaard, V., … & Christensen, J. W. (2016). Behavioral responses of nursing home residents to visits from a person with a dog,a robot seal or a toy cat, *Anthrozoos, 29*(1), 107-121.

Threapleton, D. E., Chung, R. Y., Wong, S. Y. S., Wong, E., Chau, P., Woo, J., … & Yeoh, E. K. (2017). Integrated care for older populations and its implementation facilitators and barriers: A rapid scoping review, *International Journal for Quality in Health Care, 29*(3), 327-334.

Torraco, R. J. (2005). Writing Integrative Literature Reviews: Guidelines and Examples, *Human Resource Development Review, 4*(3), 356-367.

United Nations: Principles of Older Persons. (1999) International Year of Older Persons 1999. [Online]. https://www.un.org/development/desa/ageing/resources/international-year-of-older persons.19999.html#:~:text=Theme%3A%20Towards%20a%20Society%20for%20All%20Ages%20Objective%3A,of%20society%2C%20in%20all%20corners%20of%20the%20globe.

United States Center of Disease Control and Prevention (2009). *Nonfatal fall-related injuries associated with dogs and cats- United States, 2001-2006*. United States: Morbidity and Mortality Weekly Report.

Vallor, S. (2011). Carebots and caregivers: Sustaining the ethical ideal of care in the twenty-first century, *Philosophy and Technology, 24*(3), 251-268.

Van Bogaert, P., Clarke, S., Wouters, K., Franck, E., Willems, R., & Mondelaers, M. (2013). Impacts of unit-level nurse practice environment, workload and burnout on nurse-reported outcomes in psychiatric hospitals: A multilevel modelling approach, *International Journal of Nursing Studies, 50*(3), 357-365.

van Oost, E., & Reed, D. (2011). *Towards a Sociological Understanding of Robots as Companions*, Berlin, Heidelberg.

Van Whynsberghe, A., (2016) Service robots, care ethics, and design, *Ethics and Information Technology.* 18(4), 311-321.

Vandemeulebroucke, T., de Casterle, B. D., & Gastmans, C. (2018). The use of care robots in aged care: A systematic review of argument-based ethics literature, *Archives of Gerontology and Geriatrics, 74(2)*, 15-25.

Vandemeulebroucke, T., Dierckx de Casterle, B., Welbergen, L., Massart, M., & Gastmans, C. (2019). The Ethics of Socially Assistive Robots in Aged Care. A Focus Group Study with Older Adults in Flanders, Belgium, *The Journals of Gerontology and Social Sciences.* 75(9), 1996-2007.

Ventura, M., D'Amato, A., Giannini, M., Carretta, A., Tummolo, R., Buquicchio, R. (2010). Incidence of allergic diseases in an elderly population, *Journal of Immunopharmacology and Immunotoxicology. 32*(1), 165-170.

Vichitvanichphong, S., Talai-Khoei, A., Kerr, D., Ghapanchi, A.H. (2018) Adoption of assistive technologies for aged care: A realistic review of recent studies. In *Proceedings of the Annual Hawaii International Conference on System Sciences.*

von der Pütten, A. M., Krämer, N. C., & Eimler, S. C. (2011). Living with a robot companion: empirical study on the interaction with an artificial health advisor. In *Proceedings of the 13th International Conference on Multimodal Interfaces* 2011(1).327-334.

von Lautz, A., & Maier, S. (2011). Autonomy, Decisions, and Free Will, *Cognitive Process, 12*(3), 311-313.

Wada, K., Shibata, T., Saito, T., & Tanie, K. (2002 a.). Robot assisted activity for elderly people and nurses at a day service center. *In Proceedings of IEEE International Conference on Robotics and Automation.* 1(5).

Wada, K., Shibata, T., Saito, T., Tanie, K.(2002 b.). Analysis of factors that bring mental effects to elderly people in robot assisted activity, *IEEE/RSJ International Conference on Intelligent Robots and Systems.* 2002(2), 1152-1157.

Wada, K., Shibata, T., Saito, T., Tanie, K., Tu, & Tu. (2002 c.). Effects of robot assisted activity for elderly people at day service center and analysis of its factors. In *Proceedings of the IEEE.* 92(1).

Wada, K., Shibata, T., Saito, T., Tanie, K., I. (2003b). Psychological and social effects of robot assisted activity to elderly people who stay at a health service facility for the aged. In *2003 IEEE International Conference on Robotics and Automation, Proceedings. 1(3),* 3996-4001.

Wada, K., Shibata, T., Saito, T., Tanie, K. (2004). Effects of robot assisted activity for elderly people and nurses at a day service center. In *Proceedings of the IEEE*. 92(11), 1780-1788.

Wada, K., Shibata, T., Saito, T., Sakamoto, K., & Tanie, K. (2005). Robot assisted activity at a health service facility for the aged for 17 months - An interim report of long-term experiment. *IEEE Workshop on Advanced Robotics and its Social Impacts.* 2005(1), 127-132.

Wada, K., & Shibata, T. (2007). Living with seal robots - Its sociopsychological and physiological influences on the elderly at a care house. *IEEE Transactions on Robotics, 23*(5), 972-980.

Wada, K., Shibata, T., Asada, T., & Musha, T. (2007). Robot Therapy for Prevention of Dementia at Home - Results of Preliminary Experiment, *Journal of Robotics and Mechatronics, 19*(6), 691-697.

Wada, K., Shibata, T. (2007). Social effects of robot therapy in a care house - Change of social network of the residents for two months. In *Proceedings of the 2007 IEEE International Conference on Robotics and Automation, 1(10),*1250-1255.

Wada, K., & Shibata, T. (2009). Social Effects of Robot Therapy in a Care House - Change of Social Network of the Residents for One Year, *Journal of Advanced Computational Intelligence and Intelligent Informatics, 13*(4), 386-392.

Wada, K., Ikeda, Y., Inoue, K., & Uehara, R. (2010, September). Development and preliminary evaluation of a caregiver's manual for robot therapy using the therapeutic seal robot Paro. In *19th International Symposium in Robot and Human Interactive Communication.* 2010(1), 533-538.

Walsh, F. J. (2009). Human-animal bonds I: The relational significance of companion animals, *Family Process. 48*(4), 462-480.

Walsh, K., Scharf, T., & Keating, N. (2017). Social exclusion of older persons: a scoping review and conceptual framework, *European Journal of Ageing, 14*(1), 81-98.

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

Wilson, C., & Barker, S.B., (2003). Challenges in designing human-animal interaction research. 47(1). 16-28.

Workers, C. A. (2005). *Code of Ethics*. [Online]. http:// www.casw-acts.ca/index.html.

Yaffe, K., Fox, P., Newcomer, R., Sands, L., Lindquist, K., Dane, K., & Covinsky, K. (2002). Patient and caregiver characteristics and nursing home placement in patients with dementia, *JAMA, 287*(16), 2090-2097.

Yesavage, J.A. (1988). Geriatric Depression Scale. Psychopharmacology Bulletin, 24(1), 709-711.

Baptist, A. P., & Nyenhuis, S. M. (2018). Rhinitis of the Elderly. In *Rhinitis and Related Upper Respiratory Conditions.* 123-136.

Springer, Cham.Yu, R., Hui, E., Lee, J., Poon, D., Ng, A., Sit, K., … & Woo, J. (2015). Use of a Therapeutic, Socially Assistive Pet Robot (PARO) in Improving Mood and Stimulating Social Interaction and Communication for People With Dementia: Study Protocol for a Randomized Controlled Trial, *JMIR Research Protocols, 4*(2), e45.

Zafrani, O., & Nimrod, G. (2019). Towards a Holistic Approach to Studying Human-Robot Interaction in Later Life, *Gerontologist, 59*(1), 26-36.

Zunzunegui, M. V., Alvarado, B. E., Del, S. T., & Otero, A. (2003). Social networks, social integration, and social engagement determine cognitive decline in community-dwelling spanish older adults, *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, *58*(2), 93-100.

Appendix 1.

The purpose of Chapter 2 is to identify the ways A-SARs are used in institutionalized elder care. This chapter provides a contextual grounding of the lived experience that elderly individuals, caregivers, family members, and researchers had when they used A-SARs in eldercare. This chapter will set the applied groundwork and context for the identification of ethics-based considerations in the next section.

2.1 Methods

Type of Literature - Articles that examined research with animal-like SARs for institutional eldercare. Qualitative, quantitative, and mixed methods were all considered for this literature review.

Inclusion Criteria – Publications in English or French and were on A-SAR use in institutional care for elderly individuals. There were no limitations placed on where the study took place since the innovation of A-SARs is relatively new, and few countries have not incorporated these SARs on a large scale or based on national policies. Since socially assistive robots were first exhibited to the public around the year 2001 (Wada, Shibata, Saito, Tanie, Tu, et al., 2002), all articles that were published in 2001 and later.

Exclusion Criteria - Articles on SIR or SARs without an animal-like form or focused on how design engineers built the mechanics of the A-SAR. Although it is relevant to understand how the choices in design lead to usage, this literature review focuses on the practicability of using A-SAR by caregivers. Studies that simply assessed the SAR's accessibility to elderly users without clinical outcomes were a technical report or were concerned with the mechanical design was excluded. Studies targeting cost, or those that included healthy older adults were excluded.

Search strategies - The databases Ageline, PubMed, PsycInfo, Web of Science, IEEE digital library, and CINAL Plus via Embase were scanned from 2001 to 2019 in October and November of 2019. The database search query was composed of three search concepts: 1) the context (elderly care), 2) and the intervention (robot), and 3) the dimension (companion and social assistance). The free words used for the context included: 'elder*,' 'senior*,' 'older person*,' 'old people'; their associated MeSH term was 'Aged+', '65 and over', 'Gerontologic Care'. Free-

text terms for the intervention included: 'service robot*,' 'therapeutic robot*' and 'socially assistive robot*'; their associated MeSH terms were 'Robotics' and 'Artificial Intelligence.' Additionally, free words such as 'companion,' 'loneliness,' and 'caregiver*.' The use of the asterisk (*) enables the word to be a prefix. For example, 'elder*' will represent 'elderly' and 'eldercare,' among others. The total number of original articles from the six databases is reported in Table, along with the search date.

Table A1. Table Search Strategy by Database for the Use of A-SARs in Institutional Eldercare

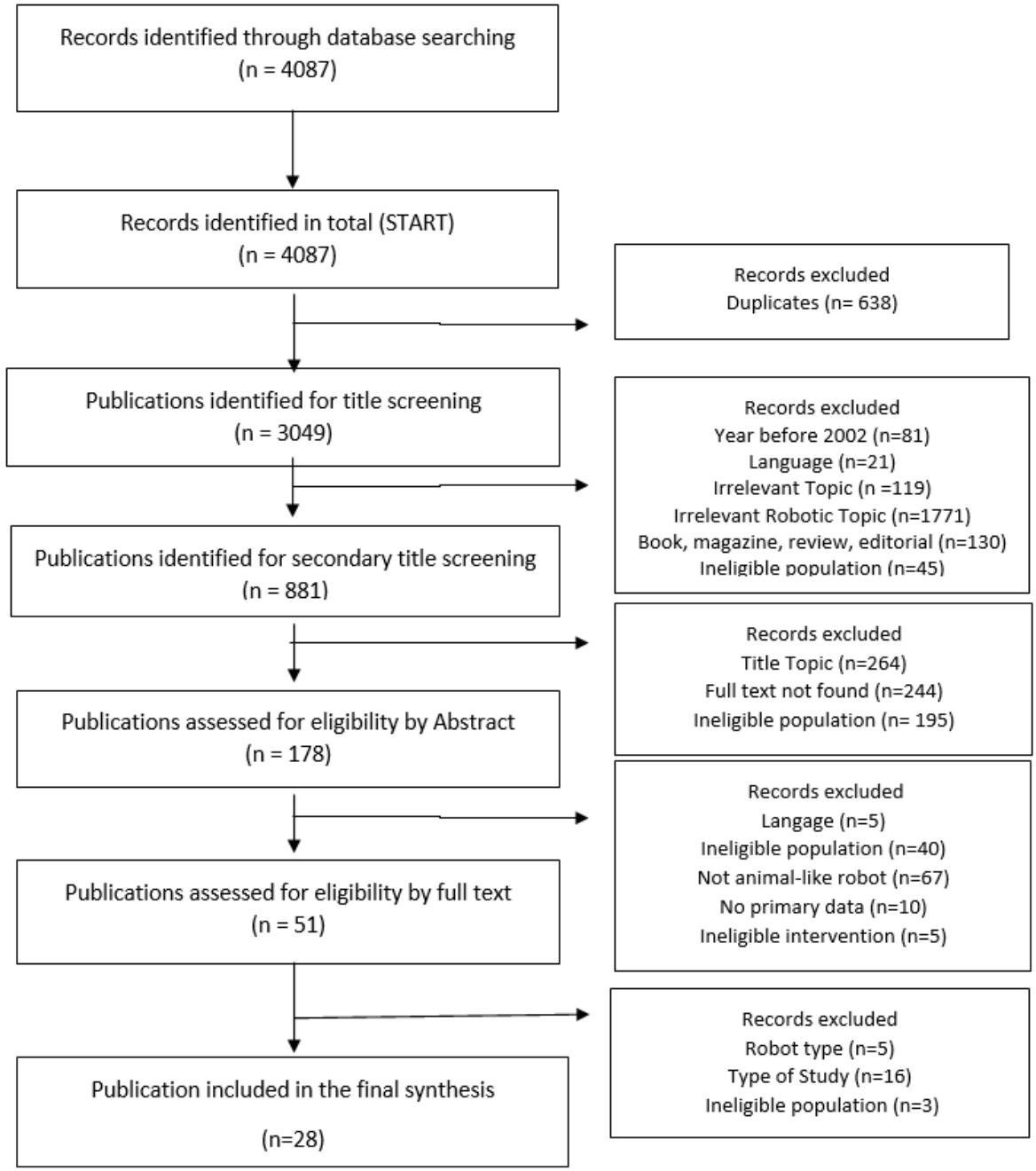
6 databases	Date	Search Strategy	Number of Articles
Ageline	09.10.2019	Elderly or aged or older or elderly or geriatric or elderly people or old people or senior AND robo* or robopet* or robotic or artificial intelligence or "animal-like" or robotics or gerontechnology AND compassion or compassionate care or empathy or companion or social* or loneliness or exclusion or wellbeing or conversation or inclusion or "socially assistive" or assist	451
Pubmed	09.05.2019	(((aged[mesh] OR elder*[tiab] OR senior[tiab] OR seniors[tiab] OR geriatric*[tiab] OR older adult*[tiab] OR old age[tiab] OR frail*[tiab] OR older people[tiab] OR older person*[tiab])) AND (robotics[mesh] OR robo*[tiab] OR robopet*[tiab])) AND (compassion*[tw] OR care[tw] OR caregiv*[tw] OR companion*[tw] OR social*[tw] OR loneliness[tw] OR exclusion[tw] OR well being[tw])	1304
Psych	11.01.2019	(aged OR elder*[tiab] OR senior[tiab] OR seniors[tiab] OR geriatric*[tiab] OR older adult*[tiab] OR old age[tiab] OR frail*[tiab] OR older people[tiab] OR older person*[tiab])) AND robotics[mesh] OR robo*[tiab] OR robopet*[tiab] or gerontechnology[tiab] AND (compassion*[tw] OR care[tw] OR caregiv*[tw] OR companion*[tw] OR social*[tw] OR loneliness[tw] OR exclusion[tw] OR well being[tw])	360
Web of Science	11.01.2019	TS=(aged*) OR TS=(elder*) OR TS=(geriatric) OR TS=("older people") OR TS=("lonely seniors") OR TS=(65+) OR TS=(80+) AND TS=(compassion*) OR TS=(companion*) OR TS=(assistive care) OR TS=(emotion*) OR TS=(social) OR TS=(loneliness) OR TS=(wellbeing) OR TS=(exclusion*) OR TS=(caregiv*) AND TS=(robot*) OR TS=("care robot") OR TS=(gerontechnology) OR TS=(robo*) OR TS=(animal-like) OR TS=("animal like")	1090
IEEE	11.10.2019	((("All Metadata":aged OR elder* or senior* or geriatric OR "older adult" OR "old age" OR frail OR vulnerable) AND "All Metadata":robot OR "artificial intelligence" OR robo* OR animal-like OR gerontechnology) AND "All Metadata":compassionate OR caregive* OR companion OR "socially assistive") aged OR elder* or senior* or geriatric OR "older adult" OR "old age" OR frail OR vulnerable) 11,187 journals AND robot OR "artificial intelligence" OR robo* OR animal-like OR gerontechnology 53, 955 journals AND compassion* OR caregiv* OR companion OR "socially assistive" 10,830 journals	664
Cinahl	11.10.2019	(MH "Aged+") OR (MM "Aged, 80 and Over") OR (MM "Gerontologic Care") AND (MH "Robotics+") OR (MM "Artificial Intelligence") OR robot* or robotic or artificial intelligence or ai or gerontechnology or robopet or animal-like" AND (MM "Quality of Life") OR (MM "socially assistive care") OR (MM "Age Specific Care") OR Empathy OR (MM "Companion") OR (MM "Animal Therapy") OR loneliness OR exclusion OR wellbeing OR caregiv* OR (MM "Social Isolation") OR (MM "Gerontologic Care") OR (MM "Caregiver Support") OR (MM "Caregiver Role Strain (Saba CCC)")	218
		Total	4087

Data Extraction, Synthesis, and Analysis - Following an in-depth reading of the results section of all, including articles, data were organized into sections that sub-divided the main objective of the review. The reviewer (EW) independently screened the publications in a three-step assessment process: the title, abstract, and full text and selection followed inclusion criteria. First, articles were read and coded to extract data. Second, identified constructs emerged

directly from the research findings. Third, articulated patterns and themes in the evidence developed a review of the literature.

Appendix 2.

Figure A2. Electronic Search for Literature Identification and the Selection Process on the Use of A-SARs in Institutional Eldercare (after Liberati et al., 2006)



Appendix 3.

Table A3. Categorization on the Use of A-SARs in Institutional Eldercare by SAR Type, User, Therapeutic Tool or Companion Animal, Key and Specific Terms

Reference Author, Year		**Location**	**A- SAR**	**Code User groups**	**Usages Key Terms**	**Usage Terms Specific to Article**
(Baisch, 2017)	1	Germany	PARO	E	Companionship Psychosocial functioning Psychosocial wellbeing Social network	Communication Self-image User-technology fit Meaningful occupation
(Bemelmans, 2015)	2	Netherlands	PARO	E C	Psychological wellbeing Psychosocial functioning	Hygiene
(Bemelmans, 2016)	3	Netherlands	PARO	E C F	Psychogeriatric care Social network Physical care	Facilitating caring activities Workload / Practical Feasibility Discomfort of Family
(Birks, 2016)	4	Australia	PARO	E C F	Psychogeriatric care Social network Emotional benefit Caring bond / Behavioural Emotions Wellbeing	Naming 'George' Powerful interaction Dismissive Good social mediator QoL
(Bradwell, 2019)	5	England	PARO	E C	Psychogeriatric care Social network	Function / Believability Realistic / Ownership

					Emotional engagement	
(Joranson, 2016)	6	Norway	PARO	E	Social network Psychological wellbeing Emotional engagement Social engagement Social interaction	Communication Meaningful occupation 'icebreaker'
(Joranson, 2016)	7	Norway	PARO	E C	Wellbeing Social engagement Emotional engagement Meaningful interaction	QoL Control over life Maintaining relationships Tension and Negative Behaviour
(Lane, 2016)	8	USA	PARO	E C	Social engagement Behavioural changes Emotional engagement Psychological wellbeing	Ownership / Visitation Behaviour Alignment Isolated /Tension and Negative Behaviour
(Liang, 2017)	9	New Zealand	PARO	E R C	Behavioural changes Emotional engagement Social engagement Social network	Blood pressure, salivary cortisol Depressive Symptoms Anxious / a sense of purpose
(Moyle, 2016)	10	Australia	PARO	C E R	Psychological wellbeing Social network	Loving personalities Hygiene

					Emotional engagement Gender differences	
(Moyle, 2019)	11	Australia	PARO	C E F	Psychological wellbeing Social network Emotional engagement Social engagement Emotional intimacy Workload	Companionship Something to love Social interaction Cost / Memories/ Responsibility Ownership
(Moyle, 2013)	12	Australia	PARO	E	Emotional engagement Workload Loneliness	QoL Apathy Evaluation
(Robinson, 2016)	13	New Zealand	PARO	E C	Psychological wellbeing Emotional Engagement Social engagement Social network	Artificial agent 'ice-breaker' Conversational
(Robinson, 2013)	14	New Zealand	PARO	E	Psychosocial effect Emotional engagement Social engagement Social network	QoL Depression/ Loneliness Increased communication Relationships between others
(Takayanagi, 2014)	15	Japan	PARO	E C	Psychosocial effect Social network Communication	Communication Words of appreciation
(Thodberg, 2016)	16	Denmark	PARO	E C	Wellbeing Communication	Comparing Human -robot Comparing Human- animal

				R	Emotional engagement Social engagement	Interest Cognitive stimuli / eye contact
(Wada, 2007)	17	Japan	PARO	E	Social networks Communication Social engagement Emotional engagement	Social networks Social interaction Interest
(Wada, 2005)	18	Japan	PARO	E	Emotional engagement Social engagement Social support Communication	Interest Empathy / Personalizing Human-Human relationship
(Chang, 2015)	19	USA	PARO	E C R F	Social mediation Gender differences Social interaction Interaction Communication	Social facilitator Human-Human relationship Human-robot interaction Imaginative engagement Confident Personal reflection Relational artifact
(Marti, 2006)	20	Japan	PARO	E R	Social mediation Emotional engagement Social engagement Therapeutic use Communication	Familiarization/ favouring the socio-relational exchange / Shift of attention / Meaningful emotional experience and emotional exchange Externalizing inner emotional states for a 'common ground'
(Iacono, 2016)	21	USA	PARO	E C	Imaginative engagement Emotional engagement Social engagement	Narrative and storytelling Interest and intent Attributing a greater backstory and attributing emotions

(Banks, 2008)	22	USA	NeCoRo	E	Wellbeing	Feelings of security and closeness Human – Dog Human-Robot
(Libin, 2004)	23	USA	JustoCat	E	Emotional engagement Social engagement Psychological wellbeing	QoL Human- Cat: Human -Robo for no difference in levels
(Libin, 2004)	24	USA and Japan	JustoCat	E R	Psychological wellbeing Emotional support Social support Wellbeing	Artificial partner Interactive agents Social agents creating relationships Play, express love, not bored, engaged, happy
(Gustafsson, 2015)	25	Sweden	CuDDler	E F	Emotional engagement Therapeutic use Social engagement Wellbeing Emotional intimacy	Reminiscent therapy Human- Human/ Human-Robot Connection to something alive, Play, Joy, social connectedness Feelings of satisfaction and family engagement
(Moyle, 2015)	26	Singapore	PARO	E C R	Emotional engagement Gender differences Research	Introduction. Discovery, Engagement. Closure Tolerability, Feasibility Impact on self-image
Sabanovic, 2013)	27	USA	PARO	R	Therapeutic and social purposes	Sensory Therapy Human-Human Human-Robot

Legend

E: Elderly individuals

C: Caregivers

F: Family

R: Researcher