


Implementation and impacts of virtual team-based care planning for older persons in formal care settings: A scoping review

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Abstract

Objective: This scoping review aimed to summarize current knowledge about the implementation, impacts, facilitators and barriers of virtual team-based care planning for older persons in formal care settings (e.g. home and community, primary, long-term and acute care).

Methods: The Joanna Briggs Institute (JBI) methodology was used. The Arksey and O'Malley and Levac, Colquhoun, and O'Brien methodologies provided additional frameworks. Databases accessed included PubMed, EMBASE, CINAHL, AgeLine, PsycInfo and Scopus. Reference lists of selected articles and grey literature retrieved through Google and Google Scholar were also reviewed. Three researchers screened titles, abstracts and conducted full-text reviews. Extracted data were mapped in a table and analysed for summative themes. Older persons and family partners assisted in interpreting findings based on their lived experiences.

Results: A total of 27 studies were included. Virtual team-based care planning led to many positive outcomes for older persons (e.g. decreased depression, reduced falls and improved medication management) and their families (e.g. reduced caregiver stress and improved caregiving skills). Only four studies reported the involvement of older persons and/or families in virtual team-based care planning. Multiple barriers to adopting virtual team-based care planning were found including lack of education/training for older persons and families in using technology.

Conclusion: Despite the multiple advantages that virtual team-based care planning offers for older persons and families, it is important to ensure that this care can be offered to all. There is a need to ensure that health equity is addressed to promote access to care and respond to social determinants of health.

Keywords

virtual care, team-based care planning, older persons, family, healthcare providers, formal care settings

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Introduction

The COVID-19 pandemic has led to greater implementation and recognition of the role of virtual care to ensure continued access to timely and safe delivery of healthcare services. Virtual care involves remote care delivered using videoconference, audio conference or telephone technologies. Prior to the pandemic, there was a low rate of adoption of technologies for virtual care despite strong policies and evidence supporting its effectiveness.¹ The hesitancy to adopt virtual care may relate to perceptions of complex change that would conflict with long-established work

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practices.² For instance, funding for virtual visits was an issue in the Canadian health care system due to lack of billing codes for services provided over email or secure messaging, and lack of separate billing codes for telephone visits and video visits.³ Despite difficulties in adopting virtual care, its effectiveness and efficiency are supported by numerous studies. Previous research in Australia, the United States and Norway reported benefits of virtual care for older persons and families including increased access to specialists and interdisciplinary teams to better manage multiple comorbidities, improved transitions in care from a hospital setting to long-term care (LTC) home and from hospital services to primary care services and reduced caregiver burden by eliminating the need for travelling to appointments.^{2,4-8}

As the COVID-19 pandemic necessitated a shift towards virtual care, it is essential that virtual care interventions provide not only safe and effective care, but person-centred care for older persons and family care partners.^{8,9} Person- and family-centred care is defined as equal partnerships between older persons, families and healthcare providers with the aim of improved planning, provision and monitoring of health and social services to address individual needs, preferences and goals.¹⁰⁻¹² Person-centred care provides individuals with the knowledge and power to actively participate in decision-making and ultimately engage in the management of their own health more effectively.⁸ For older persons, it is an invaluable tool for addressing long-term and complicated healthcare needs while focusing on each individual's goals and values.⁸ In light of these benefits that focus on tailored and holistic care, it is important that healthcare teams ensure they also apply principles of person- and family-centred care throughout the virtual care planning process.

In order to provide person- and family-centred care, it is necessary to address and eliminate potential barriers that impact access and use of care such as poor technological literacy or inaccessible funding for virtual care. Virtual care provides clinicians with the ability to reach older persons with few support networks and who are facing challenges with health, transportation and out-of-pocket expenses.¹³ As well, virtual care can increase connections between older persons, family/care partners and clinicians to reduce social isolation experienced by older persons who are homebound.¹⁴ Engaging older persons and families during virtual care should include early and collaborative discussions on what matters most to older persons and families.^{9,12,15} Facilitators to implementation of virtual care include technological training and support for providers and older persons and implementing on-site care champions. Although virtual care can increase access for many older persons, it is important to acknowledge that the implementation of virtual care into our existing health care model may also encounter barriers including lack of broadband internet, devices and low technological literacy.¹⁵

Virtual care also supports interdisciplinary team-based care planning by enhancing interdisciplinary team communication, continuity of care and collaborations between specialists such as geriatricians and primary care physicians.^{2,16,17} A team-based approach to care is recommended for older persons to ensure that complex social and healthcare needs are being addressed through holistic practices that engage older persons and families.¹⁸ The increased access to team-based care for older persons living in rural and remote areas is particularly effective at targeting the rural/urban divide that is often associated with poorer health outcomes due to delays in receiving timely care and availability of nearby specialists.^{7,19,20} Virtual team-based care may also help older persons feel connected with a larger team that is invested in supporting them.²¹

In-person team-based and person-centred care for older persons is well-researched. However, there is limited research on the implementation process of virtual team-based care planning for older persons.^{22,23} Holistic person-centred care approaches invite older persons and families to share their goals at interdisciplinary team meetings and have become more common in recent years.²⁴ In order to ensure comprehensive care planning, there is a need to better understand the facilitators and barriers to successful implementation of virtual care. One example of a facilitator is engaging older persons and care partners at all stages during the development and implementation of virtual care intervention.²⁵

An example of an interdisciplinary team-based care planning model is PIECES™ (PIECES), which consists of a holistic clinical assessment framework originally designed for use by interdisciplinary teams to address the complex physical and mental health needs of older persons.²⁶ PIECES was created 25 years ago in Ontario, Canada, as an LTC initiative to better address the needs of older persons.^{26,27} PIECES is an acronym reflecting an individual's Physical, Intellectual, and Emotional health, maximizing the Capabilities of an individual to support quality of life, integrating the living Environment of a person and encompassing a person's Social circumstances including beliefs, culture and life story.²⁶ PIECES has been implemented by interdisciplinary teams nationally in Canada and in diverse settings, including acute care, LTC, home and community care, complex continuing care and mental health settings to find solutions in addressing responsive behaviours among older persons. Responsive behaviours consist of words, sounds or actions expressed by persons with dementia to convey their physical and emotional needs.²⁸ These behaviours can be manifested through hitting, yelling, repetitive words or sounds, agitation and restlessness.²⁹

To date, there are only four published articles exploring the implementation and evaluation of PIECES for older persons.³⁰⁻³³ In LTC, PIECES has led to an increased ability of staff to recognize and address mental health

challenges and social behaviours, greater number of comprehensive assessments of older persons using a variety of existing tools, increased relationships between LTC homes and external resources and improved family satisfaction with care delivery.^{31,33} In acute care hospital settings, PIECES improved interdisciplinary collaboration between different disciplines, promoted holistic assessment of older persons and encouraged problem-solving when addressing responsive behaviours.^{30,33} Previous applications of PIECES in-person have improved recognition and early management of responsive behaviours, staff-family communication, however, none of these models were virtual. As a result, there is no knowledge of the implementation of the PIECES model within a virtual context.

The findings of this scoping review for implementing virtual team-based care planning were used to support the Healthcare Excellence Canada – LTC + Acting on Pandemic Learning Together and Implementation Science Teams – Strengthening Pandemic Preparedness in LTC initiatives. This project was implemented in collaboration with researchers and professional organizations across Canada such as Pieces Canada, Registered Practical Nurses Association of Ontario (WeRPN) and Strategy for Patient-Oriented Research (SPOR) Support Unit to implement the PIECES approach using a novel virtual intervention in two Canadian LTC homes. As part of implementation science research processes, various stakeholders were engaged in this research, including older persons and family, registered practical nurses (RPNs) and directors of LTC homes. The findings of this scoping review on virtual team-based care planning helped to inform the novel implementation of virtual PIECES, including which impacts and outcomes should be highlighted, and which facilitators may enhance its success.

Objective and research questions

The objective of this scoping review was to identify the depth and breadth of current knowledge on virtual team-based care planning for older persons implemented in formal care settings. The specific research questions were (1) What has been reported in the literature on the impact or outcomes of the implementation of virtual team-based care planning in formal care settings (e.g. primary care, hospitals, home care, community care and LTC) for older persons aged 60 years or older, families, interdisciplinary teams and organizations/systems? (2) What are the facilitators and barriers to implementation of team-based virtual care?

Methods

The Joanna Briggs Institute (JBI) methodology was used to conduct this scoping review.³⁴ Alongside the Preferred Reporting Items for Systematic Reviews and

Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) checklist, the JBI methodology provided the framework for study development, search execution and analysis of the landscape of literature.^{34,35} All steps in the JBI methodology were followed. Therefore, research questions and inclusion criteria were developed using the Participants, Concepts, and Context (PCC) mnemonic, the search was conducted with the JBI three-step search strategy, a review protocol was published, data were charted/extracted using a template and analyzed qualitatively using NVivo 1.0 and results were presented using tables and a narrative summary.³⁶

Although the JBI methodology was selected for this review, other scoping review frameworks were consulted for valuable additional guidance. As per the Levac et al. extension of the Arksey and O'Malley framework, this study utilized a multidisciplinary team during study selection, qualitative data analytical techniques while summarizing results, and stakeholder consultation during the study.^{37,38} The Arksey and O'Malley framework provided additional guidance on identifying the research question and using a numerical summary of the studies when reporting results.³⁷ An expanded description of the scoping review methodology can be found in the study protocol.³⁹

A scoping review methodology was selected to summarize the available literature on impacts and facilitators of virtual team-based care interventions to inform the novel implementation of virtual PIECES and enhance its success.^{34,40,41} This scoping review was conducted by a team of researchers, trainees, older persons, family care partners and clinicians with experience working in acute care, LTC and community and home care. HG and MY conducted literature searches and reviewed the articles with MH based on inclusion criteria. These trainees were supported by an experienced researcher, DC. This study's engagement of older persons and family care partners is reported under the section 'Patient and public involvement'. Through regular meetings, research team members were engaged in analysing data and revising themes. The entire research team reviewed, revised and approved the final manuscript.

Inclusion and exclusion criteria

The inclusion criteria for the scoping review were framed using the PCC mnemonic as per the JBI methods.³⁴ With regards to Participants, studies that included older persons (aged 60 or older) were sought as older persons often require a higher level of care to meet complex needs with the presence of multiple chronic conditions.⁴² Older persons were defined as aged 60 or older as this age range is commonly used among other published reviews and facilitated an increase in the number of available articles to include in the review.^{34,43} Studies that involved interdisciplinary healthcare teams (i.e. teams involving

more than a single discipline), family/friend care partners and/or active older person/family participation in virtual care planning were also included.

Exclusion criteria were created conservatively to ensure relevance to study objectives and practicality. Studies not written in English, study protocols, conference abstracts and studies missing one or more PCC components (i.e. wrong intervention, wrong patient population, wrong outcomes or missing outcomes of implementation) were excluded.

This review focused on the Concepts of implementation and evaluation for virtual team-based care planning. Inclusion criteria focus on interdisciplinary care that involves multiple clinicians, older adults and family members. Moreover, reports must have involved a virtual setting (e.g. audio, video and mobile application). For Context, primary care, hospitals, home and community care, LTC and formal care settings were included.

Types of evidence and information sources

Published studies and grey literature written in English from 1980 to 2021 were searched. Articles from 1980 and beyond were included to meet the goal of capturing relevant ‘team-based care’ and ‘virtual’ (phone, video or text) articles. Specifically, multidisciplinary team care approaches did not become a common practice until the early or mid-1980s.^{44,45} Although early pioneers of telemedicine began working from the 1960s to 1970s, there were few studies until the 1980s, and early telemedicine was relatively different from modern telemedicine in terms of technology and likely practice.⁴⁶ The search for published studies was conducted using the following databases: PubMed, EMBASE, CINAHL, AgeLine, PsycInfo and Scopus. All types of study designs were considered including reviews, quantitative, qualitative and mixed-methods. Grey literature (e.g. newsletters, reports, articles, guidelines and theses) located with Google were considered for inclusion to ensure coverage of the current breadth of knowledge. Published and unpublished articles were searched using Google Scholar. A list of documents related to PIECES on the PIECES Learning Website was also searched, and PIECES experts were contacted to inquire about other relevant literature.

Search strategy

According to the JBI methodology, a three-step search strategy was used to determine search terms using key words and index terms from relevant articles to conduct a full search on the concept of ‘virtual team-based care planning for older persons in formal care settings’. The search terms and strategy were reviewed by a university librarian with expertise in conducting reviews. In the first step, initially, limited searches of two appropriate online

databases (PubMed and AgeLine) were conducted. For the second step, keywords and index terms were identified based on the initial search and used to conduct the final literature search in all data databases. Relevant articles consisted of those that included older persons in a formal care setting, engaged in a virtual setting and involved the implementation and evaluation of team-based care planning. Clinician types included physicians/geriatricians, specialists, pharmacists, social workers, nurses, physical therapists, occupational therapists and others. In the final step, reference lists of all articles and reports were hand searched. Through the three-step search strategy, the following search terms were generated and used: (Older adult* OR senior* OR older person*) AND (virtual* OR tele* OR video*) AND (team* OR care partner) AND (assess* OR evaluat* OR care OR goal*). See the scoping review protocol for a comprehensive breakdown of the three-step search strategy used and more details on the search strategy.³⁹

Study selection

Covidence, a review management software, was used to select studies and review results.⁴⁷ Titles and abstracts were screened by two independent reviewers (HG, MY). Afterwards, HG, MY and MH retrieved and assessed full-text articles for relevancy based on inclusion criteria. Reasons for article exclusion were documented. Conflicts regarding inclusion or exclusion of articles were resolved through group discussions which required that at least two of the three reviewers agreed before moving on. Final results of the search were reported using the PRISMA-SCR flow diagram (Figure 1) included in the ‘Results’ section.

Data extraction and analysis

Results were charted in a data extraction table (Table 2) from all included articles (n = 27). Then, data were analysed qualitatively using NVivo 1.0 to generate relevant themes that addressed the research questions.³⁶ HG, MY and MH extracted relevant logical and descriptive data into the data extraction table. The variables extracted were author, year, country of study location, type of evidence source and study design, study purpose, study population or participants and setting or context, intervention and relevant findings. Thematic analysis was conducted on all included articles using NVivo to identify common themes within the data.³⁶

Data synthesis

Extracted data were imported into a table and accompanied by a narrative summary in the ‘Results’ section to relate the extracted data to the research questions. Team analysis was

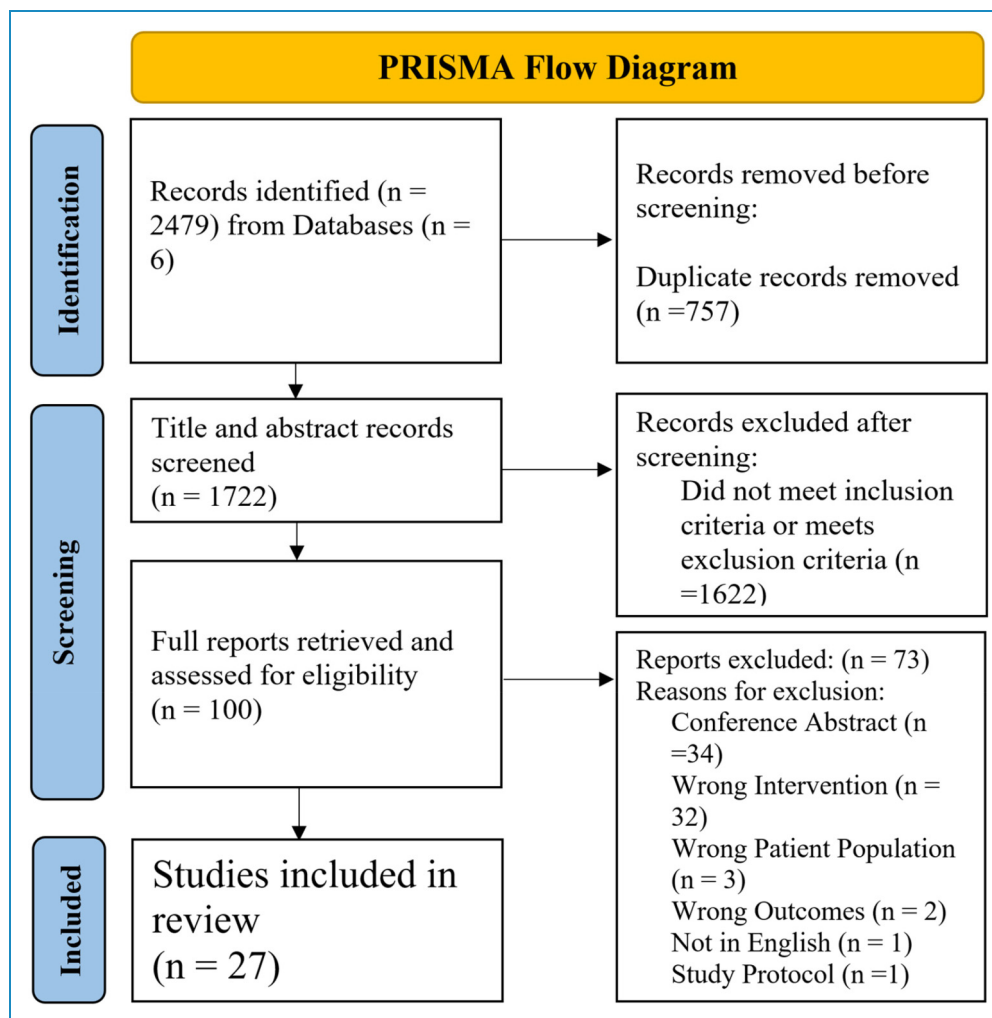


Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-SCR) flow diagram for the completed search.^{34,35}

conducted through a discussion of themes with resident and family partners, researchers and LTC directors. Pertinent findings were also used to inform the implementation of a virtual PIECES model and its evaluation.

Patient and public involvement

As suggested by Levac et al., this study included stakeholder consultation with LTC home clinicians (RPNs), directors, family/care partners and older person residents.³⁸ Stakeholders were recruited from our research team working on a study implementing a novel PIECES intervention in LTC. After data were analysed and thematic analysis performed, preliminary results were presented at three ZOOM videoconferencing meetings to inform the naming and discussion of themes. Stakeholder insights were reported and utilized to inform study discussion and conclusions.

Older persons and family/care partners participated in two ZOOM videoconferencing meetings (~45 minutes) to inform the naming and discussion of the themes developed from the data. Meetings consisted of a slideshow presentation on study results and pauses for questions/discussions throughout the presentation. One meeting included a member of the research team (MY) and two resident partners living in an LTC home. The second meeting was held with another member of the research team (HG) and one family partner who was supporting a family member in an LTC home. Clinicians and directors were engaged at a separate ZOOM research team meeting to discuss themes and findings.⁴⁸ Older persons, family members, clinicians and directors involved in this study were recruited from two LTC home partners in Southern Ontario, Canada through the Healthcare Excellence Canada – LTC + Acting on Pandemic Learning Together and Implementation Science Teams – Strengthening Pandemic Preparedness in LTC initiatives.

Results

Search results

A total of 2479 articles were located and 757 duplicates were removed. The titles and abstracts of a total of 1722 articles were screened against our inclusion criteria for relevance. Then, full-text screening of 100 articles was conducted for eligibility. A total of 27 articles were included in the review. See Figure 1 for the PRISMA-ScR flow diagram.

Overview of included studies

The studies included in this review were published between the years 1986 and 2021 with 92.6% of articles published in 2010 or later. A little over half of the studies were conducted in the United States (51.9%) (Table 1). The remainder of the studies was conducted in Canada (18.5%), Australia (18.5%) and other countries (i.e. France, Ireland, Portugal, Korea, China and Norway). Most of the interventions explored in the articles used only videoconferencing (33.3%) or a combination of videoconferencing and telephone/audio conferencing (25.9%). In terms of setting, the majority of interventions took place in home and community care (29.6%) and LTC (22.2%) settings. Although care may have only been delivered in one setting (e.g. home and community care), nearly all studies included collaborators such as specialists from other settings (e.g. specialty medical clinic team collaborating virtually with a primary care team).²¹ Most of the studies used a pilot study design to test preliminary or novel interventions (37%) and qualitative design (14.8%); however, there were a variety of research designs among the studies included for review. Percentages shown (Table 1) were calculated by dividing by the total number of included studies ($n = 27$). Therefore, percentages may not add up to 100% in each category. Data were extracted from all 27 included studies using a data extraction table (Table 2).

Overview of themes

Through a collaborative process with our research partners – older persons, health care professionals and family/care partners – themes were identified from the 27 included articles to address the research question about the use of virtual team-based care planning for older adults living in formal care settings. Results were shared with stakeholders and themes were named and discussed during team analysis at videoconferencing meetings. Five main categories for findings included clinical outcomes for older persons; outcomes for interdisciplinary teams; outcomes for organizations and care practices; feasibility and acceptability of virtual models; and facilitators and barriers to virtual delivery.

Within each of the five main categories, themes were developed based on findings (Table 3).

Clinical outcomes for older persons

Relevant studies on virtual team-based care planning with older adults suggested impacts on various clinical outcomes. Studies that discussed mental and physical health outcomes, medications and care transitions between services were summarized into the following themes: (a) improved mental and physical health; (b) efficient medication management; and (c) smooth care transition.

Improved mental and physical health

Mental health. Four articles reported on improved mental health outcomes such as antipsychotic use, depression scores and responsive behaviours.^{4,9,52,53} When ECHO-AGE (a remote case-based video consultation programme linking experts in behaviour management for patients with dementia to LTC providers) recommendations were followed (e.g. starting or stopping medications, behaviour plan changes, lab tests and referrals), LTC sites reported clinical improvements including decreased hospitalizations, use of antipsychotics, antidepressants, mood stabilizer and antihypertensives.⁵²

In an evaluation of the BRIGHTEN programme – an intervention including telephone, audio and asynchronous communication – the average depression scores of older persons were suggestive of depression at baseline.²¹ At the 6-month follow-up, there was a significant decrease in depressive symptoms and reduction in mean scores within the non-clinical range for depression.²¹ A significant reduction in mental distress symptoms was also found, suggesting an improvement in mental health functioning.²¹ In a subsequent study evaluating the BRIGHTEN programme, a similar significant decrease in depression scores was found in a sample of ethnically and socioeconomically diverse older persons.⁵³

When telemedicine was used for rehabilitation, reported outcomes included an increase in cognitive functioning (Mini-Mental State Exam) and episodic memory test scores.⁹ Despite the paucity of studies exploring caregiver outcomes, virtual team-based care planning suggested benefits for the mental health of both family and staff. In a review on telemedicine and dementia care, significant outcomes for families included improved scores on caregiver mastery scales.⁹ Additionally, Doyle et al. reported reduced family and staff carer stress through a videoconferencing case conference programme.⁴

Responsive behaviours (e.g. wandering, repetition, yelling, agitation and restlessness) are used by persons with dementia to convey their physical and emotional needs.³³ Studies reported that virtual care can decrease the frequency and severity of responsive behaviours.^{4,52} In a pilot study by Doyle et al. exploring videoconferencing

Table 1. Overview of included studies (n = 27).

Category	Number of studies (n (% of included studies))
Country of study	United States = 14 (51.9%) Canada = 5 (18.5%) Australia = 5 (18.5%) France = 1 (3.7%) Ireland = 1 (3.7%) Norway = 1 (3.7%) Portugal = 1 (3.7%) Korea = 1 (3.7%) China = 1 (3.7%)
Type of intervention	Video = 9 (33.3%) Video and telephone/audio = 7 (25.9%) Video and telephone/audio and asynchronous communication = 4 (14.8%) Telephone/audio = 3 (11.1%) Telephone/audio and asynchronous communication = 2 (7.4%) Video and asynchronous communication = 2 (7.4%)
Type of setting	Home and community care = 8 (29.6%) LTC = 6 (22.2%) Primary care = 5 (18.5%) Hospital = 3 (11.11%) Hospital and primary care = 2 (7.4%) Hospital and community care = 1 (3.7%) Hospitals/academic centres (e.g. university-affiliated hospital, university-affiliated clinic or university research facilities), home settings, adult day care centres and LTC = 1 (3.7%) Hospital and skilled nursing facility (care transition) = 1 (3.7%)
Named research design in study	Pilot study = 10 (37.0%) Qualitative = 4 (14.8%) Editorial = 2 (7.4%) Mixed-methods = 2 (7.4%) Observational = 2 (7.4%) Prospective cohort = 2 (7.4%) Quasi-experimental = 1 (3.7%) Systematic review = 1 (3.7%) Case report = 1 (3.7%) Commentary = 1 (3.7%) Quality improvement initiative discussion paper = 1 (3.7%)
Equipment/access provided	Devices (e.g. laptops, tablets and phones) = 11 (40.7%) Internet access = 10 (37.0%) Telephone conference/hotline services = 4 (14.8%)
Training in using technology	Healthcare providers = 14 (51.9%) Older persons = 5 (18.5%) Families = 2 (7.4%)
Providers discipline	Nurses (e.g. registered nurse, registered practical nurse (RPN), clinical nurse specialist, nurse practitioner, nurse manager) = 25 (92.6%) Physician specialists (e.g. geriatricians, palliative care physicians, psychiatrists, neurologists) = 20 (74.1%) Social workers = 18 (66.7%) Primary care physicians = 16 (59.2%)

(continued)

Table 1. Continued.

Category	Number of studies (n (% of included studies))
	Pharmacists = 11 (40.7%) Physiotherapists = 11(40.7%) Occupational therapists = 9 (33.3%) Dietitian = 5 (18.5%) Psychologists (e.g. psychologist, geropsychologist) = 4 (14.8%) Physician assistants = 2 (7.4%) Chaplain = 2 (7.4%) Geriatric mental health worker /mental health counsellor = 2 (7.4%) Hospitalist facilitator or physician facilitator = 2 (7.4%) Personal support worker/nurse assistant = 2 (7.4%) Speech language pathologists = 2 (7.4%) Community liaison worker = 1 (3.7%) Infectious disease specialists = 1 (3.7%) Community resource specialist = 1 (3.7%) Chiropracist = 1 (3.7%) Health promoter = 1 (3.7%) Respiratory therapist = 1 (3.7%) Rehabilitation assistant = 1 (3.7%) Assistant practitioner = 1 (3.7%)
Clinical outcomes for older persons	Efficient medication management = 5 (18.5%) Improved mental health = 4 (14.8%) Improved physical health = 4 (14.8%) Smooth care transition = 3 (11.1%)
Outcomes for interdisciplinary teams	Improved team collaboration among providers = 14 (51.9%) Enhanced interdisciplinary team communication = 11 (40.7%) Identified need for greater patient and family involvement = 4 (14.8%) Complex needs addressed by interdisciplinary care = 4 (14.8%)
Outcomes for organizations and care practices	Virtual care was cost-effective = 12 (44.4%) Organizations and systems considerations needed to support virtual care = 6 (22.2%) Virtual care addressed inequities of care = 5 (18.5%)
Feasibility and acceptability of virtual models	Virtual care was feasible = 6 (22.2%) Acceptability = 15 (55.6%) Virtual care met the needs of older persons = 10 (37.0%) Healthcare providers perceived virtual care as useful = 8 (29.6%) Families were highly satisfied with virtual care = 7 (25.9%)
Facilitators to virtual delivery	Facilitators = 11 (40.7%) Technological facilitators = 6 (22.2%) Reduced travel time = 5 (18.5%) Obtaining buy-in from healthcare providers = 3 (11.1%)
Barriers to virtual delivery	Barriers = 17 (63.0%) Technological issues and access to technology = 12 (44.4%) Healthcare providers perceived disruptions to usual care = 8 (29.6%) Limitations to conducting physical examinations and assessments = 6 (22.2%)

LTC: long-term care.

Table 2. Data extraction table for included articles (n = 27).

Author, year and country	Type of evidence source and study design	Purpose	Population or participants and setting or context	Intervention	Relevant findings
Aïdoud et al., 2020 ⁴⁹ and France	- Editorial report	- To describe the structure of a local support platform for helping nursing homes care for older patients with COVID-19.	- Outcomes and care pertained to older adults in nursing homes in the Indre-et-Loire region of France.	- The local support platform had four main components: (1) a 24/7 specialist telephone hotline; (2) a collaborative online forum ('COVID-19' videoconferences); (3) mobile geriatric medicine teams visiting nursing homes; and (4) a multidisciplinary board for advising nursing home clusters on crisis management and medical decisions for the most vulnerable residents.	- The regional 'COVID-19 videoconference' helped de-isolate nursing homes by enabling dialogue on common problems and providing equal levels of access to information on COVID-19 care. - The multidisciplinary support team included a geriatrician, an infectious disease specialist and a palliative care physician to help nursing home staff to anticipate decisions, discuss medical decisions and care for the most vulnerable residents. - This system became a valuable and popular tool for dialogue between the region's nursing homes.
Amirsadri, et al., 2017 ⁵⁰ and United States	- Case report	- To demonstrate benefits of a hybrid team-based model of home visit with a telemedicine psychiatrist to care for patients who are homebound.	- Patient was a white woman in her mid-80s previously hospitalized for schizophrenia. - Urban area of a major city.	- Care was provided with hybrid telepsychiatry (team-based practice with social worker travelling to the home with electronic tablet for connection with psychiatrist).	- The intervention resulted in detecting unrecognized depression and complex trauma. - The treatment plan included adding an antidepressant and therapy plan, eliminating one psychiatric medication and reducing dosage of pain medication. - There was improvement in depression, improved function and quality of life. - Patient and caregiver both reported high levels of satisfaction with the services. - This hybrid telepsychiatry provided a reasonable option for homebound elderly patients living in urban areas and was less expensive than nursing home admission.
Appleman et al., 2020 ⁵¹ and United States	- Research article - Pilot study	- To explore a new model of healthcare delivery for medically complex older persons using	- Older persons. - Primary care clinics and a Veterans Affairs Hospital.	- The Geriatric-Interdisciplinary Mobile Patient Access Team (G-IMPACT), comprised of a nurse practitioner and	- Older persons were satisfied with the virtual visits with an average rating of 9/10. - Clinicians rated similarly high levels of satisfaction with the virtual visits. In terms of collaboration, the average rating was 6.6 among team members regarding medical decision-making.

(continued)

Table 2. Continued.

Author, year and country	Type of evidence source and study design	Purpose	Population or participants and setting or context	Intervention	Relevant findings
		telehealth technology.		technology assistant, visited patients at home using synchronous video to link to a suite of geriatric specialists.	- Technological challenges for both older persons and clinicians were perceived as barriers to virtual care.
Catic et al., 2014 ⁵² and United States	- Pilot research study - Survey	- To design, implement, and assess the pilot phase of ECHO-AGE, a remote case-based video consultation programme linking experts in behaviour management for patients with dementia to nursing home care providers.	- Interprofessional specialty team at a tertiary care centre and staff from LTC. - Cases of older adult residents residing in long-term care were presented. - 11 LTC sites in Massachusetts and Maine.	- LTC sites presented challenging cases regarding residents with dementia and/or delirium related behavioural issues to specialists via videoconferencing. - Patients' families were invited to participate in the discussion, but this rarely occurred during the inaugural year of the programme.	- For patients in whom the ECHO-AGE recommendations were followed, the LTC sites reported that 74% clinically improved versus 20% when recommendations were not followed. - Hospitalization was less common among patients in whom the recommendations were followed. - Mortality was significantly lower when recommendations were followed. - Male and female participants did not differ significantly in terms of outcomes. - Results suggest that a case-based video-consultation programme could be successful in improving care of elders with dementia and/or delirium related behavioural issues by linking specialists with LTC providers.
Conn et al., 2013 ¹⁹ and Canada	- Programme evaluation - Mixed-methods design	- To evaluate the effectiveness of The District Mental Health Services Older Adults Program (DMHSOAP).	- Chart review of older adults. - Focus groups with diverse group of mental healthcare workers. - Remote/rural area in northern Ontario (telepsychiatry services).	- Retrospective chart review; analysis of sessional evaluation forms and case consultations; a survey of referring physicians; and three focus groups of health professionals at the distant sites.	- Participants reported positive perceptions of the telepsychiatry programme offering service availability for specialist consultation without requiring far travel. The service allowed family members to be involved in the consultation process by eliminating the need to travel. - Cohesion and functioning of the healthcare team, collegial relationships and mutual respect were central to the success of the programme. - Key factors contributing to the success and longevity of the programme include administrative and infrastructure support, presence of telehealth champions, an appropriate funding model and inclusion of tele-education for staff.

(continued)

Table 2. Continued.

Author, year and country	Type of evidence source and study design	Purpose	Population or participants and setting or context	Intervention	Relevant findings
Donnelly et al., 2021 ¹⁶ and Canada	<ul style="list-style-type: none"> - Research study - Observational survey 	<ul style="list-style-type: none"> - To conduct and report on the perspectives of non-physician providers of interprofessional primary care (IPC) during the COVID-19 pandemic through a survey. 	<ul style="list-style-type: none"> - Non-physician IPC providers working in primary care teams (Ontario Family Health Teams). - Primary care clinics in Ontario, Canada. 	<ul style="list-style-type: none"> - Shift from in-person primary care to nearly completely virtual format. Over 76.5% of patient care delivery was over phone and 18.1% over video. 	<ul style="list-style-type: none"> - Only 40% of IPC providers received virtual care training, and 57.4% would have liked to have additional training. - 48.3% of respondents experienced greater team collaboration with virtual care which was directly supported by email (20.4%), phone (19.8%), and video (16.9%) communication. - Primary care shifted nearly completely to a virtual format. Over 76.5% of patient care delivery was over phone and 18.1% over video. - Providers percent confidence in each method of care delivery was 81.4% for phone, 68.6% for video, 56.5% for email and 40.7% for text. - Notable themes and subthemes included increased care capacity due to caregiver involvement in patient calls and technology, technological barriers for senior/nonverbal/hearing impaired groups and increased ability to maintain collaboration from multiple providers of care.
Doyle et al., 2016 ⁴ and Australia	<ul style="list-style-type: none"> - Research article - Mixed-methods design 	<ul style="list-style-type: none"> - To evaluate expansion of a psychiatry service for older adults and pilot test a model to improve medical supervision and clinical governance for staff using remote information technology. 	<ul style="list-style-type: none"> - Dementia service staff - Regional, rural and remote areas in Victoria and the Northern Territory in Australia. 	<ul style="list-style-type: none"> - Teleconference and web-based team case presentations and education sessions. 	<ul style="list-style-type: none"> - 59% of staff perceived case conferences to improve outcomes for older persons through increased confidence in addressing responsive behaviours. - Case conference reports revealed a decrease in family caregiver stress. - Virtual case conferences provided good support for staff in terms of access to multidisciplinary teams and opportunity to discuss strategies - The virtual model reduced travel time for staff and improved team collaboration. - Challenges with information technology included poor sound quality, connectivity delays, slow internet speeds and need for changing presentation skills when communicating virtually.
Emery et al., 2012 ²¹ and United States	<ul style="list-style-type: none"> - Research article - Pilot study 	<ul style="list-style-type: none"> - To explore the feasibility of the BRIGHTEN 	<ul style="list-style-type: none"> - Persons aged 60 and older with symptoms of depression or anxiety. 	<ul style="list-style-type: none"> - The BRIGHTEN programme, an interdisciplinary team approach for assessing 	<ul style="list-style-type: none"> - Results suggested significant improvements in mental health after treatment by the virtual, multidisciplinary BRIGHTEN team.

(continued)

Table 2. Continued.

Author, year and country	Type of evidence source and study design	Purpose	Population or participants and setting or context	Intervention	Relevant findings
		program (Bridging Resources of an Interdisciplinary Geriatric Health Team via Electronic Networking).	<ul style="list-style-type: none"> - Outpatient primary and specialty medical clinics in Chicago. 	and treating older persons with depression.	<ul style="list-style-type: none"> - Key indicators included interdisciplinary team collaboration, collaboration with patients in creating treatment plans, and providing accessible behavioural health services to adults living in the community.
Emery-Tiburcio et al., 2017 ⁵³ and United States	<ul style="list-style-type: none"> - Research article - Pilot study 	<ul style="list-style-type: none"> - To determine whether the BRIGHTEN programme, a multidisciplinary virtual team-based primary care intervention, reduces depression symptoms in older adults. 	<ul style="list-style-type: none"> - Older persons (aged 60 or older). - Nine primary care clinics in Cook County, Illinois, USA 	<ul style="list-style-type: none"> - The BRIGHTEN 'virtual' team (psychologist, psychiatrist, social worker, physical therapist, occupational therapist, dietitian and chaplain) received patient evaluations and communicated via secure email. - Recommendations were made for each participant's mental and overall health, shared with them, and a person-centred treatment plan was created. 	<ul style="list-style-type: none"> - Results suggested significant improvements in mental health after treatment from the virtual, multidisciplinary BRIGHTEN team. - Key factors included interdisciplinary team collaboration, collaboration with patients in creating treatment plan, and providing accessible behavioural health services to adults living in the community. - Health care providers focus on linguistic matching, the cultural and social aspects of health and having an openness to patient experiences to build a therapeutic relationship, instead of cultural matching between provider and patient.
Farris et al., 2017 ² and United States	<ul style="list-style-type: none"> - Research article - Prospective cohort 	<ul style="list-style-type: none"> - To examine whether videoconference connecting interdisciplinary hospital-based team with clinicians at post-acute care sites improves interprofessional communication and reduces medication errors. 	<ul style="list-style-type: none"> - Hospital-based providers (hospitalists, geriatricians, pharmacists, social workers, medical trainees and subspecialists) and post-acute care clinicians. - One tertiary care medical centre and eight post-acute care sites. 	<ul style="list-style-type: none"> - All patients discharged to eight post acute care sites were discussed in a weekly videoconference. 	<ul style="list-style-type: none"> - Post-acute care providers reported that videoconferencing enhanced communication and provided much-needed access to information and hospital staff. - Post-acute care providers valued this conference and did not feel that it was too time intensive or redundant. - The video communication aspect of ECHO-CT established personal relationships and a sense of teamwork between care providers on the sending and receiving sides of care. - ECHO-CT may improve the transitions of care processes between hospital and post-acute care sites.

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Table 2. Continued.

Author, year and country	Type of evidence source and study design	Purpose	Population or participants and setting or context	Intervention	Relevant findings
Fonda, 1986 ⁵⁴ and Australia	- Report - Pilot study	- To describe a novel approach for multidisciplinary meetings using telephone conferences.	- Older persons living in the community. - The hospital-based Aged and Extended Care Department in Melbourne.	- Telephone conferences for multidisciplinary team meetings.	- Of the 89 referrals, 18% of older persons were referred for more comprehensive in-patient assessment and 37% were referred for an out-patient assessment. - The number of referrals for multidisciplinary geriatric assessments increased. - Telephone conferences saved travel time for providers and were perceived as relatively inexpensive.
Gordon et al., 2016 ⁵⁵ and United States	- Pilot research study - Pilot study	- To report the impact of Extension for Community Healthcare Outcomes (ECHO-AGE) on use of physical restraints and antipsychotics.	- Frontline nursing home staff and clinical experts (e.g., geriatrician, geropsychiatrist, behavioural neurologist). - Residents with dementia and behavioural problems. - LTC in Massachusetts and Maine, USA.	- LTC sites participated in biweekly videoconferences to discuss challenging cases of residents with dementia and behavioural issues. - Frontline providers were trained in videoconferencing to become experts in dementia care. - 18-month follow-up with treatment and control sites.	- Primary study outcomes were focused on the percentage of residents physically restrained and receiving antipsychotic medication. Secondary outcomes included help needed with activities of daily living, self-reported pain, pressure ulcers, bladder control, depressive symptoms. - Compared to control sites over an 18-month follow-up, ECHO-AGE long-term care sites were 75% less likely to be physically restrained (OR = 0.25, $p = 0.5$), 17% less likely to be prescribed antipsychotic medication (OR = 0.83, $p = 0.07$) and 23% less likely to experience a urinary tract infection (OR = 0.77, $p = 0.01$). - The greatest changes in primary outcomes occurred during the first 3 months after the intervention began.
Gray et al., 2016 ⁵⁵ and Australia	- Research article - Prospective observational design	- To examine the feasibility and sustainability of a telegeriatric service model.	- Older persons. - Small rural hospitals in southeast Queensland.	- A telegeriatric service model using videoconferencing which included specialist geriatric consultation and ongoing geriatric evaluation and management.	- 1405 geriatric consultations were provided using videoconferencing over two years and across three rural hospitals. - 308 consultations were an initial assessment (22%), 422 were to review assessments (30%) and 675 consisted of case conference discussions (48%). - Within 6 months of implementing the telegeriatric model, there were stable patterns of consultation, and this was sustained until 24 months.

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Table 2. Continued.

Author, year and country	Type of evidence source and study design	Purpose	Population or participants and setting or context	Intervention	Relevant findings
Gray et al., 2018 ⁵⁶ and Canada and New Zealand	<ul style="list-style-type: none"> - Research article - Embedded comparative multiple-case study approach 	<ul style="list-style-type: none"> - To explore how Information and Communication Technology (ICT) is used to support activities of integrated care and barriers and enablers to its adoption. 	<ul style="list-style-type: none"> - Managers and healthcare providers supporting older persons with complex care needs. - Primary care clinics in two provinces in Canada (Ontario and Quebec) and New Zealand. 	<ul style="list-style-type: none"> - Information and communication technology to support the implementation of nine models of integrated community-based primary health care. 	<ul style="list-style-type: none"> - ICT systems were most often used to support care coordination for older persons and enabled inter-professional teamwork to develop care plans. - Information sharing within teams were both asynchronous (e.g. reviewing notes from another provider) and synchronous (e.g. calls between two or more providers). - ICT was used for remote monitoring, electronic referrals and virtual consults.
Hawley-Hague et al., 2021 ⁵⁷ and United Kingdom	<ul style="list-style-type: none"> - Research article 	<ul style="list-style-type: none"> - To explore the usability, feasibility and acceptability of videoconferencing for healthcare professionals and older adults. 	<ul style="list-style-type: none"> - Older adults (50+ years). - Health professionals. - Home programmes delivered by falls services in Manchester, UK. 	<ul style="list-style-type: none"> - Health professionals and older adults received technology training workshops. - Virtual home exercise programme, and strength and balance programme led by health professionals (e.g. occupational, and physical therapists). 	<ul style="list-style-type: none"> - Acceptability was good for follow-up calls and discussions, but not for delivery of exercises due to lack of camera angles for viewing the patient's full body and movements. - Reliability was good for software (skype), poor for network (4G cellular data connection not adequate in Manchester) and poor for hardware (Samsung Galaxy S4 overheats often). - Exclusion of older adults with lower incomes and/or lack of technological literacy was a concern. - Largest barrier to feasibility was patient safety risks from limited camera view when delivering programmes that require view of the patient's full body.
Malone et al., 2010 ⁵⁸ and United States	<ul style="list-style-type: none"> - Report - Quasi-experimental design 	<ul style="list-style-type: none"> - To describe a programme to improve care of older patients in hospitals where a geographically distinct Acute Care for Elders (ACE) unit is not feasible. 	<ul style="list-style-type: none"> - Patients aged 65 and older on a medical or surgical unit. - Healthcare system in Eastern Wisconsin, USA. 	<ul style="list-style-type: none"> - ACE Tracker: An electronic spreadsheet listing all older patients in a facility and their risk factors for functional decline. - e-Geriatrician: Regular consultation through teleconferencing between an off-site geriatrician and a local ACE team. 	<ul style="list-style-type: none"> - Preliminary outcomes show that the ACE Tracker and e-Geriatrician model deployed at a distant hospital without a geriatrician on staff improved processes of care for older patients. - ACE Tracker provided a reliable report of patients' care. - ACE Tracker and e-Geriatrician represented a method to disseminate geriatric concepts with efficient use of a geriatrician's time. - Significant improvements in urinary catheter and physical therapy referrals but no significant changes in the other outcomes. - No change in the length of stay or in the rate of hospital readmission within 30 days.

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Table 2. Continued.

Author, year and country	Type of evidence source and study design	Purpose	Population or participants and setting or context	Intervention	Relevant findings
Meyer, 2011 ⁵⁹ and United States	<ul style="list-style-type: none"> - Discussion paper - Quality improvement initiative 	<ul style="list-style-type: none"> - To summarize the results of teleconferencing and real-time information review for team-based elder hospital care using Acute Care for Elders (ACE) Tracker and e-Geriatrician. 	<ul style="list-style-type: none"> - Elderly patients (65+ years). - Interdisciplinary healthcare teams (clinical nurse specialists, social workers, pharmacists, physical and occupational therapists and remote geriatrician). - Acute care, Aurora Health Care system in Eastern Wisconsin, USA. 	<ul style="list-style-type: none"> - ACE Tracker spreadsheets containing daily data from electronic health records and personal risk factors for each patient were reviewed by an interdisciplinary in-person hospital team and a remote geriatrician. - 1/3 of older patients were discussed by videoconferencing for 30 inu a day, 5 days a week. 	<ul style="list-style-type: none"> - Quality of care improved through an increase in patients receiving physical therapy (60.4% to 69.6%), an increase in social work evaluation (67.3% to 73.7%), and a decrease in patients receiving urinary catheter (26.2% to 20.1%). - A system of six hospitals with no geriatricians on staff sought to improve care for older persons and implemented their own ACE unit and ACE tracker data reports. - During ACE meetings, the team typically made care plan recommendations for 30–50% of patients discussed, which were then received by the attending physician and further discussed at the next ACE meeting. - A lack of receptiveness to team input from attending physicians, and openness from physicians to working with a remote geriatrician was reported in some hospitals.
Moore et al., 2017 ⁶ and United States	<ul style="list-style-type: none"> - Research study - Prospective cohort study 	<ul style="list-style-type: none"> - To examine the Extension for Community Health Outcomes – Care Transitions (ECHO-CT) novel videoconferencing intervention's effects on health care utilization and costs for patients after hospital discharge to a skilled nursing facility. 	<ul style="list-style-type: none"> - Patients discharged from the hospital to a skilled nursing facility (SNF) for rehabilitation (<100 days). - Hospital staff: Project manager, pharmacist, hospitalist facilitator, social workers and physicians. - SNF staff: Nurses, doctors and physical therapists. 	<ul style="list-style-type: none"> - Hospital and SNF teams engaged in weekly videoconferences to discuss patient transitions. - Videoconferences discussed a summary of the hospital course, challenges/questions about the care plan, current patient condition and medications. - Reviews concluded with a team reflection on the care transition process and provided opportunity for collaboration and learning. 	<ul style="list-style-type: none"> - Outcomes variables were hospital readmission rates, length of skilled nursing facility stay for patients not readmitted, health care costs and mortality within 30 days of care transition. - Hospital readmission rates, length of skilled nursing facility stay for patients and health care costs were all reduced in the ECHO-CT intervention groups. - Medication review and presence of a pharmacist within the team was helpful in identifying medication-related errors and the adjustments needed. - Goals of care, disease management and care coordination were topics that were frequently discussed during the interdisciplinary meetings and may have resulted in the positive outcomes observed.

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Table 2. Continued.

Author, year and country	Type of evidence source and study design	Purpose	Population or participants and setting or context	Intervention	Relevant findings
Patel et al., 2020 ⁶⁰ and Ireland	- Editorial	- To discuss challenges faced in implementing telehealth in a rural Psychiatry of Old Age service.	- Older persons. - Rural Psychiatry of Old Age service in the North-West of Ireland.	(1) Two interventions: - (1) Electronic hub for consultation and for supporting patients with routines and loneliness. - (2) Tablets for routine consultation of older persons with non-cognitive symptoms of dementia.	- Using videoconferencing for multidisciplinary team meetings was challenging due to lack of up-to-date hardware and software and lack of internet access. - Telephone clinics worked well for older persons who already had a good rapport with providers. - Using the telephone to perform assessments for older persons new to the service was challenging and non-verbal communication was not captured.
Powell and Silveira, 2021 ⁶¹ and United States	- Commentary	- To discuss the adaptation of palliative care for older adults with multiple (multi-) morbidities during COVID-19.	- Older adults with multi-morbidities. - Palliative care involved three to 5 or more clinicians in an interdisciplinary team. - Inpatient and outpatient palliative care, United States.	- No specific intervention. - Reports on outpatient and inpatient adaptations to COVID-19 in palliative care. - Adaptations included telecare/telemedicine through videoconferences or phone calls.	- Quick dissemination of best practice use of telemedicine to palliative care providers, necessary caregiver involvement for patients who have difficulties with technology, technology access instructions, and anticipatory guidance for possible technological difficulties all contributed to successful tele-palliative care. - Cognitively impaired older persons and their families were particularly vulnerable to lack of emotional support that came with isolation from COVID-19. - For the reason above, it was essential to facilitate family involvement through regular videoconferences (even in cases where the patient is unconscious) or daily updates by phone to reduce feelings of vulnerability and disconnection.
Powers et al., 2017 ¹⁷ and United States.	- Research article - Prospective pilot study	- To demonstrate feasibility of clinical video telehealth technology for interprofessional dementia evaluations and follow-up to rural veteran residents.	- Providers included geriatrician, geriatric psychologist, geriatric psychiatrist, social worker, nurse manager, telehealth technician. - Older adult veterans attended the virtual	- Veteran residents undergo interprofessional dementia assessment by a geriatrician, geropsychologist, geriatric psychiatrist or neurologist and social worker using clinical video telehealth (CVT) technology.	- The telemedicine clinic accomplished the aim of replicating the in-person dementia clinic experience for rural veterans. - The primary outcome of the clinic was reduced travel time and costs. - In the first year, 95 individuals were served in 156 clinic visits and 251 interprofessional provider encounters. - This clinic model demonstrated that CVT technology was a feasible means of providing

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Table 2. Continued.

Author, year and country	Type of evidence source and study design	Purpose	Population or participants and setting or context	Intervention	Relevant findings
Powers and Buckner, 2018 ⁶² and United States.	<ul style="list-style-type: none"> - Research article - Pilot study 	<ul style="list-style-type: none"> - To report on the application of real-time video technology for dementia care. 	<ul style="list-style-type: none"> - clinic. - Rural Pennsylvania. - Older persons (veterans) and family caregivers. - Rural areas in Tennessee. 	<ul style="list-style-type: none"> - A clinical video telehealth (CVT) programme offered as part of a dementia clinic/geriatric primary care clinic. 	<ul style="list-style-type: none"> - interprofessional dementia evaluations and follow-up to rural residents. - 45 CVT visits were completed in 3 years. - 98% of older persons and caregivers were satisfied with CVT visits. - Consult recommendations included community-based long-term care services and supports (LTSS) for 23 older persons (64%), medication reconciliation for 13 older persons (36%) and further diagnostic testing for 8 older persons (22%).
Rush et al., 2019 ²⁰ and Canada.	<ul style="list-style-type: none"> - Research article - Qualitative research study 	<ul style="list-style-type: none"> - To report on the receptiveness of older adults and providers to telehealth for rural cardiac specialty care. 	<ul style="list-style-type: none"> - Older adult patients with atrial fibrillation (AF). - Providers (nurse practitioners, heart function nurses, pharmacists). - Rural communities. 	<ul style="list-style-type: none"> - No intervention yet. Study results were to be used to inform a telehealth initiative in rural communities for older adults with AF. 	<ul style="list-style-type: none"> - Telehealth reduced costs, large commute distances and health care trade-offs that AF patients are forced to make from the lack of rural cardiac specialty care. - Patients unfamiliar with telehealth were not receptive and unable to envision its use. - Providers and patients with past telehealth experience were receptive, understood how it could reduce lack of follow-up, access to specialists and better care coordination between providers. - Rural patients satisfied with their care were not accepting of changes (e.g. telehealth), took pride in looking after themselves and accepted that they would be at higher risk without urban facilities/specialists.
Shulver et al., 2016 ⁷ and Australia	<ul style="list-style-type: none"> - Research article - Qualitative study 	<ul style="list-style-type: none"> - To report on healthcare provider views on telehealth and implementing telehealth as a part of conventional health services for older persons. 	<ul style="list-style-type: none"> - Rehabilitation and allied healthcare workers, both experienced and inexperienced with telehealth. - Collaborative care between public hospital, rural health 	<ul style="list-style-type: none"> - The Telehealth Pilots Programme provided telehealth services primarily for aged, cancer and palliative care at home. - Semi-structured focus groups were conducted 	<ul style="list-style-type: none"> - Rural allied health clinicians, telehealth clinicians and novice telehealth urban clinicians believed that telehealth would increase quality of health care in rural areas. - Urban clinicians were particularly concerned about complex cases and believed that patient safety and feasibility of treating compounding co-morbidities were not appropriate for telehealth. - For complex cases, 'on the ground' supporters (care

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Table 2. Continued.

Author, year and country	Type of evidence source and study design	Purpose	Population or participants and setting or context	Intervention	Relevant findings
Silsand et al., 2021 ⁶ and Norway	<ul style="list-style-type: none"> - Research article - Case study - Semi-structured focus groups 	<ul style="list-style-type: none"> - To report on the rapid shift to videoconferencing in the COVID-19 pandemic by the Patient-centred Team (PACT), a multidisciplinary team seeking to ensure that patient-centred care continues. 	<ul style="list-style-type: none"> - Older adults with complex and long-term needs receiving care from a multidisciplinary team. - Transition between Hospital and Primary Care in Northern Norway. 	<ul style="list-style-type: none"> - PACT established a comprehensive plan for follow-up care after being discharged from the hospital. - A combination of hospital and municipality (primary care) health care professionals collaborated through videoconference and with the patient to discuss care plans and follow-ups. 	<ul style="list-style-type: none"> - PACT shifted from 2-4 providers visiting in-person to conducting team videoconferencing visits with only 1 member on site. - PACT found that additional collaborators (general practitioners and homecare staff) were able to be involved. - Less time was spent on patient ambulation and travelling to meetings. There was less need for PACT to visit patients at home. - The team described itself as more multidisciplinary and more time/cost saving. - Videoconferencing technology was the largest barrier to adoption and extensive technical support and training was needed throughout the entire shift to virtual care. Virtual meetings were described as more demanding and tiring.
Tang et al., 2001 ⁶³ and China	<ul style="list-style-type: none"> - Research article - Prospective pilot study 	<ul style="list-style-type: none"> - To examine the feasibility, acceptability, costs, benefits and limitations of telepsychiatry. 	<ul style="list-style-type: none"> - Older persons. - Government-funded homes for older persons in two regions of Hong Kong. 	<ul style="list-style-type: none"> - Telepsychiatry provided via a videoconferencing system. 	<ul style="list-style-type: none"> - In 1 year, a total of 1001 teleconsultations were provided. - Initial consultations and urgent reassessments were conducted for mood disturbances, memory impairment, aggressive behaviour, insomnia and paranoid ideas. - 62 out of 76 patients who were able to respond stated that they liked telepsychiatry (81.6%). - Older persons, relatives and staff communicated openly during consultations and were involved in decision-making.

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Table 2. Continued.

Author, year and country	Type of evidence source and study design	Purpose	Population or participants and setting or context	Intervention	Relevant findings
Yi et al., 2021 ⁹ and United States, Canada, Portugal, Italy, Australia and Korea.	- Systematic review with no meta-analysis	- To systematically review the literature on virtual visits including barriers and facilitators for older persons cognitive impairment.	- Older persons with dementia or mild cognitive impairment. - All settings were included.	- Synchronous in-home or clinic video-based telemedicine visits.	- In all 14 studies assessing feasibility, authors reported telemedicine to be feasible. - In all 7 studies exploring acceptability, telemedicine was found to be acceptable. - 11 out of 17 studies required care partner involvement during telemedicine visits. - 13 out of 17 studies reported satisfaction with telemedicine due to less time spent on travelling and driving.

for dementia care, only 2 of 18 patients continued to express concerning responsive behaviours that were concerning following discharge from psychiatry services for older adults and 72% of providers described a decrease in the severity of responsive behaviours.⁴ Catic et al. found that with the implementation of ECHO-AGE providers discussed behaviour plans for all residents and suggestions were provided for 72.3% of residents which often included offering positive reinforcement of targeted behaviours.⁵²

Physical health. Four articles considered physical health outcomes and found improvements for older persons with regard to physical function, falls and service referrals.^{5,52,58,59} Malone et al. evaluated the AcuteCare for Elders (ACE) tracker (an electronic spreadsheet listing all older patients in a facility and their risk factors for functional decline) and e-geriatrician model (teleconferencing consultation between an off-site geriatrician and a local ACE team), which found no significant changes after 6 months of intervention implementation in community hospitals with regards to the use of physical restraints, high-risk medications and social services evaluations.⁵⁸ However, this model led to a small decrease in the use of urinary catheters from 26.2% to 20.1%.^{58,59} The ACE tracker and e-geriatrician model also led to a positive outcome with regards to falls reduction 1-year post-implementation with a decline in patient falls from approximately 4.5 per 1000 patient days to a little over 1.0 falls in one hospital.⁵⁹

The ECHO-AGE model also led to significantly improved outcomes related to body systems as residents in LTC were 23% less likely to have had acquired a urinary tract infection upon follow-up.⁵ In addition, a lowered use of physical restraints was found with 75% of residents from facilities implementing this model less likely to be restrained compared to residents from control facilities at 18-month follow-up; however, this was not significant.⁵ Significantly decreased mortality in 29 out of 39 residents in LTC for whom suggestions were followed were also reported compared to 10 residents who did not have an improvement (4% vs. 50%).⁵² With this model, hospitalization occurred less often in the group of residents who followed suggestions compared to the group that did not follow suggestions (29% vs. 60%); however, this was not statistically significant.

Virtual care planning resulted in an increase in physical therapy consultations and clinical improvements through recommendations for lab testing and referrals to other services.⁵² As well, hospice care, psychiatric service and neurology referrals were arranged when necessary. In this study, LTC sites also reported that virtual team-based care recommendations were more effective than standard treatments for improving clinical outcomes. Significant clinical improvements were reported for 74% of participants when virtual care recommendations were followed versus 20% of participants when recommendations were not followed due to older person, family or physician preferences. In Malone

Table 3. Overview of categories and themes.

Categories	Themes
Clinical outcomes for older persons	<ol style="list-style-type: none"> 1. Improved mental and physical health 2. Efficient medication management 3. Smooth care transition
Outcomes for interdisciplinary teams	<ol style="list-style-type: none"> 1. Identified need for greater patient and family involvement 2. Complex needs addressed by interdisciplinary care 3. Enhanced interdisciplinary team communication 4. Improved team collaboration among providers
Outcomes for organizations and care practices	<ol style="list-style-type: none"> 1. Virtual care addressed inequities of care 2. Virtual care was cost-effective 3. Organizations and systems considerations needed to support virtual care
Feasibility and acceptability of virtual models	<p>Feasibility</p> <ol style="list-style-type: none"> 1. Virtual care was feasible <p>Acceptability</p> <ol style="list-style-type: none"> 1. Families were highly satisfied with virtual care 2. Healthcare providers perceived virtual care as useful 3. Virtual care met the needs of older persons
Facilitators and barriers to virtual delivery	<p>Facilitators for virtual care</p> <ol style="list-style-type: none"> 1. Technological facilitators 2. Reduced travel time 3. Obtaining buy-in from healthcare providers <p>Technological barriers</p> <ol style="list-style-type: none"> 1. Technological issues and access to technology 2. Healthcare providers perceived disruptions to usual care 3. Limitations to conducting physical examinations and assessments

LTC: long-term care.

et al., the introduction of virtual team-based care planning resulted in an increase of physical therapy consultations from 27.0% to 39.1% across 11 hospitals.⁵⁸

Efficient medication management. Five articles explored medication management, reporting that medications were updated to better meet the needs of older persons and medication errors were corrected.^{2,6,19,50,52} Virtual team-based care planning resulted in improved medication management for older persons. In an evaluation of telepsychiatry service, medication management was recommended for 95% of the patients.¹⁹ With the ECHO-AGE intervention, the suggestion for stopping or reducing antipsychotics was provided for 34% of LTC residents. Other medications such as antidepressants and other psychoactive medications were similarly suggested to be stopped or reduced in dose. Some other residents were perceived to require antipsychotic or antidepressant medications, which was started in 17.2% of residents and increased in 48.3% of residents.⁵² In a case study by Amirsadri et al., home-based telepsychiatry was explored and medication changes were made to prevent adverse effects for an older person who was previously hospitalized with schizophrenia.⁵⁰

In the care transition intervention, ECHO-CT, multidisciplinary videoconferencing was used to correct medication errors and discrepancies between hospital and post-acute care facilities as a part of care planning and review.^{2,6} A total of 106 pharmacy interventions were conducted and addressed problems such as inappropriate doses, medications or omission of essential medication.² Similarly, in an interprofessional teledementia clinic, the most frequent recommendation was medication review and adjustment.¹⁷

Smooth care transition. Three studies explored care transition outcomes.^{6,58,59} Two studies found reductions in hospital readmissions, shorter length of stay in LTC and increased home discharges for older persons.^{6,59} Hospital readmission rates were reduced (18.2% to 15.5%) in the ECHO-CT group compared to the control group where they increased from 18.3% to 24.3%.⁶ Length of stay in LTC was also significantly reduced by a mean estimate of 5.52 days. The use of virtual team-based care planning corrected numerous medication errors which may have contributed to improved care transitions. The ACE tracker and e-geriatrician model did not lead to any changes at the two hospital units with regard to the length of hospital

stay or the 30-day readmission rate.⁵⁸ At one hospital site, the model led to a 5% decrease in discharges to LTC and an 8% increase in home discharges with home care support referrals 1-year post-implementation.⁵⁹

Outcomes for interdisciplinary teams

Themes for the category outcomes for interdisciplinary teams were (a) identified need for greater patient and family involvement; (b) complex needs addressed by interdisciplinary care; (c) enhanced interdisciplinary team communication; and (d) improved team collaboration among providers.

Identified the need for greater patient and family involvement

Few studies (n = 4) involved patients and/or families in care planning.^{21,56,61,63} In those articles, patients and families were involved through collaboration in developing treatment or care plans and staying connected with providers. In the BRIGHTEN programme, a social worker specializing in geriatrics acted as a programme coordinator and collaborated with patients to create a personalized treatment plan, connecting them with relevant services and following-up with telephone calls.²¹ Patients and families were also involved in decision-making and care planning.^{56,63} In New Zealand, primary care providers collaborated in care planning processes and plans were then recorded in the electronic medical record.⁵⁶ Information and communication technology was most commonly used to support patients by providing them with information about their health conditions although goal setting using this technology was rare.⁵⁶ Family or caregiver involvement in virtual consultations was perceived as essential for older adults receiving palliative care with difficulties communicating and multiple morbidities.⁶¹ Palliative care teams supported families through regular updates, emotional support and facilitating videoconferences with patients to help families feel connected with patients and the medical team.⁶¹

Complex needs addressed by interdisciplinary care

A total of four studies found that interdisciplinary virtual care was helpful in addressing the complex needs of older persons.^{5,17,54,62} Following the implementation of an inter-professional teledementia clinic for older persons living in rural areas, there were improved diagnoses of diverse conditions and more treatment options offered.¹⁷ The care of older persons in LTC was also found to be improved using videoconferencing to connect hospital-based clinicians with frontline staff in LTC, allowing them to better address complex responsive behaviours among residents

with dementia.⁵ Interdisciplinary care was found to better meet the needs of frail older persons such as those diagnosed with dementia, multiple comorbidities and/or experiencing deficits in activities of daily living with the potential of improving outcomes for this high-needs population.⁶² Interdisciplinary care is often considered more efficient in meeting the needs of frail older persons.⁵⁴ In a study exploring the use of telephone conferences for multidisciplinary team meetings, most referrals in the community were found to be made for very frail patients who had previously received inadequate assessments in terms of their complex medical, physical and psychosocial issues by initial sources of referrals such as general practitioners.⁵⁴

Enhanced interdisciplinary team communication

Numerous studies (n = 11) reported that interdisciplinary team communication within and across services was enhanced by team-based care planning done virtually.^{2,5,6,8,16,21,49,52,53,56,59}

In the BRIGHTEN programme, all members of the virtual interdisciplinary geriatric care team used email communication to provide care recommendations and participate in discussions when needed.^{21,53} A person-centred care plan was then created with the participant.^{21,53} A total of seven studies explicitly reported enhanced interdisciplinary communication within the healthcare team (clinical experts and frontline staff) or between the healthcare team and older persons.^{2,5,6,8,16,49,59} However, many other studies that were included in this review and not listed above (due to lack of explicit reporting) reported improvements relating to virtual communication. In home care settings, videoconferencing has been shown to be an important communication tool.⁸ Within the virtual Patient-centred Care Team (PACT) intervention, the number of healthcare workers that visited an older person's home was reduced from four members (before virtual care) to one member (with hybrid virtual care).⁸ Additional team members were available via videoconference when needed.⁸ Reorganizing interdisciplinary work to include videoconferencing allowed for more collaborations with clinicians from other settings (hospital, general practitioner's office or municipality).⁸

Information sharing is a key part of care planning and necessary for an interdisciplinary care team to function. Information and communication technology can facilitate information sharing between interdisciplinary teams within medical centres in remote facilities or community LTC.^{5,6,52} Within a team, synchronous and asynchronous information sharing (e.g. electronic messaging/calling or patient notes left by another clinician, respectively) was also supported by virtual communication means.⁵⁶ Other strategies for improving information sharing included sharing electronic spreadsheets for patient data and the use of a centralized electronic medical record system.^{56,59}

Improved team collaboration among providers

Care coordination and collaboration between settings/clinicians were improved in 14 articles following the implementation of virtual team-based care planning.^{2,4-8,16,19,21,49,51,52,58,59} Since the COVID-19 pandemic, close to half of the providers working in interprofessional primary care teams perceived collaboration to be improved in a study that included 445 surveys.¹⁶ Collaboration in primary care was often supported using email and phone.¹⁶ The improved collaboration reported may have been related to teams using their collective expertise to plan for the care of older adults.¹⁶ Virtual care planning positively impacted team collaboration by enabling better coordination of care among multiple providers, improving clinical decision-making for older adult veterans and treatment planning and guiding a more comprehensive process of gathering of information.⁵¹ Virtual care created feelings of collegiality among providers as providers perceived that they were part of a larger team that included others outside of their organizations.^{4,19,49}

To support the care of older adults who are transitioning from hospital services to receiving primary care at home, videoconferencing across organizations enhanced relationships between providers from different settings.⁸ The collaboration between primary care and homecare providers was especially helpful in a particular situation where a physician was able to virtually meet with a patient at home and, based on an informed assessment, make a quick decision to admit the patient to hospital.⁸ The video communication component of ECHO-Care Transition was helpful in building relationships and creating a teamwork atmosphere among hospital and post-acute care providers.² Having continued professional relationships between providers such as the local geriatric mental health outreach team and primary care providers helped to ensure that patients were part of a stable circle of care.¹⁹ Linking providers from different settings to collaborate on patient care was especially important for sites that lacked geriatricians.^{58,59}

Involving a team of multidisciplinary providers (e.g. a geriatrician, an infectious disease specialist and a palliative care physician) was found to be an effective approach to supporting nursing home staff to prepare to make decisions, discussing clinical decisions, guiding LTC physicians in using decision support tools and continuing to provide care for frail residents in light of the COVID-19 pandemic.⁴⁹ Working virtually with different providers created professional development and growth opportunities for providers to learn from one other, improve their knowledge, and increase their repertoire of skills and abilities to administer tests when caring for older persons.^{4-7,19,21,52}

Outcomes for organizations and care practices

Virtual care was found to lead to better health care service delivery for older persons by addressing inequities of care such as access to specialists and reducing the cost of care for healthcare organizations. Adopting key considerations from the perspectives of organizations and systems can support the implementation of virtual care and fit into usual care practices. Themes were (a) virtual care addressed inequities of care; (b) virtual care was cost-effective; and (c) organizations and systems considerations needed to support virtual care.

Virtual care addressed inequities of care

A total of five articles discussed how virtual care provides more equitable care by ensuring that older persons who reside in areas further away from specialists or who are homebound and unable to travel to the offices of specialists receive much needed care.^{19,20,50,62,63} Powers and Buckners found that older persons with dementia and families may live hundreds of miles away from the clinic site.⁶² One-third of the older persons included in their study had advanced dementia and most had multiple chronic conditions making travelling challenging for this population.⁶² Videoconferencing was seen to be an efficient approach to eliminate the burden of attending appointments in-person. Virtual care also provided unique advantages for healthcare providers and older persons by eliminating the need for travelling and therefore saving out-of-pocket expenses spent on travelling.^{20,50,63} This type of care was perceived by healthcare providers as effective in meeting the needs of older persons, especially as a follow-up appointment when diagnostic tests were already completed, and treatment plans have already been put in place.²⁰

Virtual care was cost-effective

There were 12 included articles that discussed how virtual team-based care planning provided cost-effective benefits.^{2,6-9,20,21,50,55,57,58,62} In most studies, reduced travel time and costs were of particular benefit to healthcare teams administering hybrid (i.e. with in-person and virtual team members) or completely virtual home care and rural older persons seeking specialist care only offered in large academic centres or hospitals.^{7-9,20,55,57,62} A study in northern Norway found that videoconferencing eliminated the risk of costly cancellations due to harsh winter climates.⁸ Videoconferencing meetings were reported to be shorter, less expensive and requiring fewer resources than in-person meetings.^{2,8} The use of a virtual team format can save clinician time/resources and offer collaboration with a more comprehensive team of professionals compared to what can be done in-person.^{6,8,21,50,58} Administrative costs can be reduced by combining virtual

appointments with multiple specialists and decreasing time spent on scheduling multiple appointments.⁵¹ To illustrate, the ECHO-CARE Transition programme reported a mean cost saving of approximately \$2602.19 per older person ($p < 0.001$), primarily from reducing adverse events during care transitions by mobilizing an interdisciplinary virtual team.⁶ Nonetheless, hidden costs such as technical training, equipment updates and acquiring space for new technology must be considered due to the technological and infrastructure investments needed for a virtual transition.⁶³

Organizations and systems considerations are needed to support virtual care

Despite the numerous benefits that virtual care reportedly brings to organizations, there are also important considerations that need to be considered in order to successfully adopt this new model of care. A total of six studies discussed the challenges and implications of virtual care for organizations and systems, focusing on the efficient delivery of virtual care.^{4,7,17,19,50,55} Amirsadri et al. found that adding telepsychiatry to in-person home visits provided unique advantages.⁵⁰ The addition of telepsychiatry allowed social workers to conduct home assessments and complete social services referrals, nurses to complete physical exams and the entire team to connect with a psychiatrist using a computer tablet from the homes of older persons.⁵⁰ Conn et al. highlighted key factors that contributed to the success and sustainability of virtual care including administrative and infrastructure help, creation of virtual care champions, a suitable funding model and staff education for virtual care.¹⁹ Continuous technological support that goes beyond information technology support was necessary and technicians should be trained/instructed to have a clinical lens when providing support.^{4,7,19} An adequate virtual care system can be created by ensuring that adequate infrastructure and technical support are present.⁴

From an organizational perspective, virtual care was found to strengthen the management and delivery of healthcare services for rural hospitals. Specifically, linkages to specialists enabled rural hospital staff to manage more complex caseloads and reduce transfers of older persons to larger hospitals.⁵⁵ Some of the challenges in implementing virtual care included the transferability of this model's success in different contexts.⁵⁵ Powers et al. created an interprofessional teledementia clinic for rural veterans and found that diversity in population and existing billing and policy limitations external to the veterans' affair system may make it challenging for other regions to use the model and evaluate cost-effectiveness in their context.¹⁷ Strict data privacy and security regulations may pose limitations on how the personal information of older persons can be shared across organizations and hinder the ability of organizations to implement innovative virtual care.⁵⁵

Feasibility and acceptability of virtual models

Virtual models used for team-based care planning were found to be feasible and acceptable for most older persons, families and healthcare providers. Themes were (a) virtual care was feasible; (b) families were highly satisfied with virtual care; (c) healthcare providers perceived virtual care as useful; and (d) virtual care met the needs of older persons.

Virtual care was feasible. A total of six articles explored the feasibility of virtual team-based care planning for older persons and found it to be a practical way to deliver and plan care.^{8,16,55,59,61,63} One study demonstrated that primary-care teams were able to shift almost completely to providing virtual services during COVID-19 with 76.5% of consultations occurring by phone compared to 70% of care delivered in-person prior to COVID-19.¹⁶ In collaborating with in-person homecare services through the PACT intervention, a hybrid virtual team that included physicians and pharmacists, videoconferencing was perceived to be beneficial for accurate medication management because it provided a unique opportunity for remote providers to see into medicine cabinets located within patients' homes.⁸ The PACT also showed that videoconferencing could be used by physiotherapists to assess the mobility and gait of patients with the assistance of homecare providers.⁸ Palliative care physicians perceived that they could provide much needed services through virtual care for patients and families and that it was highly effective in meeting patients' goals.⁶¹

Virtual consultations provided by healthcare providers were found to be regular and in high demand. In 1 year, Tang et al. reported that videoconferencing was used in 1001 consultations to offer psychogeriatric services for LTC homes in collaboration with a regional hospital.⁶³ One hundred forty nine out of 152 psychiatric assessments were conducted via videoconferencing.⁶³ In 2 years, Gray et al. reported that 1405 virtual geriatric consultations were provided to support small rural hospitals and almost half of the consultations consisted of case conference discussions (48%).⁵⁵ Virtual care systems were found to support healthcare teams by ensuring that at least one-third of older persons' care plans were being reviewed and that at least one patient's care plan was being reviewed per week in the hospital.⁵⁹ Virtual care meetings were found to be in-demand because they were generally shorter than in-person meetings. Healthcare providers appeared to be better prepared for videoconferencing meetings and more focused on addressing problems; however, these sessions could be more labour-intensive than in-person meetings and should be limited to no more than one hour per meeting.⁸

Acceptability. Satisfaction with virtual care was reported primarily in three groups: family, older persons and healthcare providers. Overall, 15 different articles reported on satisfaction with virtual care in one or more of the 3 groups discussed.^{2,4,7-9,16,17,19,20,50-52,55,62,63}

Families were highly satisfied with virtual care. Seven studies found high satisfaction with virtual care in family care partners or family caregivers.^{9,17,19,20,50,51,62} Family caregivers reported decreased caregiver burden, and found it strongly beneficial for avoiding difficulties associated with travelling with older persons with behavioural issues.^{17,50,62} Rural and first nation communities were able to receive specialist care in their home communities and increased family involvement was made possible by eliminating the need for travel.^{19,20} In a review on dementia care, one study reported that 100% of family care partners and patients preferred not driving to receive care and that 91% of care partners preferred virtual care over in-person care.⁹ Families readily accepted virtual visits and reported no negative impact on communicating openly and privately.⁵¹

Healthcare providers perceived virtual care as useful. A total of eight articles described virtual care as being satisfactory for healthcare providers.^{2,4,7,8,19,51,52,63} Physicians, nurses, physiotherapists and pharmacists found virtual care planning to be acceptable for case conferencing and patient follow-up, and felt high satisfaction with the positive care outcomes and resources saved.^{4,8,19,51,63} As well, time spent on videoconferencing was valued by providers and not seen as time-consuming or requiring a great deal of work.² However, it is critical that excellent planning and the proper steps for implementing videoconferencing (training, resources and technology) are in place to prevent technological difficulties that disturb clinical routine, scheduling or referral processes.^{19,51} With the exception of clinical exams, physicians report that information sharing was just as effective in a videoconferencing meeting compared to an in-person meeting.⁸ High usage and engagement during virtual team-based care discussions were reported across numerous LTC sites in the ECHO-AGE programme, suggesting usefulness and satisfaction among clinicians.⁵² Despite having no previous technological training, rural clinicians were particularly keen on exploring the possibilities of virtual care to support older person needs in rural communities.⁷

Virtual care met the needs of older persons. A total of 10 articles discussed satisfaction of virtual care in older persons and mixed findings were reported.^{8,9,16,17,19,20,50,51,55,63} Satisfaction is not uniform across all older persons as it depends on location, health care/treatment needs or personal needs. In studies with participants from rural and

First Nations communities, older persons who felt dissatisfied with previous rural health services saw virtual health services as a way to overcome poor access to specialists, lower stress by avoiding busy clinic environments or travel and reduce out-of-pocket travel expenses.^{9,17,20,55}

To illustrate, Silsand et al. reported the mean distance saved per virtual visit as 103 transportation miles per trip.⁸ During the COVID-19 pandemic, these points of satisfaction were further highlighted in populations including frail older persons.¹⁶ Older persons were also satisfied with the benefit of preserving their daily routine without disturbance.⁵¹ It is crucial to distinguish that these outcomes were being reported when virtual care was used as an addition rather than outright replacing current services.¹⁹

Older persons felt most dissatisfied when technological barriers were not able to be resolved. Additionally, care redundancies such as taking health appointments virtually while needing to take labs in-person also show that virtual care may not always be satisfying depending on the level of infrastructure and planning available.⁵¹ Within a virtual psychiatry service, the virtual team-based format included a social worker and a daughter who were able to assist with rewording assessment questions.⁵⁰ When conducting studies with older persons with dementia, deafness or cognitive barriers, satisfaction was difficult to measure because older persons would or were not able to give definitive answers.^{8,63}

Facilitators and barriers

Facilitators. Numerous facilitators were found in a total of 11 articles to support the implementation of virtual team-based care in formal care settings for older persons and their family caregivers.^{4,7,8,17,19-21,50,52,57,59} These facilitators were (a) technological facilitators, (b) reduced travel time and (c) obtaining buy-in from healthcare providers.

Technological facilitators. A total of six articles discussed various technological facilitators for virtual team-based care planning such as the use of existing telemedicine networks and prioritizing technical support and education.^{8,17,19,50,52,59} The successful adoption of virtual care depended on whether technological facilitators were in place to make new technologies easier for organizations, healthcare providers, older persons and families to use. One facilitator to implementing virtual care was tapping into existing resources such as well-established telemedicine networks and digital equipment.^{8,19} Conn et al. found that telepsychiatry services were successfully implemented in rural and remote areas of Northern Ontario, Canada because services were delivered using an existing telemedicine network that already had adequate infrastructure (i.e. scheduling and technology) and complete funding from the provincial Ministry of Health.¹⁹ The services were further sustained by key factors including administrative

support, use of telehealth champions and education on how to use telepsychiatry for healthcare providers.¹⁹ Many homecare service providers were found to have existing access to digital equipment such as computer tablets prior to the COVID-19 pandemic.⁸ This made it easier to conduct interdisciplinary videoconferencing meetings to support care transitions from hospital to primary care services for older persons.⁸

If technology was not yet put in place, it may easily be integrated in care using commercially available cloud-based programs that meet privacy standards and low-cost equipment such as computers and cameras.^{50,52} To support older persons who may be new to using virtual care technology, it was found to be important to offer technical support.¹⁷ Similarly, a key facilitator for virtual care was providing training and education for healthcare providers including using different software, equipment and opportunities to practice using technology.^{8,59}

Reduced travel time. The facilitator's reduced travel time was discussed as an important aspect of virtual care in five articles.^{4,8,17,20,57} Reduced travel time was found to be convenient and reduce costs for older persons with dementia and their caregivers.^{4,17} As such, reducing travel time was a key facilitator for ease in implementing and accessing care. In older persons requiring specialty cardiac care, virtual team-based care was also found to reduce stress related to having to attend in-person follow-up appointments at faraway clinics.²⁰ Healthcare providers perceived that teleconferencing could also be time-saving by reducing or eliminating travel time, allowing them to invest the time saved back into the care of older persons.⁵⁷ Reducing travel time for appointments could also make person-centred care better by ensuring that healthcare providers recognize the valuable time and energy of older persons and that some older persons have additional mobility issues associated with travelling due to complex chronic conditions.^{8,20}

Obtaining buy-in from healthcare providers. Another important facilitator for the implementation of virtual team-based care was getting buy-in from healthcare providers which were discussed in three articles.^{7,19,21} The amount of buy-in ultimately impacted the amount of time, effort and commitment that providers were willing to invest in this new way of practice. For effective virtual team-based care, there must be cohesion among the healthcare team developed through positive and respectful relationships, sustained professional relationships across services and continued programme promotion and outreach to local healthcare providers.¹⁹ By implementing a virtual programme to bring together interprofessional geriatric healthcare teams within primary care services through electronic networking, Emery et al. found that having a site champion in each of their clinics who was committed to offering their time and effort to support the BRIGHTEN programme was beneficial

for programme implementation.²¹ Teams of healthcare providers servicing rural areas were committed to ensuring the success of telehealth technology because it was perceived as addressing unequal access to services across geographical locations through innovation methods.⁷

Barriers. Many articles discussed barriers to implementing team-based virtual care (n = 17).^{2,7-9,16,17,19,20,52,56-63} Some of these barriers included using technology, access to technology and policy issues, healthcare providers perceptions about disruptions to usual care and healthcare providers experiencing challenges in conducting assessments virtually.

Technological issues and access to technology.

Technological issues and access to technology such as poor technological literacy or internet connectivity were discussed in 12 articles and the most common barrier reported.^{7-9,16,17,19,20,52,57,60,61,63} In these instances, healthcare providers perceived difficulties in using technology to provide virtual team-based care for older persons and that some systems were challenging to use.^{8,16,63} Providers suggested that healthcare organizations should adopt a single videoconferencing platform for meetings to reduce complexity in using technology and so that healthcare providers do not feel incompetent in using technology.⁸ Although some healthcare providers working within interprofessional primary care teams received training in using virtual technology, close to 60% of healthcare providers reported a need for additional training.¹⁶ Training in using technology can help enable normalization of virtual healthcare services for older persons and reframe skill sets within virtual care delivery.⁷ Older persons and their family care partners were also found to require training and support in using technology in order to overcome technological barriers.^{9,61} Family members of older persons were found to provide important support in assisting older persons in using virtual technology.⁸

For rural or low socio-economic status older persons, issues with internet connectivity prevented the use of videoconferencing within the homes of older persons and clinics.^{9,17,60} A lack of reliable internet connection was a concern for low-income neighbourhoods as older persons may be excluded from receiving virtual care due to digital literacy issues and being unable to afford high-speed/reliable home internet (Wi-Fi) or a suitable device.^{9,57} Sometimes, video equipment was unavailable for use at the patient's bedside or only available in offices and meeting spaces.⁸ Audio and visibility issues such as older persons' inability to hear providers and frozen computer screens were commonly reported as barriers to virtual care.⁹ It was found that the quality of interactions or visits with healthcare providers using virtual technology may have been poor due to sensory impairments among older persons such as visual and hearing loss, which was particularly noted in older persons with dementia.^{8,9,17,19,20} Older persons may find

technology to intrude on personal privacy especially when multiple equipment of varying sizes are brought into the homes of older persons.⁵⁷ Older persons who were unfamiliar with virtual technology did not understand how it could be used to support the atrial fibrillation care they needed in rural communities.²⁰ Back-up plans, such as phone conversations, were also important to put in place in case there were communication issues with technology.^{9,61}

For healthcare providers, certain applications may not be approved for use by health services regulatory bodies.⁶⁰ To overcome barriers in transferring medical information of patients from one site to another, Catic et al. recommended the use of confidential patient numbers and encrypting information about patients transferred electronically.⁵²

Healthcare providers perceived disruptions to usual care.

A total of eight articles discussed how healthcare providers perceived the implementation of virtual care or switching to virtual care as a disruption to usual care.^{2,7,8,17,19,56,59,62} Some healthcare providers reportedly perceived that adopting new technologies was disruptive to usual care practices because of time needed to implement, changed organizational and funding structures and altered referral processes.^{2,7,8} Innovations such as virtual technology were commonly used to support and enhance existing practices rather than changing them completely.⁵⁶ In some studies, healthcare providers felt constrained by processes in establishing clinics, scheduling for multiple providers across different time zones and finding space for virtual meetings.^{17,62} In another study, there were some delays in putting in place recommendations for older persons made by specialists due to resistance among family physicians in participating in the telemedicine process and referring patients for telepsychiatry assessments and frequent turnover of physicians.¹⁹ Meyer found that it could be difficult to persuade multidisciplinary teams to take part in virtual huddles and to encourage the implementation of recommendations into patient care plans.⁵⁹

Limitations to conducting physical examinations and assessments. In six articles, healthcare providers felt that virtual care jeopardized the quality of their physical examinations and assessments at times.^{7,8,17,57,58,60} For example, when older persons were confined to a bed in the hospital, it was difficult for healthcare providers to determine their physical condition through a screen.⁸ Telephone clinics did not allow healthcare providers to observe the non-verbal communication behaviours and cues of older persons.⁶⁰ For older persons with dementia, neuropsychological tests have not been validated for virtual use.¹⁷ In some instances, healthcare providers were forced to omit important neurological examination aspects such as gait evaluations and testing for rigidity and had to rely instead on the history of older persons and past observations of the neurologist.¹⁷ Similarly, many providers felt there were risks for adverse

events for older persons during virtual assessments such as falls during exercises or inappropriate positioning of video equipment and choking during swallowing assessments.^{7,57} Video technology was not always suitable for delivery of exercises due to lack of view of older persons related to camera angles (no suitable areas to put phone cameras) and concerns for those with balance issues.⁵⁷ At times, geriatricians connecting virtually have felt frustrated with not being able to perform physical examinations for certain older persons.⁵⁸

Discussion

The aim of this scoping review was to provide a comprehensive summary of the current landscape of virtual team-based care planning interventions. This summary included the delivery settings, residents and family care partners' perspectives, disciplines involved and outcomes targeted. Key findings were (a) virtual care addressed the complex needs of older persons and their families; (b) virtual care improved interdisciplinary team collaboration; (c) little to no family involvement in virtual care; and (d) health equity needs to be a key consideration when implementing virtual care.

Older persons and their families have complex care needs that are often unmet due to many gaps in care, particularly in rural or isolated communities where roughly 23% of Canadians over 65 years of age live.⁶⁴ This scoping review suggests that gaps in specialist access, interdisciplinary care and residents and family care partner needs are improved by virtual care planning. Evidence suggests that virtual care planning can improve the geographical distribution of specialist care, which is often limited to large or academic hospitals when delivered in-person.^{20,49,52,65}

Virtual care was found to improve interdisciplinary care which is recognized as a key outcome because both frail and healthy older persons may require coordinated and complex care from multiple health professionals to treat co-morbidities.⁶⁶ Although the call for interdisciplinary geriatric care has been around for decades, adoption has been slow and has faced numerous barriers.⁶⁷ Research on interdisciplinary geriatric care reports that clear communications systems between team members and co-locating teams to facilitate meetings are among the most important factors for its successful enactment.⁶⁸ However, co-locating teams on the same premises is also one of the largest barriers to interdisciplinary care because of financial cost, spatial constraints and/or geographical availability of healthcare professionals.⁶⁹ As a solution, virtual care planning meetings offer a feasible alternative by utilizing established information technology systems to facilitate interdisciplinary team meetings with high satisfaction and usefulness for diagnosis and care planning.^{69,70} Rajasekaran et al. reported that virtual care planning meetings for oncology were satisfying for 72.8% of providers

and 75% of patients during the COVID-19 pandemic, roughly 55% of whom were happy to attend only virtual care meetings in the future.⁷⁰ Ultimately, older adults are often interested in and satisfied with virtual team-based care planning when it is offered as an addition or alternative to complex care needs because traditional care alone is often insufficient or arduous.¹⁹

Increasing family involvement provides crucial support, especially to older adults with cognitive, sensory, or mobility impairments, enhancing care in multiple ways. For example, family care partners can be involved in tracking medication management across care transitions, encouraging physical activity to aid recovery or monitoring risks and deteriorations in condition to know when to seek care.^{71–73} Emerging research themes describe caregiver burden and high barriers to self-care for care partners in this supporting role.⁷⁴ Virtual care can alleviate some of these burdens for care partners by removing the need to drive to receive care.⁹ By addressing these barriers, virtual care planning meetings can increase care partner participation by lessening burden and burnout which ultimately improve outcomes for older adults. Overall, these practical and clinical gains provide evidence that virtual care can address many of the current problems and shortcomings in traditional care for older adults with complex care needs.

Virtual care during the COVID-19 pandemic can increase safety and access to healthcare services for specific groups of patients including those living in rural areas, experiencing mobility issues or currently working by eliminating the need for transportation and associated travelling costs (e.g. parking and mileage).⁷⁵ However, virtual care can also increase the digital divide among older persons and families if strategies are not put in place to address the barriers discussed. Patients living in rural areas may have limited access to technology, poor digital literacy and cannot access digital technology without travelling long distances to a clinical setting to participate in interdisciplinary virtual care discussions.⁷⁵

Social and structural determinants of health pose many challenges for patients trying to access virtual care because of lack of social support available, unaffordable out-of-pocket costs and inequities due to race, sex or socio-economic status.⁷⁶ Future directions for policy changes to promote health equity in virtual care should include greater funding towards digital health literacy education and training, providing easily accessible digital support for patients, and using culturally safe processes in implementing virtual care.⁷⁶ Complex interfaces for patients should be simplified for ease of navigation and better uptake of virtual care.⁷⁶ Marginalized groups such as older persons unfamiliar with using technology and those from a lower socio-economic status often require support in developing digital literacy skills.⁷⁷ Members of marginalized communities should be included in discussions

regarding how best to deliver virtual care so that it meets their health needs.⁷⁷ There is a need for greater investment in building relationships between health system decision-makers and communities impacted by health inequities to inform strategies to sustain virtual care and maximize its value.⁷⁸ Governments also have a key role in addressing health equity by investing in infrastructure for universal high-speed internet access and ensuring that access to devices and internet/phone plans can be provided.⁷⁸ With the current advances in technology, it is imperative that no one is being left behind with regard to benefiting from innovative care processes.

Only 4 out of 27 studies included in this scoping review involved older persons and families in virtual team-based care planning.^{21,56,61,63} These team-based conversations about goals of care were therefore often being conducted without the presence of older persons and families. Often, descriptions of the ‘team’ in team-based care planning seemed to be exclusive to clinical staff. This finding revealed the need to meaningfully engage older persons and families in care planning through innovative projects such as the virtual delivery of the PIECES intervention in LTC homes to build and sustain team collaboration and workforce resilience. In this project, older persons experiencing responsive behaviours and their families were invited to participate in virtual care conferences with a team composed of LTC home staff. These care conferences were held using videoconferencing and led by RPNs who were educated as PIECES champions with remote yet regular access to PIECES mentors to address their questions or concerns.

Conn et al. similarly reported the use of on-site champions as effective in providing staff with virtual care support.¹⁹ Findings of this scoping review revealed that obtaining buy-in from healthcare providers ensured that they recognized the value of a new way of practicing as well as encouraged them to put in time and effort to ensure the success of virtual team-based care.^{7,19,21} Key barriers that were found in this scoping review related to technological issues and access to the internet and devices for older persons, families and healthcare providers.^{7–9,16,57,63} In the current virtual PIECES project, these barriers associated with costs and technological training were addressed by the research team by providing internet access for the LTC homes, technology support, equipment such as large screen TVs and tablets and education and written resources about using videoconferencing software for older persons, families and healthcare providers.

Recommended strategies for implementing virtual team-based care planning

Recommended strategies for organizations interested in implementing virtual team-based care planning for older persons

Table 4. Recommended strategies for organizations to implement virtual team-based care planning.

Strategy	Rationale	Source
1. Ensure adequate funding is available to offer devices and internet access to older persons and families	From a health equity lens, it is important that virtual team-based care planning does not exclude older persons and families who cannot afford or do not have access to devices and the internet. Costs could be offset if some older persons and families have their own devices and reliable internet access. ^{9,57}	<ul style="list-style-type: none"> - Insights of the research team (i.e. academic researchers, resident and family/care partners, clinicians, RPNs and directors of LTC homes) - Hawley-Hague et al., 2021 - Yi et al., 2021
2. Provide in-person technological education and training on the benefits of virtual team-based care planning to older persons and families	Education and training should extend beyond healthcare providers. Older persons and families can benefit from in-person, one-on-one education in how to use virtual applications and devices so that they are not intimidated by technology. They could also benefit from being informed of the value of virtual care as this may be a new mode of care delivery for many. ^{7,8,17,59,61}	<ul style="list-style-type: none"> - Insights of the research team (i.e. academic researchers, resident and family/care partners, clinicians, RPNs and directors of LTC homes) - Meyer, 2011 - Powell and Silveira., 2021 - Powers et al., 2017 - Shulver et al., 2016 - Silsand et al., 2021
3. Create processes where older persons and/or families are included in virtual team-based care planning discussions	Older persons and families should be involved in interdisciplinary discussions aimed at developing care plans to improve the health of older persons. Being present at these meetings can ensure that everyone is receiving the same information and in agreement with treatment plans. This can improve relationships between older persons, families and the interdisciplinary team. ^{21,61,63}	<ul style="list-style-type: none"> - Insights of the research team (i.e. academic researchers, resident and family/care partners, clinicians, RPNs and directors of LTC homes) - Emery et al., 2012 - Powell and Silveira, 2021 - Tang et al., 2001
4. Develop processes to determine who would benefit from virtual team-based care planning and who would require in-person visits	There may be instances when in-person visits at a clinic are necessary to complete thorough physical assessments, tests and procedures. If older persons are already having to visit clinic settings, it is best to have them meet with healthcare providers in-person. That being said, they may not have the opportunity to meet the entire interdisciplinary team, which would be more feasible through virtual care. Virtual team-based care planning is ideal for older persons who already have an established relationship with healthcare providers. Older persons and families who are unable to travel to clinic settings may prefer virtual care for convenience. ^{16,20,51,56}	<ul style="list-style-type: none"> - Appleman et al., 2020 - Donnelly et al., 2021 - Gray et al., 2018 - Rush et al., 2019
5. Offer videoconferencing meetings for older persons and families instead of phone meetings	Videoconferencing is most comparable to an in-person meeting as older persons and families can hear and see their healthcare providers. This is therefore much more ideal than phone conferences or meetings. ^{56,61,63}	<ul style="list-style-type: none"> - Insights of the research team (i.e. academic researchers, resident and family/care partners, clinicians, RPNs, directors of LTC homes) - Gray et al., 2018

(continued)

Table 4. Continued.

Strategy	Rationale	Source
		- Powell and Silveira, 2021 - Tang et al., 2001
6. Include on-site champions to support healthcare providers	Having one to two on-site champions readily available to support healthcare providers in delivering virtual team-based care planning can reduce frustrations in using technology. It can also help with garnering buy-in from healthcare providers as they become more comfortable in using virtual applications and see the value of virtual care. Champions would provide positive encouragement for healthcare providers. ^{19,21}	- Insights of the research team (i.e. academic researchers, resident and family/care partners, clinicians, RPNs and directors of LTC homes) - Conn et al., 2013 - Emery et al., 2012
7. Have a back-up plan in place	Technological issues may occur that affect the ability of videoconferencing meetings to take place as planned. The lack of efficiency can lead to delays and negative perceptions of technology by older persons, families and healthcare providers. It is important to have a back-up plan in place when technology fails and inform older persons and families of the plan. This may include turning off the camera so that less bandwidth is used during the meeting and parties can still hear each other. The phone could also be used when there are issues with technology. Older persons and families should be provided with a number to call if videoconferencing is not functional. ^{9,61}	- Powell and Silveira, 2021 - Yi et al., 2021
8. Provide administrative and infrastructure support to mitigate healthcare provider concerns	To support the workflow of healthcare providers, administrative and infrastructure support are essential to prevent the disruption of clinical routines and efficiently manage scheduling/referral processes. Proper implementation is the key factor to mitigating healthcare provider hesitancy and improving sustainability of virtual care. ^{19,51}	- Appleman et al., 2020 - Conn et al., 2013

LTC: long-term care; RPNs: registered practical nurses.

were developed based on the synthesis of findings and insights of the research team (i.e. academic researchers, resident and family partners, clinicians, RPNs and directors of LTC homes). These strategies can help to reduce barriers that were identified within studies (e.g. no access to equipment and the internet or lack of training for older persons and families) and incorporate facilitators (e.g. on-site champions or getting buy-in of healthcare providers) to promote the optimal delivery of virtual team-based care planning. The strategies are relevant for all clinical settings. See Table 4 for eight recommended strategies along with rationales.

Implications for policy and research

Policy changes within the health care and health insurance system infrastructure are necessary to facilitate virtual team-based care planning. To begin, policy barriers for the widespread implementation of digital health include lack of data regulation, quality and privacy policies.⁷⁹ Sharing information electronically between specialists across sites (hospitals, LTC and community and home care) should be standardized to facilitate interdisciplinary collaboration. To augment the use of virtual care team-based planning interventions, billing and health coverage options for this

type of care need to be available to all older persons and families rather than only for those in certain healthcare systems.¹⁷ There is a need for more research in the area of virtual care to facilitate the policy reform necessary for broader implementation and help quantify the impact of virtual team-based care planning and the opportunity costs associated with not moving forward with optimization of technology. Research on this emerging topic should also address the lack of family and older person involvement/engagement by the virtual interdisciplinary care planning team.

Strengths and limitations

A key strength of this scoping review was the consultation of family members, older persons, clinicians and operation leaders. These key stakeholders provided guidance on directions for the scoping review and their perceptions helped to shape the discussion of scoping review findings. They were also instrumental in developing recommended strategies for organizations interested in implementing virtual team-based care planning for older persons and their families. Other strengths of the review include the use of NVivo for in-depth thematic analysis beyond what is required of a scoping review, and article screening by three interdisciplinary research team members blinded to screening outcomes of the other two members through use of Covidence.^{34,37,38} There were a few limitations of our review. Notably, this review reported on both pre- and post-COVID-19 pandemic interventions without separating the results. This perspective may limit the applicability of results in settings where pandemic restrictions are stringent. Our results also report numerous details on effect size; however, this summary of effect size is limited because it does not involve any formal meta-analysis or synthesis. Our results were also limited to those written in the English language.

Conclusion

Overall, findings revealed that multiple benefits (e.g. reduced responsive behaviours, decreased hospitalizations and improved medication management) can be achieved by implementing virtual team-based care planning for older persons and families across formal care settings. Although virtual team-based care meetings can lead to positive outcomes, there is a need to ensure that older persons and families are regularly invited to contribute to these discussions. Virtual team-based care planning was found to be acceptable and feasible by older persons, families and healthcare providers; however, multiple barriers may impact the success of its delivery. Education and training for older persons and families in using virtual technology should be prioritized along with training for healthcare providers. When organizations offer virtual care team-based care planning, this must be done in a way that reflects health equity and does not exclude marginalized populations.

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