Tensions and antagonistic interactions of risks and ethics of using robotics and autonomous systems in long-term care

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**Appendix: Contexts and Characteristics of Studies Included in the Systematic Review**

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| **No** | **Study name/author(s)** | **Country** | **Methods/ design of the study** | **Population of interests** | **Types of long-term care setting** | **Types of robotics/ autonomous systems** |
| 1 | Robot Caregiver or Robot-Supported Caregiving? The Performative Deployment of the Social Robot PARO in Dementia Care (Pfadenhauer and Dukat, 2015) | Germany | Observational and qualitative study | Older people with dementia | Dementia care setting | Social robots (humanoid and non-humanoid) |
| 2 | Attitudes towards care robots among Finnish home care  personnel – a comparison of two approaches (Rantanen et al., 2018a) | Finland | Cross-sectional study using survey questionnaire | Home-care personnel | Home-based care setting | Care robots |
| 3 | The adoption of care robots in home care—A survey on the attitudes of Finnish home care personnel (Rantanen et al., 2018b) | Finland | Cross-sectional study using survey questionnaire | Home-care personnel | Home-based care setting | Care robots |
| 4 | What Is Robot Ethics? (Scheutz, 2013) | N/A | Conceptual study | Various stakeholders in the long-term care system | N.A. | Autonomous robots |
| 5 | Care, monitoring, and companionship: views on care robots from older people and their carers (Jenkins and Draper, 2015) | UK, France, The Netherlands | Qualitative study (focus group discussion) | Older people from the general population, formal and informal carers | N.A. | Care robots |
| 6 | Social robotics, elderly care, and human dignity: a recognition-theoretical approach (Laitinen et al., 2016) | Finland | Conceptual study | Older people from the general population | N.A. | Social robots (humanoid and non-humanoid) |
| 7 | What effect does an animal robot called CuDDler have on the engagement and emotional response of older people with Dementia? A pilot feasibility study (Moyle et al., 2016) | Australia | Qualitative study (participant observations and in-depth individual interviews) | Older people with dementia | Residential care setting (nursing homes) | Companion robots |
| 8 | Robots and people with dementia: unintended consequences and moral hazard (O’Brolchain, 2017) | Ireland | Conceptual study | Older people with dementia | Dementia care setting | Social robots (humanoid and non-humanoid) |
| 9 | Ethical design of intelligent assistive technologies for dementia: a descriptive review (Ienca et al., 2018) | N.A. | Literature review | Older people with dementia/ Alzheimer’s disease | Dementia care setting | Intelligent assistive technology (IAT) |
| 10 | Legal issues for mobile servant robots (Fosch-Villaronga and Virk, 2017) | Italy | Single country Case study | Various stakeholders in the long-term care systems | All aged-care settings | Mobile servant robots |
| 11 | Robots and the division of healthcare responsibilities in the homes of older people (Jenkins and Draper, 2014) | UK, France, The Netherlands | Qualitative study (focus group discussion) | Older people from the general population, formal and informal carers | N.A. | Care robots |
| 12 | Ethical dimensions of human-robot interactions in the care of older people: insights from 12 FG convened in the UK, France and the Netherlands (Draper et al., 2014) | UK, France, The Netherlands | Qualitative study (focus group discussion) | Older people from the general population, formal and informal carers | N.A. | Care robots |
| 13 | Ethical values and social care robots for older people: an international study (Draper and Sorell, 2017) | UK, France, The Netherlands | Qualitative study (focus group discussion) | Older people from the general population, formal and informal carers | N.A. | Care robots |
| 14 | Review: Seven matters of concern of social robots and older people (Frennert and Östlund, 2014) | N.A. | Literature review | Older people from general population | N.A. | Social robots (humanoid and non-humanoid) |
| 15 | Could robots become authentic companions in nursing care? (Metzler et al., 2015) | N.A. | Literature review | Older people in nursing homes | Residential care setting | Care robots |
| 16 | The ethics of robotic caregivers (Etzioni and Etzioni, 2017) | N.A. | Conceptual study | Older people from general population | N.A. | Humanoid robots, chatbot, person care robots |
| 17 | Social and assistive robotics in dementia care: Ethical recommendations for research and practice (Ienca et al., 2016) | N.A. | Conceptual study | Older people with dementia/ Alzheimer’s disease | Dementia care setting | Rehabilitation robots, service robots, telepresence robots, companion robots |
| 18 | Long-term care and technological innovation: the application and policy development of care robots in Taiwan (Chou et al., 2018) | Taiwan | Single country case study | Various stakeholders in the long-term care system | N.A. | Assistive robots, monitoring robots, companion robots |
| 19 | European regulatory framework for person carrier robots (Fosch-Villaronga and Roig, 2017) | EU | Literature review | Various stakeholders in multiple European long-term care systems | All aged-care settings | Person Carrier Robots |
| 20 | Service innovation using social robot to reduce social vulnerability among older people in residential care facilities (Khaksar et al., 2016) | Australia | Mixed methods study (key informant interviews followed by and questionnaire survey) | Aged care specialists | Residential care setting | Social robots (humanoid and non-humanoid) |
| 21 | The use of care robots in aged care: A systematic review of argument-based ethics literature (Vandemeulebroucke et al., 2018) | N.A. | Systematic review | Various stakeholders from multiple long-term care systems | Community-based and institutional/ residential are settings | Care robots |
| 22 | Robot carers, ethics and older people (Sorell and Draper, 2014) | UK | Conceptual study | Older people from the general population, formal and informal carers | N.A. | Social robots (humanoid and non-humanoid), virtual visiting |
| 23 | The autonomy-safety paradox of service robotics in Europe and Japan: a comparative analysis (Matsuzaki and Lindermann, 2016) | Japan, EU | Comparative cross-country case study | Various stakeholders in Europe’s and Japan’s long-term care systems | N.A. | Service robots |
| 24 | Granny and the robots: ethical issues in robot care for elderly (Sharkey and Sharkey, 2012) | N.A. | Conceptual study | Various stakeholders in the long-term care system | All aged-care settings | Assistive robots, companion robots |
| 25 | Social robots and seniors: a comparative study on the influence of dynamic social features on human-robot interaction (Moro et al. 2018) | Canada | Qualitative study (video-recording and semi-structured interviews) | Older people with mild cognitive impairments | Residential care setting (nursing home) | Social robots (humanoid) |
| 26 | Designing commercial therapeutic robots for privacy preserving systems and ethical research practices within the home (Sedenberg et al. 2016) | N.A. | Conceptual study | Various stakeholders in the long-term care system | N.A. | Therapeutic care robots |
| 27 | Robots and human dignity: a consideration of the effects of robot care on the dignity of older people (Sharkey 2014) | N.A. | Conceptual study | Various stakeholders in the long-term care system | All aged-care settings | Assistive robots, monitoring robots, companion robots |
| 28 | A literature review on new robotics: automation from love to war (Royakkers and van Est 2015) | Europe and the US | Literature review | Various stakeholders in the long-term care system | All aged-care settings | Care robots |
| 29 | Ethics of healthcare robotics: Towards responsible research and innovation (Stahl and Coeckelbergh 2016) | N.A. | Conceptual study | Various stakeholders in the long-term care system | N.A. | Care robots |
| 30 | Design for acceptability: improving robots’ coexistence in human society (Salvini et al. 2010) | NA | Conceptual study | Various stakeholders in the long-term care system | N.A. | Service/care robots |
| 31 | Caregiving robots and ethical reflection: the perspective of interdisciplinary technology assessment (Decker 2008) | NA | Conceptual study | Various stakeholders in the long-term care system | N.A. | Care robots |
| 32 | Can a service robot which supports independent living of older people disobey a command? The views of older people informal carers and professional caregivers on the acceptability of robots (Bedaf et al. 2016) | UK, France, The Netherlands | Qualitative study (Focus group discussion with | Older people, informal carers and care professionals | Home-based care setting | Service/care robots |
| 33 | Legal regulations and public policies for next-generation robots in Japan (Nambu 2016) | Japan | Single country case study | Various stakeholders in the Japan’s health and long-term care system | N.A. | Physical assistance robots (wearable exoskeletal robots for rehab and motion assistance), mobility robots |