



UNIVERSITY OF CALGARY
CUMMING SCHOOL OF MEDICINE



UNIVERSITY OF CALGARY
O'Brien Institute for Public Health
Health Technology Assessment Unit

Three Rapid Reviews

Focused on the COVID-19 Pandemic:
Caring for People with Cognitive Impairment
Caring for People at End-of-life
Effective Technology Use

The Health Technology Assessment Unit, University of Calgary

November 6, 2020

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1 Abbreviations

COVID-19	Coronavirus Disease 2019
DLQI	Dermatology Life Quality Index
DSM-5	Diagnostic and Statistical Manual of Mental Disorders, 5th Edition
HADS	Hospital Anxiety and Depression Scale
ICU	Intensive Care Unit
MOCA	Montreal Cognitive Assessment
N	Number
NA	Not Applicable
NCD	Neurocognitive Disorder
NR	Not Reported
PCI	Percutaneous Coronary Intervention
PGWB	Psychological General Well-Being Index
PPE	Personal Protective Equipment
PRESS	Peer Review of Electronic Search Strategies
PROSPERO	International Prospective Register of Systematic Reviews
QoL-AD	Quality of Life in Alzheimer's Disease
RCSES	Revised Caregiving Self-Efficacy Scale
RMBPC	Revised Memory and Behavior Problem Checklist
SD	Standard Deviation
SE	Standard Error
SF36V2	Short Form 36 Version 2
STEMI	Acute ST Segment Elevation Myocardial Infarction
TV-AssistDem	Television-based Assistive Integrated Service to Support People Living with Mild Dementia or Mild Cognitive Impairment
ZBI	Zarit Burden Interview Scale

2 Executive Summary

This report presents the findings and conclusions of three rapid reviews examining: 1) best care practices for persons with cognitive impairments during COVID-19, 2) best care practices for persons who are at end-of-life during COVID-19, and 3) effective use of technology during COVID-19. The primary research objectives for these reviews were:

1. What are the best practices for care and engagement of persons with cognitive impairments who are required to isolate/quarantine due to COVID-19 either at home in the community, or in long-term or supportive care facilities?
2. What are the best practices for care and support of persons of any age receiving end-of-life care in the community, long-term care facilities, hospice, or hospital during the COVID-19 pandemic?
 - How do we support quality of care for persons at end of life during COVID-19?
 - What are the COVID-19 symptoms for persons at end of life?
 - How do we reduce the impact and burden of isolation resulting from the pandemic for persons at the end of life, and their family, friends and caregivers, during COVID-19?
3. How do we promote the effective use of technology or other “distance tools” during COVID-19 isolation or quarantine to support patients (and/or their families, friends, or caregivers)?

Methods:

A rapid review methodology was used to gather and synthesize the available evidence to address the research questions above. Three rapid reviews were conducted:

- I. Rapid review of best practices for care and engagement of persons with cognitive impairments during the COVID-19 pandemic.
- II. Rapid review of best practices for care and support of persons receiving end-of-life care during the COVID-19 pandemic.
- III. Rapid review of effective technology use to support patients (and/or their families, friends, or caregivers) during the COVID-19 pandemic.

Key Findings:

Five studies were included in the rapid review of best practices for care and engagement for persons with cognitive impairments who are required to isolate/quarantine during COVID-19. Suggestions for care and engagement broadly focused on the use of telehealth services, cognitive stimulation, and social support for caregivers. Evidence suggests that multi-modal telehealth services, including online, telephone, and videoconferencing methods, are important for the well-being of community-dwelling persons with cognitive impairment during COVID-19 confinement. It is important for persons with cognitive impairment to receive continuous cognitive and environmental stimulation during COVID-19. Lastly, caregivers of persons with cognitive impairment also require social support. No recommendations for hospitalized persons or those in long-term or supportive care facilities were identified.

Fifty-six studies were identified in the rapid review of best care practices for persons at end-of-life during COVID-19. Most of the included studies were guidelines, tools/frameworks, and observational studies conducted in the United States, United Kingdom, and India. Given the recent emergence of COVID-19, practices account for how isolation and uncertainty have changed the needs of patients, and their families, at end of life. The practices reported most often were related to: communication; patient and family support/well-being, and symptom management; adequate medication and equipment supply. Based on the literature synthesized in this rapid review, it appears that there are no “one-size-fits-all” recommendations for best practice, but rather an extensive list of practices to consider based on the setting of care, patients’ needs, and needs of families and healthcare providers.

Seven studies were included in the rapid review of effective technology use to support individuals during COVID-19 isolation or quarantine. Four broad categories of technologies were identified: 1) provider-initiated active teleconsultations; 2) Zoom™-based training/interventions; 3) interactive technology; and 4) an app offering medical advice. Across studies, technology interventions administered through Zoom™, apps, telephone and video conferencing, and TV generally resulted in health outcomes that were either beneficial or comparable to regular care. As a result, technology interventions appear to be helpful substitutes for regular care when in-person communication is not possible, such as during COVID-19

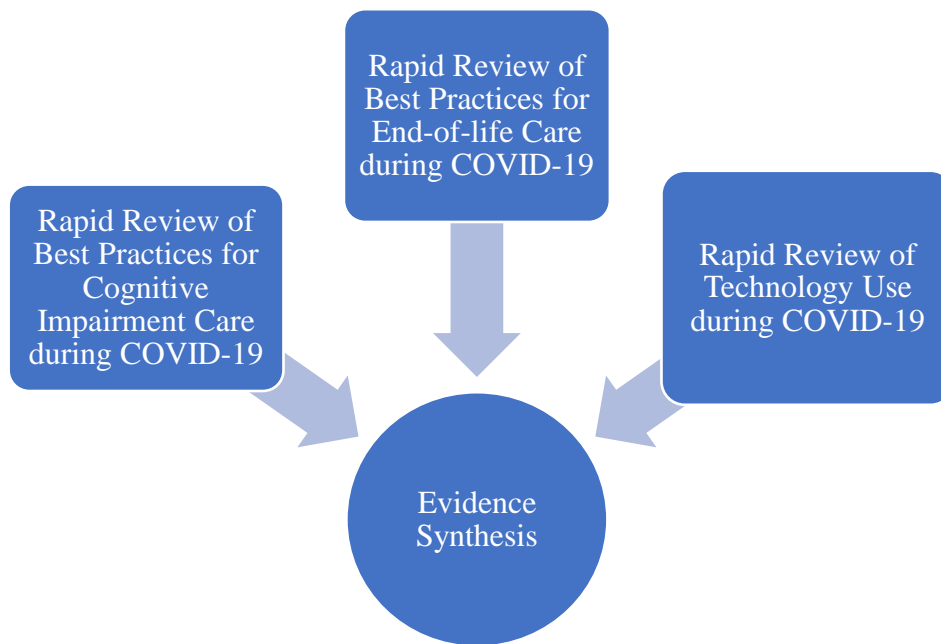
isolation/quarantine. However, these results should be interpreted with caution given the scarcity and the quality of the literature identified.

Overall, the findings of this evidence synthesis suggest that the literature related to best care practices of patients who are cognitively impaired or are at end-of-life and the literature on effective technology use during COVID-19 is generally disparate or scarce. The most robust evidence was identified for best care practices of patients at end-of-life, broadly suggesting that care should be tailored to the needs of the patient, their family, and healthcare providers, as well as the setting of care. Limited evidence suggests that care of persons with cognitive impairment should emphasize communication, cognitive stimulation, and social support for the patients and their caregivers. Lastly, technology interventions appear to be broadly beneficial, or at least comparable, to regular care, can be administered in a multitude of modalities, including Zoom™, apps, telephone, video conferencing, and TV-based interventions, and represent helpful substitutes for regular care when in-person communication is not possible.

3 Purpose of this Evidence Synthesis

The purpose of this evidence synthesis was to summarize the evidence on best care practices for persons with cognitive impairments and persons who are at end-of-life during COVID-19, as well as effective use of technology during COVID-19. This report synthesizes the findings from three rapid reviews on: 1) care and engagement of persons with cognitive impairments who are socially isolated/quarantined, 2) care and support of persons who are at end-of-life, and 3) effective use of technology to support patients (and/or their families, friends, or caregivers) (Figure 1).

Figure 1. Summary of Process



4 Research Question and Objectives

The primary research objectives for this evidence synthesis were to determine:

1. What are the best practices for care and engagement of persons with cognitive impairments who are required to isolate/quarantine due to COVID-19 either at home in the community or in a supported living facility?
2. What are the best practices for care and support of persons receiving end-of-life care in the community, long-term care facilities, hospice, or hospital during the COVID-19 pandemic?
 - How do we support quality of care for persons at end of life during COVID-19?
 - What are the COVID-19 symptoms for persons at end of life?
 - How do we reduce the impact and burden of isolation resulting from the pandemic for persons at the end of life, and their family, friends and caregivers?
3. How do we promote the effective use of technology or other “distance tools” during COVID-19 isolation or quarantine to support patients (and/or their families, friends, or caregivers)?

A rapid review methodology was used to gather and synthesize the available evidence to address the research questions above. Three rapid reviews were conducted:

- I. Rapid review of best practices for care and engagement of persons with cognitive impairments during the COVID-19 pandemic.
- II. Rapid review of best practices for care and support of persons receiving end-of-life care during the COVID-19 pandemic.
- III. Rapid review of effective technology use to support patients (and/or their families, friends, or caregivers) during the COVID-19 pandemic.

5 Rapid Review of Best Practices for Care and Engagement for Persons with Cognitive Impairments

Summary:

- Five studies were included in the rapid review of best practices for care and engagement for persons with cognitive impairments who are required to isolate/quarantine during COVID-19. Suggestions for care and engagement broadly focused on the use of telehealth services, cognitive stimulation, and social support for caregivers.
- Multi-modal telehealth services, including online, telephone, and videoconferencing methods, are important for the well-being of community-dwelling persons with cognitive impairment during COVID-19 confinement.
- It is important for persons with cognitive impairment to receive continuous cognitive and environmental stimulation during COVID-19.
- Caregivers of persons with cognitive impairment require social support.
- No recommendations for hospitalized persons or those in long-term or supportive care facilities were identified.

5.1 Purpose

To synthesize the published literature on best practices for care and engagement of persons with cognitive impairments who are required to isolate/quarantine due to COVID-19 either at home in the community or in a supported living facility.

5.2 Methods

5.2.1 Search Strategy

A rapid review was completed. The literature search was conducted by following the Cochrane interim guidance for rapid reviews.¹ Embase, MEDLINE, CINAHL, and PsycINFO were searched for studies. Given that COVID-19 emerged in 2019, the search was limited to studies published from 2019 until September 21, 2020. Terms aimed at capturing the population of interest, including “Alzheimer” and “dementia” were combined with isolation terms, such as “social isolation” and “quarantine,” and virus terms, such as “coronavirus,” using the Boolean Operator “and.” Terms were searched as text words in titles and abstracts and as MeSH subject headings when applicable. The search was limited to English or French language studies. The search strategy was developed by a research librarian and peer review of electronic search strategies (PRESS) was conducted by another research librarian.² The full search strategy is available in Appendix A.

In recognition of the rapid development of literature on COVID-19, Google scholar and a pre-print server (medRxiv) were searched for grey literature or literature not yet peer-reviewed. The reference lists of any systematic reviews identified during abstract or full-text review were hand-searched to ensure all relevant literature was captured. This rapid review is registered in the International Prospective Register of Systematic Reviews (PROSPERO), number CRD42020210905.

5.2.2 Study Selection

Screening calibration was completed by all reviewers involved in this rapid review prior to starting abstract screening and full-text screening. After >70% agreement was reached, screening of citations was completed by two independent reviewers using Microsoft Excel. Abstracts proceeded to full-text review if they: examined persons with cognitive impairment who were socially isolated or quarantined due to COVID-19 (either due to general isolation, or required isolation); included any or no comparator; and examined health-related impacts of isolation or quarantine, related to quality of care and engagement during isolation. Citations were excluded if they failed to meet the inclusion criteria above, or if they: were editorials, letters, or commentaries; or were published in languages other than English or French (Table 1). All abstracts selected for inclusion by any reviewer proceeded to full-text review. This initial screen was intentionally broad to ensure that all relevant literature was captured.

Studies included after abstract review proceeded to full-text review. Full-text review was completed by two independent reviewers. All studies selected for inclusion by any reviewer at the full-text screening stage proceeded to data extraction.

Table 1. Inclusion and Exclusion Criteria for Rapid Review of Cognitive Impairment

Inclusion Criteria	Exclusion Criteria
<ul style="list-style-type: none"> • Those with cognitive impairment • Isolation or quarantine due to COVID-19 • Any, or no comparator • Health-related impacts of isolation or quarantine, related to quality of care and 	<ul style="list-style-type: none"> • Commentaries, editorials, and letters • Studies published in languages other than English or French

5.2.3 Data Extraction and Analysis

Data were extracted by a single reviewer using a standard data extraction form and verified by another reviewer. For all studies, year of publication, country, study design characteristics, and practice considerations were extracted. Discrepancies between reviewers during data extraction were resolved through consensus. Data were analyzed using a narrative synthesis methodology. Similar suggestions for care and engagement provided by the study authors were grouped together, and findings for each study were summarized individually.

5.2.4 Quality Assessment

Quality assessment was not feasible or conducted because of the broad range of study designs included.

5.3 Results

5.3.1 Study Characteristics

The search strategy yielded 367 unique citations. After abstract review, 72 studies proceeded to full-text review (Figure 2). Sixty-seven studies were excluded for the following reasons: not related to cognitive impairment (n=29); study design not of interest (n=16), including editorials, commentaries and letters (Appendix A); did not report best practices or engagement (n=11); not related to isolation or quarantine methods (n=9); not English or French (n=1); and not retrievable (n=1). A total of five relevant studies were included in the final dataset³⁻⁷ (Figure 2).

Three of the five included studies were cohort studies,^{3,6,7} one was a survey,⁵ and another was a review article.⁴ Four studies provided recommendations for community-dwelling adults with cognitive impairment, while the review article did not indicate a specific setting (Table 2). The studies originated from India, China, Spain, France, and the Netherlands. Three broad suggestions for care and engagement were identified from the studies, including recommendations specific to: cognitive stimulation, social support for caregivers, and telehealth via online, telephone, and videoconferencing services (Table 3).

Figure 2. PRISMA Flowchart of Included Studies

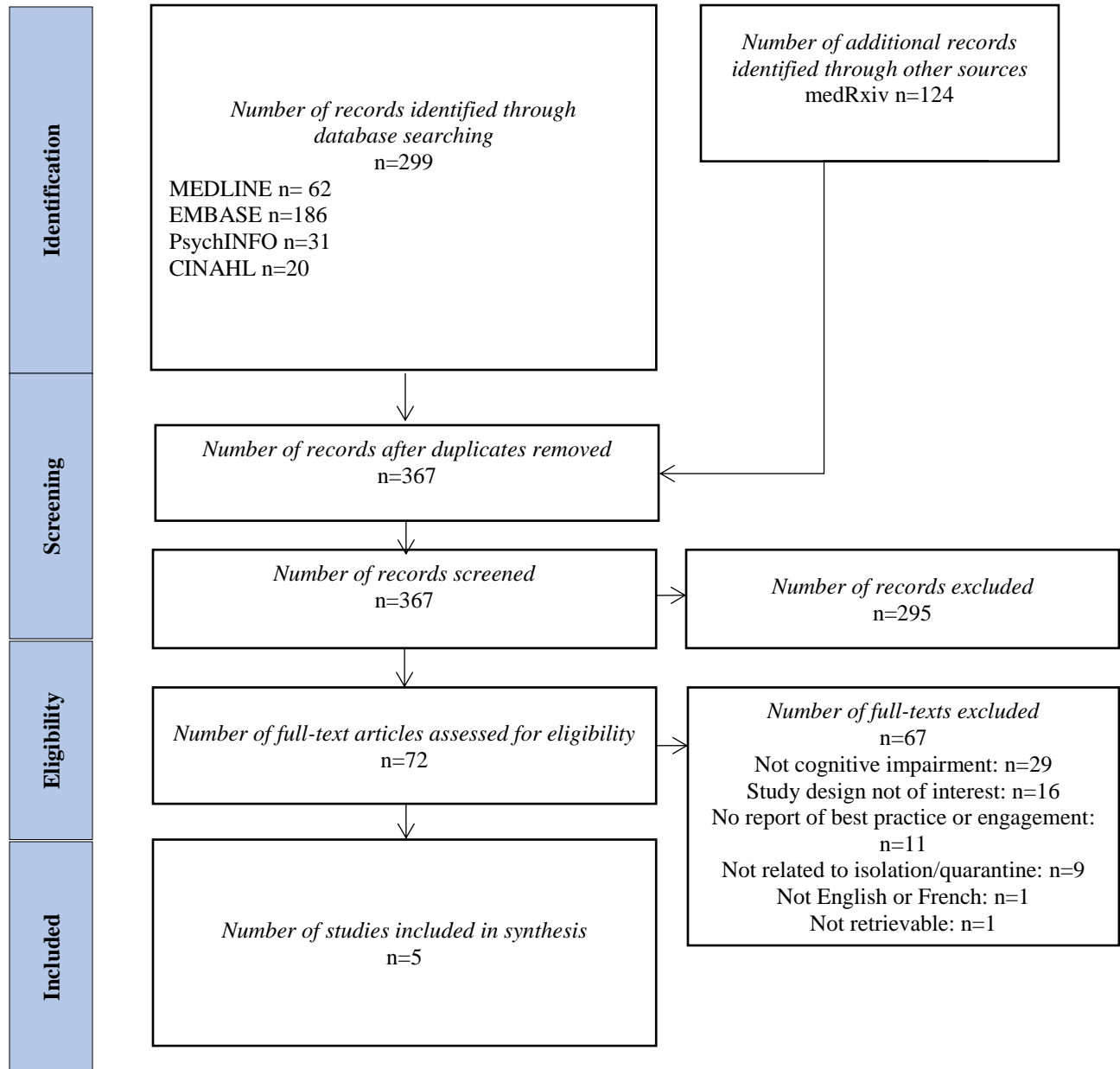


Table 2. Characteristics of Included Studies

Author (Country)	Mean Age	Population/ Diagnosis	Study Design	Study Objectives	Key Findings
Boutoleau-Bretonniere et al. ³ (France)	71.89 (SD=8.24)	Alzheimer's Disease (n=38)	Cohort	Effects of confinement during the COVID-19 crisis on neuropsychiatric symptoms in patients with Alzheimer's disease	Among the 38 patients, only 10 demonstrated neuropsychiatric changes during the confinement. Cognitive function of these 10 patients, assessed with the Mini-Mental State Examination, was worse than that of patients who did not demonstrate neuropsychiatric changes. Among the 10 patients with neuropsychiatric changes, the duration of confinement was significantly correlated with both the severity of neuropsychiatric symptoms, as well as with the distress experienced by caregivers.
*D'Cruz et al. ⁴ (India)	NA	Cognitive impairment (including dementia)	Review	To provide a thematic analysis and synthesis of both direct and indirect risks to older adults during the COVID-19 pandemic	NA
Goodman-Casanova et al. ⁵ (Spain)	73.34 (SD=6.07)	Mild Cognitive Impairment or Mild Dementia (n=93)	Survey (part of a larger RCT)	<ol style="list-style-type: none"> 1. Explore impact of confinement on the health and well-being of community-dwelling older adults with mild cognitive impairment or mild dementia. 2. Provide television-based and 	<ol style="list-style-type: none"> 1. There were no significant differences in health and well-being between the intervention and control groups. 2. Respondents with TV-AssistDem performed more memory exercises

				<p>telephone-based health and social support.</p> <p>3. Study the effects of a television-based assistive integrated technology, TV-AssistDem</p>	<p>than control respondents.</p>
Lai et al. ⁶ (China)	<p>72.87 (SE=0.84) in intervention group;</p> <p>72.73 (SE=0.84) in control group</p>	Dementia (n=60)	Cohort	<p>Evaluated whether supplementary telehealth via video-conferencing platforms could bring additional benefits to care-recipient with neurocognitive decline and their spousal caregivers at home</p>	<ol style="list-style-type: none"> 1. Supplementary telemedicine averted the deterioration in cognition in the telephone-only group. 2. The falling trend in quality of life observed in the telephone only group was reversed. 3. Varying degrees of improvements in physical and mental health, perceived burden, and self-efficacy were observed among caregivers in the video-conferencing group, which were absent in the telephone-only group
Zaagsma et al. ⁷ (Netherlands)	NR	Intellectual Disabilities (n=648)	Cohort (retrospective and prospective)	<p>Provide insight into the use of online support during the COVID-19 outbreak</p>	<p>COVID-19 outbreak and the related containment measures had a strong impact on online support use, specifically on the unplanned use of online support.</p>

Abbreviations: COVID-19: coronavirus disease 2019; n: number; NA: not applicable; NR: not reported; SD: standard deviation; SE: standard error

*Unspecified care setting, the other studies were in community care setting

Table 3. Recommendations for Persons with Cognitive Impairment During COVID-19 Isolation

Setting	Suggestions	Considerations	Source of Evidence
Unspecified	Cognitive stimulation	Older adults with delirium, major and minor neurocognitive disorders are vulnerable to deterioration due to the deprivation of environmental stimuli. Providing serial reorientation, visual and auditory aids, tactile stimulation, structuring their daily routine and incorporating cognitively stimulating material (art, music, aromatherapy, puzzles and games) ensures home based support of cognitive deficits. ⁴	Review article
Community	Social support for caregivers	In patients with Alzheimer’s disease, the duration of confinement was significantly correlated with the severity of symptoms as well as with their caregivers’ distress. Findings suggest that support should be offered to caregivers by social service authorities during crises. Support could include instrumental support (e.g., helping them with their daily living needs, housework, and managing neuropsychiatric changes in spouses), emotional support, informational support, and peer support from other caregivers who experience similar challenges. ³	Cohort study
	Social connectedness	When providing telehealth to people with a neurocognitive disorder and their caregivers at home, the authors suggest doing so via video conference, rather than telephone conversation alone. This could capture important social elements intrinsic to face-to-face interaction, which could be critically beneficial for this population. ⁶	Cohort study
	Online support	Offering online support in addition to regular onsite support for people with intellectual disabilities living independently may help service providers to be more flexible and responsive to fluctuations in support needs and support availability during a crisis like COVID-19. Authors note, however, that this service was operational pre-COVID-19, and that setting up a service of this scale quickly may be difficult. ⁷	Cohort study
	Television-based support	Television-based assistive integrated technology (TV-AssistDem) emerged as a promising cognitive stimulation and telehealth tool to deliver health care and facilitate remote caregiver support during exceptional circumstances, such as the current COVID-19 outbreak.	Survey

		People with mild cognitive impairment or mild dementia who used TV-AssistDem performed more memory exercises than control participants. Findings show the potential of television sets for informative, recreational, and intellectual purposes. ⁵	
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5.3.1.1 Telehealth Services

A study by Zaagsma et al. found that the utilization of online support by community-dwelling individuals with intellectual disabilities increased after the initiation of COVID-19 lockdowns.⁷ This service enabled them to contact a team of specially trained support workers at any time via videoconferencing or through telephone. The authors suggested that online support should supplement regular onsite support for people with intellectual disabilities living independently, as this may help service providers to be more flexible and responsive to fluctuations in support needs during the pandemic.⁷ They noted that this service was operational pre-COVID-19, and that setting up a service of this scale quickly may be difficult.⁷

Another study by Lai et al. evaluated the benefits of supplementary telehealth via videoconferencing in persons with dementia and found that those receiving supplementary videoconferencing services in addition to telephone services were less likely to experience a deterioration in general cognitive functioning compared to those receiving telephone services alone.⁶ Consequently, they recommended that health services should be provided to persons with neurocognitive impairment and their caregivers via videoconference applications such as Zoom, WhatsApp™, and FaceTime™, rather than by telephone conversation alone. They reiterated that this could capture important social elements intrinsic to face-to-face interaction, which could be critically beneficial for this population.⁶

5.3.1.2 Cognitive Stimulation

A survey by Goodman-Casanova et al. found that community-dwelling persons with mild cognitive impairment or mild dementia preferred television-based assistive integrated technology for recreation, information, and memory exercises during COVID-19 isolation.⁵ The authors suggested the use of this service as a cognitive stimulation and telehealth tool to deliver health care and facilitate remote caregiver support during the COVID-19 outbreak.⁵

An advocacy review by D’Cruz and Banerjee also suggested the need for cognitive stimulation among older adults with delirium and neurocognitive disorders on account of their susceptibility to deterioration due to the deprivation of environmental stimuli during isolation.⁴ They suggested that providing visual and auditory aids, tactile stimulation, structuring their daily routine, and

incorporating cognitively stimulating material such as, art, music, aromatherapy, puzzles and games, addresses the cognitive deficits.⁴

5.3.1.3 Social Support for Caregivers

In a study of persons with Alzheimer's disease, Boutoleau-Bretonniere et al. found that the duration of confinement was significantly correlated with the severity of symptoms, as well as with their caregivers' distress.³ Therefore, they suggested that during crises support should be offered to caregivers by social service authorities. These could include instrumental support (e.g., helping them with their daily living needs, housework, and managing neuropsychiatric changes in spouses), emotional support, informational support, and peer support from other caregivers who experience similar challenges.³

5.3.1.4 Other Measures

Other suggested measures, without evidence, to address the negative experience of confinement included keeping well-informed about COVID-19, accessing health and social services, having a reliable support network that decreases risk of exposure to COVID-19 and guarantees food and medical supplies, and establishing a daily routine with maintained sleeping habits and leisure activities.⁵

5.4 Conclusions

Multi-modal telehealth services, including online, telephone, and videoconferencing methods, are important for the well-being of community-dwelling persons with cognitive impairment during COVID-19 confinement. It is important for persons with cognitive impairment to receive continuous cognitive and environmental stimulation during COVID-19. Finally, caregivers of persons with cognitive impairment also require social support. No recommendations for hospitalized persons or those in long-term or supportive care facilities were identified.

6 Rapid Review of Best Practices for Care and Support of Persons Who Are at End-of-life

Summary:

- Fifty-six studies were identified in this search for identifying practices for those at end of life during COVID-19.
- Most of the included studies were guidelines, tools/frameworks, and observational studies conducted in the United States, United Kingdom, and India.
- Given the recent emergence of COVID-19, practices account for how isolation and uncertainty have changed the needs of patients, and their families, at end of life
- The practices reported most often were related to: communication; adequate medication and equipment supply; patient and family support/well-being, and symptom management.
- Based on the literature synthesized in this rapid review, it appears that there are no “one-size-fits-all” recommendations for best practice, but rather an extensive list of practices to consider based on the setting of care, the patient’s needs, and needs of the families and healthcare providers.

6.1 Purpose

To synthesize the published literature on: 1) best practices for care and support of persons receiving end of life care in the community, long term care facilities, hospice, or hospital during the COVID-19 pandemic; and 2) symptoms of COVID-19 in those at end of life.

6.2 Methods

6.2.1 Search Strategy

A rapid review was completed. The literature search was conducted by following the Cochrane interim guidance for rapid reviews.¹ Embase, MEDLINE, CINAHL, and PsycINFO were searched for studies published from 2019 until September 21, 2020. Given that COVID-19 is a new disease that emerged in 2019, the literature search was limited to 2019-onwards.

Terms aimed at capturing the population of interest, including “terminal care” and “palliative care” were combined with virus terms, such as “coronavirus,” using the Boolean Operator “and.” Terms were searched as text words in titles and abstracts and as MeSH subject headings when applicable. The search was limited to English or French language studies. The search strategy was developed by a research librarian and peer review of electronic search strategies (PRESS) was conducted by another research librarian.² The full search strategy is available in Appendix B.

In recognition of the rapid development of literature on COVID-19, Google scholar and a pre-print server (medRxiv) were searched for grey literature or literature not yet peer-reviewed. The reference lists of any systematic reviews identified during abstract or full-text review were hand-searched to ensure all relevant literature was captured. This rapid review is registered in the International Prospective Register of Systematic Reviews (PROSPERO), number CRD42020210943.

6.2.2 Study Selection

Screening calibration was completed by all reviewers involved in this rapid review prior to starting abstract screening and full-text screening. After >70% agreement was reached, screening of citations was completed by two independent reviewers using Microsoft Excel. Abstracts proceeded to full-text review if they: examined persons receiving end of life care during the COVID-19 pandemic; included any or no comparator; and examined health-related impacts of isolation or quarantine, related to quality of care and support during isolation. Citations were excluded if they failed to meet the inclusion criteria above or if they were editorials, letters, or commentaries; or were published in languages other than English or French (Table 4). All abstracts selected for inclusion by any reviewer proceeded to full-text review. This initial screen was intentionally broad to ensure that all relevant literature was captured.

Studies included after abstract review proceeded to full-text review. Full-text review was completed by single reviewers. All studies selected for inclusion by any reviewer at the full-text screening stage proceeded to data extraction.

Table 4. Inclusion and Exclusion Criteria for Rapid Review of End-of-life

Inclusion Criteria	Exclusion Criteria
<ul style="list-style-type: none"> • Patients receiving end of life care as defined by the study • Isolation or quarantine due to COVID-19 • Any, or no comparator • Health-related impacts of isolation or quarantine, related to quality of care, impact of technology or “distance tool”, 	<ul style="list-style-type: none"> • Commentaries, editorials, and letters • Studies published in languages other than English or French

6.2.3 *Data Extraction and Analysis*

Data were extracted by a single reviewer using a standard data extraction form and verified by another reviewer. For all studies, country, study design, practices and practice considerations were extracted. Discrepancies between reviewers during data extraction were resolved through consensus. Data were analyzed using a narrative synthesis methodology. Similar practices for care and engagement provided by the study authors were grouped together, and findings for each study were summarized individually.

6.2.4 *Quality Assessment*

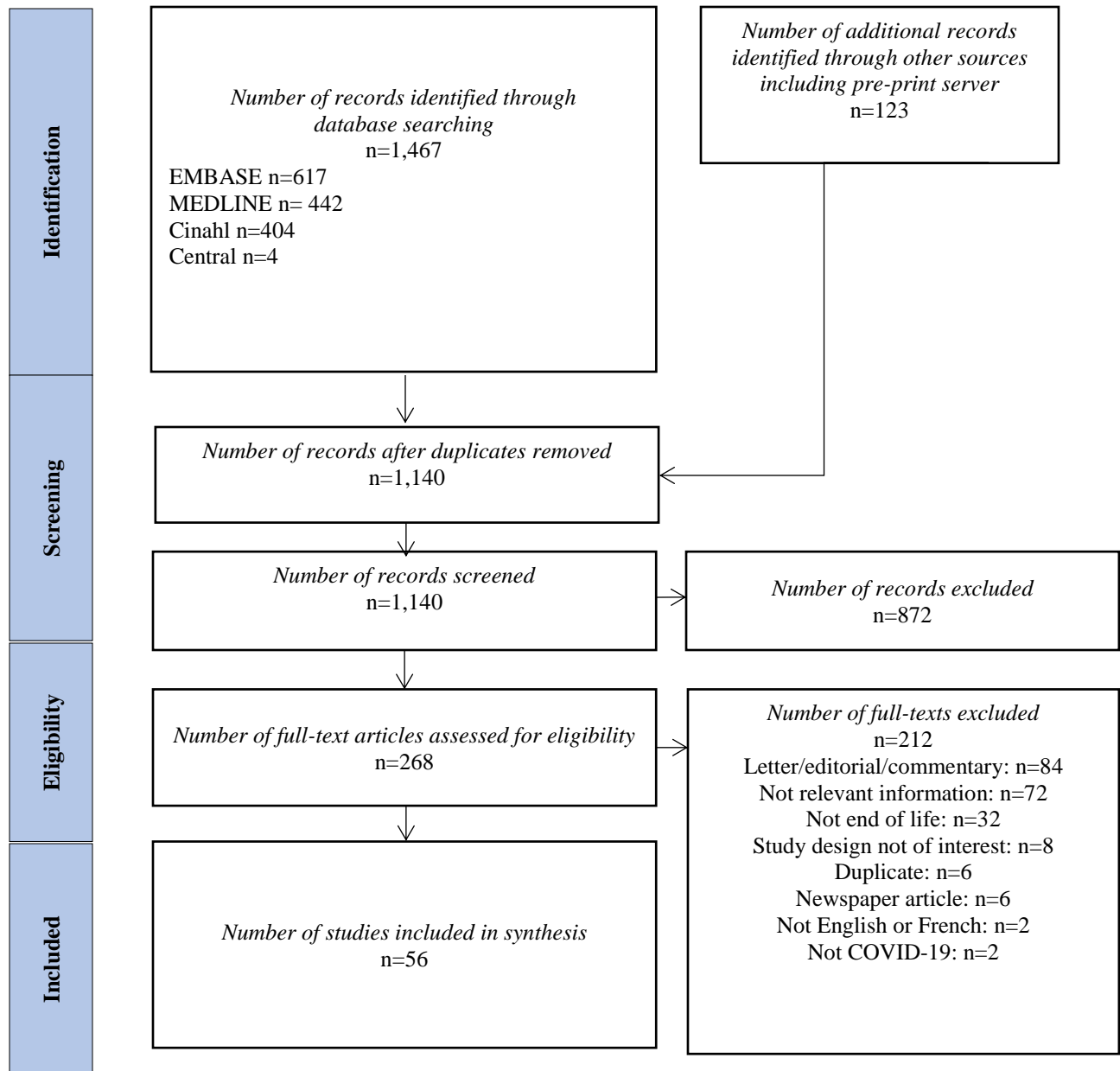
Quality assessment was not completed due to the range of study designs included. No meaningful comparative quality assessment was feasible.

6.3 **Results**

6.3.1 *Study characteristics*

The search strategy yielded 1,140 unique citations. After abstract review, 268 studies proceeded to full-text review (Figure 3). Two hundred and twelve studies were excluded for the following reasons: letter/editorial/commentary (n=84); not relevant information (n=72); not end of life (n=32); study design not of interest (n=8); duplicate (n=6); newspaper article (n=6); not English or French (n=2); not COVID-19 (n=2). Fifty-six relevant studies were included in the final dataset. References for studies that met all other criteria, but were excluded because they were commentaries or editorials can be found in Appendix B.

Figure 3. PRISMA Flowchart of Included Studies



Of the 56 included studies, ten were clinical guidelines,⁸⁻¹⁷ eight were tools/frameworks,¹⁸⁻²⁵ and seven were chart reviews²⁶⁻³² or cross-sectional studies.³³⁻⁴⁰ Additional study designs included case studies,⁴¹⁻⁴⁷ reviews,⁴⁸⁻⁵² case series,^{41,53-56} cohort studies,^{40,57-59} qualitative studies,⁶⁰⁻⁶² and one controlled non-randomized study⁶³ (

Table 5). Twenty-one studies originated from the United States, 13 from the United Kingdom, nine from India, five from Italy, two from Sweden, and one each from: France, Germany, Morocco, the Netherlands, Singapore and Switzerland. The primary setting of care discussed within the included studies was: hospital, long-term care, hospice, and community, with additional studies providing practice suggestions that were not specific to a particular setting. For additional information on study characteristics, see Appendix B. To address the aims of this report, the results section is divided into two sections: practices for end of life care, and symptoms of COVID-19 at end of life.

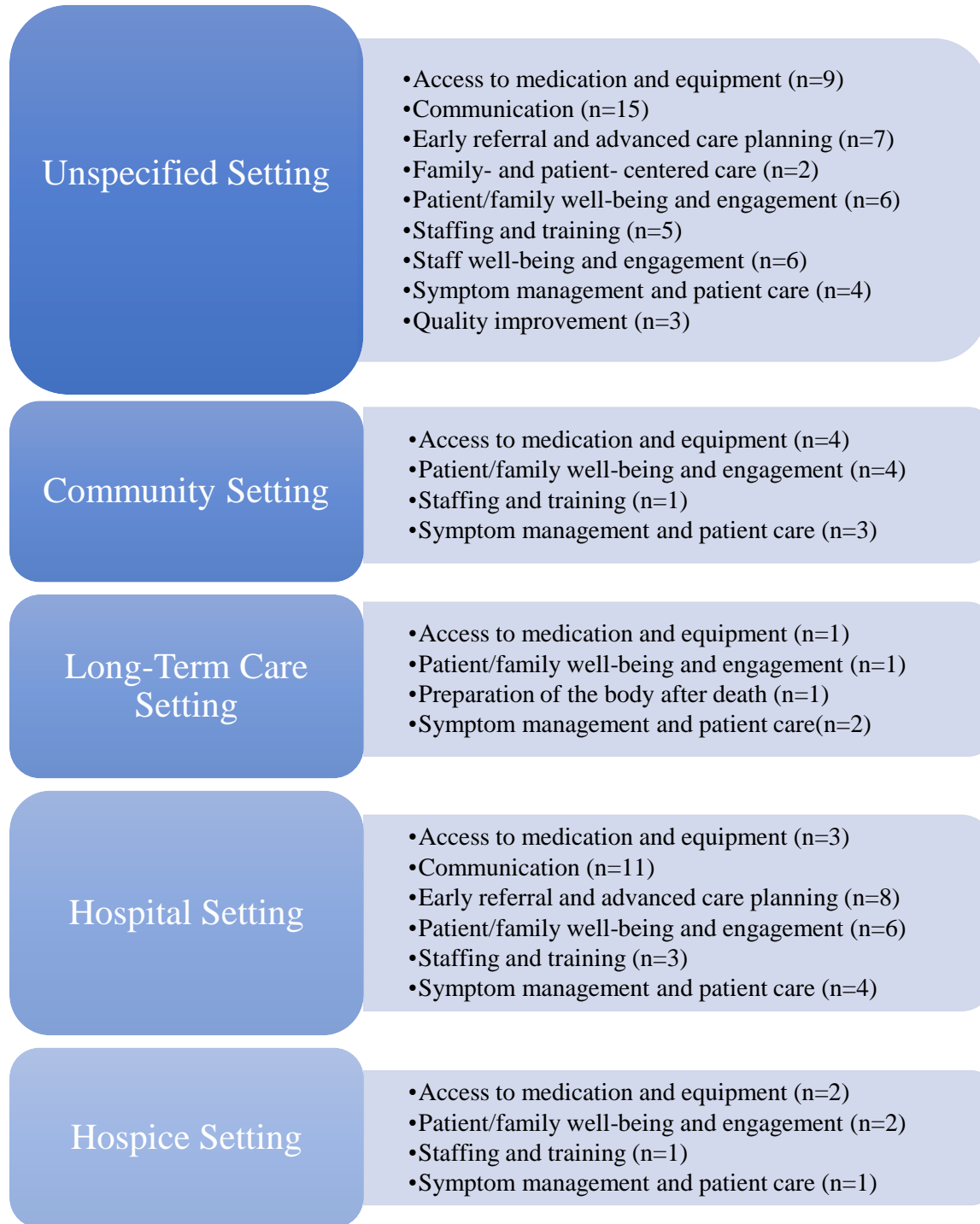
Table 5. Characteristics of Studies Included in the End-of-life Rapid Review

Study Design	Setting
Controlled non-randomized (n=1)	Hospital (n=1) ⁶³
Qualitative (n=3)	Community (n=1) ⁶² Hospital (n=1) ⁶⁰ Unspecified (n=1) ⁶¹
Cohort (n=4)	Community (n=1) ⁵⁸ Hospital (n=1) ⁵⁷ Long-term Care (n=1) ⁴⁰ Unspecified (n=1) ⁵⁹
Case Series (n=5)	Community (n=1) ⁵³ Hospital (n=3) ^{41,54,56} Unspecified (n=1) ⁵⁵
Review (n=5)	Long-term Care (n=1) ⁵² Unspecified (n=4) ⁴⁸⁻⁵¹
Case Study (n=6)	Hospital (n=5) ^{42-44,46,47} Unspecified (n=1) ⁴⁵
Chart Review (n=7)	Hospital (n=7) ²⁶⁻³²
Cross-Sectional (n=7)	Community (n=1) ³³ Hospital (n=4) ^{34,35,37,38} Hospice (n=2) ^{36,39}
Tools/Frameworks (n=8)	Hospital (n=3) ^{19,22,23,25} Unspecified (n=4) ^{18,20,21,24}
Guidelines (n=10)	Community (n=2) ^{8,15} Hospital (n=2) ^{13,17} Long-term Care (n=1) ¹¹ Unspecified (n=5) ^{9,10,12,14,16}

6.3.2 *Suggestions for Best Practice*

Given the recent emergence of COVID-19, there are few well-established best practices for end of life care during this global pandemic. Much of the literature relies on observational and qualitative studies to provide evidence for guideline, tools, and framework development. Within this literature, there are common suggestions, or considerations. An overview of the suggestions identified by setting can be found in Figure 4, and a narrative synthesis of these suggestions follows.

Figure 4. Overview of Suggestions by Setting



6.3.2.1 Setting not Specified

Sixteen studies provided suggestions and considerations for unspecified settings (Table 6). Suggestions on communication, access to medication and equipment (e.g., personal protective equipment (PPE) and medical equipment), and early referral/advanced care planning were the most common for unspecified care settings. Given the isolation/quarantine protocols due to

COVID-19, many of the communication considerations relate to using virtual technology to reduce face-to-face interaction (e.g., telemedicine). Benefits of telemedicine reported by patients include increased access to care, reduced discomfort, reduced travel time, and reduced risk of health-care associated infections.³⁴ Additionally, enabling loved ones to be with the patient virtually during clinical rounds, and at end of life, alleviated some of the burden of isolation if in-person visits are restricted. Given the new challenges with end of life care during COVID-19 (e.g., isolation, prognosis of COVID-19 at end of life, etc.), early referral and advanced care planning is important to ensure patient treatment goals and preferences are met.^{8,9,12,25}

Unique to unspecified settings were suggestions on staff well-being, patient- and family-centered care, and quality improvement. Considerations to help healthcare providers address and cope with the challenges of providing end of life care during COVID-19 include: encouraging self-care and improving emotional well-being of health care workers and caregivers,^{24,50} implementing measures to improve connectedness among staff,⁴⁸ and offering healthcare providers psychological support to cope with their experiences.¹² While suggestions related to patient- and family-centered care are discussed in other settings (e.g., clear communication between healthcare provider, patient and family to respect the needs and preferences of the patient), framing the relationship between healthcare provider, patient, and family as a collaboration or partnership was unique to those in unspecified settings. For quality improvement, it is suggested that continuous monitoring be done using standardized information collection to inform operational changes and quality of services,⁴⁸ and establish standard and resource-stratified palliative care guidelines and protocols for different stages of a pandemic.²⁴

Table 6. Suggestions for End of Life Care during COVID-19: Unspecified Setting

Suggestion	Considerations	Type of Evidence
Access to Medication and Equipment	<ul style="list-style-type: none"> • Monitor and ensure sufficient supplies of PPE, medications, intravenous catheters, lines, and diagnostic and monitoring equipment^{10,48,50} • Provide training on rational use of opioid medications to primary caregivers and health-care professionals • Have a centralized stock of anticipatory prescribing medications which are available 24 hours a day,³³ and allow for re-use of anticipatory prescribing medications³³ • For palliative anticancer treatments: act according to age, the patient’s general condition, co-morbidities, type of treatment (chemotherapy, immunotherapy, targeted therapy), line of treatment, stage and prognosis¹⁴ • Strengthen networking among palliative care organizations and local care providers to facilitate access to care locally⁶⁰ 	Two guidelines, ^{10,25} two frameworks, ^{14,24} one qualitative study, ⁶⁰ one systematic review, ⁴⁸ one cross-sectional study, ³³ one cohort study, ⁵⁹ and one rapid review ⁵⁰
Communication	<ul style="list-style-type: none"> • Utilize smartphone based technology to encourage the use of telemedicine, particularly to provide holistic care for those who are immunocompromised and unable to visit the hospital regularly;^{8,9,34,35,53} benefits of telemedicine reported by patients include increased access to care, reduced discomfort, reduced travel time, and reduced risk of health-care associated infections³⁴ • Use virtual technology to enable social communication, such as daily phone call to family,^{48 9 22,25} and include children when appropriate²² • Equip community health workers to conduct home-based palliative care activities²⁴ • Enable families to virtually partake in health decisions^{18,24} • “With virtual visits, acknowledge that a ‘one-size-fits-all’ mentality is a poor fit for the individualized needs of the heterogeneous palliative care population”⁴⁹ • Allow family members to participate in clinical rounds via virtual communication⁶¹ • If the family is not present at time of death, have the physician call immediately to inform them, answer questions, and offer condolences²² 	Four guidelines, ^{8,9,12,25} three systematic reviews, ^{22,48,49} two frameworks, ^{18,24} two cross-sectional studies, ^{34,35} two qualitative studies, ^{60,61} one rapid review, ⁵⁰ and one case series ⁵³
Early referral and Advanced	<ul style="list-style-type: none"> • Time from referral to death was significantly shorter during COVID-19 when compared with pre- 	Four guidelines, ^{8,9,12,25} one chart review, ²⁸ one

Suggestion	Considerations	Type of Evidence
Care Planning	<p>COVID-19; people who are Black, Asian and minority ethnic groups are most likely to have delayed referral²⁸</p> <ul style="list-style-type: none"> • Rapid triage to assess likelihood of response to treatment and recognition of dying⁴⁸ • Early discussion of advanced care planning should be implemented to determine patient’s preferences and treatment goals^{8,9,12,21,25} 	systematic review ⁴⁸ and one framework ²¹
Family- and Patient-Centered Care	<ul style="list-style-type: none"> • Encourage autonomy and individual choice such that “the patient’s preferences, needs, values, expectations, and goals as well as the family’s concerns, provide the foundation and framework for the palliative plan of care.”¹⁸ • Partnering with patients and caregivers to create a tailored care plan^{18,25} • Assign a specific contact person for each patient to help ensure continuity of care and timely communication with families before and after death²⁵ 	One framework, ¹⁸ and one guideline ²⁵
Patient/Family Well-being and Engagement	<ul style="list-style-type: none"> • Facilitation of socially distanced social activities with caregivers and patients⁶⁰ • Evaluate patients for distress using validated tools, and manage distress by providing access to emotional, psychological, and spiritual support including counseling, social work, chaplaincy and psychotherapy^{10,12,18,25,51} • Enlist informal networks of community-based and faith-based organizations to tele-connect with patients in need of basic social support and deliver compassionate care^{24,25} • Family members/loved ones should be invited and supported (e.g. being provided with PPE if indicated) to visit the dying patient with COVID-19 in person¹² • Family members/loved ones of deceased patients with COVID-19 should be offered bereavement support by healthcare professionals trained in palliative care or bereavement support^{12,51} • Offer the following support to family members/loved ones: dedicated space, place where they can sit, put on music, offer beverages, place for them to change their clothes and PPE; any disturbances caused by the equipment should be managed (e.g., turn away monitors, turn off alarms)⁵¹ 	Three guidelines, ^{10,12,25} two frameworks, ^{18,24} and one qualitative study ⁶⁰
Staffing and Training	<ul style="list-style-type: none"> • Provide training in communication and bereavement counselling for non-specialist staff^{12,24,48,50} • Restrict contact with volunteers, while encouraging them to make contributions to psychosocial 	Two guidelines, ^{9,12} one systematic review, ⁴⁸

Suggestion	Considerations	Type of Evidence
	<p>and bereavement care⁴⁸</p> <ul style="list-style-type: none"> • Allow for flexibility in deployment where staff can be moved from acute to community settings^{9,48} • "Staff taking care of patients with serious COVID-19 should receive training in optimizing clinician–patient communication whilst wearing personal protection equipment"¹² 	<p>one rapid review,⁵⁰ and one framework²⁴</p>
Staff Well-being and Engagement	<ul style="list-style-type: none"> • Encourage self-care, and practices such as debriefing to improve emotional well-being of health care workers and caregivers^{24,50} • Implement measures to improve connectedness among staff, facilitate camaraderie⁴⁸ • Staff caring for patients with serious COVID-19 should be offered psychological support to cope with their experiences¹² 	<p>Three guidelines,^{9,10,12} one systematic review,⁴⁸ one rapid review⁵⁰ and one framework²⁴</p>
Symptom Management and Patient Care	<ul style="list-style-type: none"> • Patients presenting with serious COVID-19 and distressing breathlessness despite optimal treatment of underlying causes should be given benzodiazepines, low-dose opioids for the palliative treatment of breathlessness¹² • Patients with serious COVID-19 in palliative care and distressing breathlessness should be given oxygen therapy for the palliative treatment of breathlessness when their transcutaneous oxygen saturation is <90% • Bridge elements of dermatology with the concepts of palliative medicine to help with the last stages of a patient's journey⁴⁵ • Ensure patient comfort and pay attention to their physical appearance⁵¹ • Have protocols in place for sedation and withdrawing vasoactive drugs⁵¹ • Have procedures in place for: preparing and transporting the patient to a place designated for therapeutic withdrawal; stopping hydration and nutrition; withdrawing a ventilator when extubation should be avoided, including having the necessary protection in place and managing bodily fluids; withdrawing care; removing the equipment; and transporting the body of the deceased⁵¹ • Palliative cancer care patients should be kept at home as much as possible, while maintaining contact by telemedicine¹⁴ 	<p>One guideline,¹² one review,⁵¹ one framework,¹⁴ and one case study⁴⁵</p>

Suggestion	Considerations	Type of Evidence
Quality Improvement	<ul style="list-style-type: none"> • Continuous monitoring using standardized information collection to inform operational changes and quality of services⁴⁸ • Establish standard and resource-stratified palliative care guidelines and protocols for different stages of a pandemic and based on rapidly evolving situations and scenarios²⁴ 	One systematic review, ⁴⁸ one framework, ²⁴ and one guideline ¹⁰

6.3.2.2 Community Setting

Six studies reported suggestions for end of life care in a community setting (Table 7). Unique to providing care in the community setting are suggestions on how to reduce frequent home care visits. By using different methods to deliver medication to patients such as postal service, pharmacy deliveries, home delivery, or drive-through pick-up, the exposure between patient and healthcare provider can be reduced.^{8,15,58} Suggestions for symptom management for patients in the community include coordinating services for patients returning home (e.g., ambulance service); preparing the caregiver to care for patient at home; helping ensure basic needs are met such as grocery and financial needs; and, coordinating last rituals.⁶⁰ Some guidance for patients in the community to cope with isolation include: maintaining a daily routine; engage in physical activities and spending time outdoors; schedule calls/video chats/virtual games; recognize events/milestones; and maintain patient autonomy, and consider online services or contactless services (e.g. pet therapy).⁵⁵

Table 7. Suggestions for End of Life Care during COVID-19: Community Setting

Suggestion	Considerations	Type of Evidence
Access to Medication and Equipment	<ul style="list-style-type: none"> • Use different methods to deliver medication to patients such as postal service, pharmacy deliveries, home delivery, or drive-through pick-up; provide 2-4 weeks supply to avoid frequent home visits^{8,15,58} • Increase access to palliative care in the community⁵⁰ 	Two cohort studies, ^{15,58} one clinical guideline, ⁸ and one rapid review ⁵⁰
Patient/Family Well-being and Engagement	<ul style="list-style-type: none"> • Provide support and services such as: psychosocial support, and end of life care^{15,58} • Discuss quality of life and screen for depression⁵⁵ • Contact via telephone to registered home care patients can provide extended support, diet consultation, physiotherapy advice and assessment of the need for a home care visit^{15,58} • Encourage patients and caregivers to maintain a daily routine;^{55,62} engage in physical activities and spend time outdoors, schedule calls/video chats/virtual games, recognize events/milestones, and maintain patient autonomy⁵⁵ • Consider online services or contactless services (e.g. pet therapy)⁵⁵ 	Two cohort studies, ^{15,58} one qualitative study, ⁶² and one case series ⁵⁵
Staffing and Training	<ul style="list-style-type: none"> • Address learning needs for community healthcare staff to support family carers⁵⁰ 	One rapid review ⁵⁰
Symptom Management and Patient Care	<ul style="list-style-type: none"> • Coordinate services for patients returning to home such as ambulance service, preparing caregiver to care for patient at home, helping ensure basic needs are met such as grocery and financial needs, and coordinating last rituals⁶⁰ • Manage cough with cough suppressant or honey if it is distressing, and encourage patients to avoid laying on their back⁸ • Encourage patients to drink fluids regularly if they have fever⁸ • Consider benzodiazepine to manage anxiety or agitation^{8,62} 	Two qualitative studies, ^{60,62} and one guideline ⁸

6.3.2.3 Long-term Care Setting

Two studies reported suggestions and considerations in long-term care settings (Table 8).

Considerations for long-term care settings are similar to those reported for unspecified, hospital, and hospice settings, including stockpiling medications, communication with family/caregivers about visitation restrictions, and using a frailty scale to inform decisions about care plan and treatment.¹¹

Table 8. Suggestions for End of Life Care during COVID-19: Long-Term Care Setting

Suggestion	Considerations	Type of Evidence
Access to medication and Equipment	<ul style="list-style-type: none"> Care homes should work with GPs and local pharmacists to ensure that they have a stock of anticipatory medications and the community prescription chart, to enable, at short notice, palliative care for residents 	One guideline ¹¹
Patient/Family Well-being and Engagement	<ul style="list-style-type: none"> Communicate openly about impending death¹¹ Discuss visiting restrictions¹¹ Specialists in pastoral/spiritual care should be present and part of the expanded care team and available to families and patients¹¹ 	One guideline ¹¹
Symptom Management and Patient Care	<ul style="list-style-type: none"> Health care professionals may find the Clinical Frailty Scale (CFS) to be a useful resource in making and discussing escalation decisions¹¹ “If required, MPC [mobile palliative care] teams are...to be called in to residential and nursing homes to ensure optimal treatment.”¹¹ 	One guideline ¹¹ and one cohort study ⁴⁰
Preparation of the Body after Death	<ul style="list-style-type: none"> To date, there is no evidence of infection from exposure to the body of someone who died from COVID-19; however, guidance on the preparation and transportation of the body must be followed¹¹ 	One guideline ¹¹

6.3.2.4 Hospital Setting

Twenty-five studies reported suggestions and considerations for hospital setting (Table 9). Suggestions for hospital settings are similar to those in the unspecified setting, including a focus on facilitating virtual visits, early communication with family/caregivers to clarify end of life directives, and offering spiritual/psychological support to patient and families. Morris et al.²² suggest a number of ways to mitigate the burden of isolation in hospital settings, including: asking families for photos so ICU teams can see who they were before becoming ill; asking families if the patient has a favorite type of music and play it in their hospital room; placing a “Getting to know you” poster on the patient’s door; suggesting families make an audio recording that can be played by staff for the patient, telling them the things they would tell them in person; and, considering tracing handprints or making hand molds of the patient.

Table 9. Suggestions for End of Life Care during COVID-19: Hospital Setting

Suggestion	Considerations	Type of Evidence
Access to Medication and Equipment	<ul style="list-style-type: none"> • Provide health-care workers with proper PPE, medication kits, and equipment needed for patients; patients indicated fear of getting infected due to lack of available PPE • Provide a longer intravenous line so that medication pump could remain in the corridor for nursing to use as needed without re-entering the room⁴⁶ • Resources including availability of ICU beds, key medications such as sedatives and opioids, supportive treatments such as dialysis machines, and personal protective equipment within all hospitals should be closely monitored¹³ 	One cross-sectional survey, ³⁷ one case study, ⁴⁶ and one guideline ¹³
Communication	<ul style="list-style-type: none"> • Do not restrict visitors; the psychosocial, and spiritual toll on patients and loved ones at end of life cannot be underestimated⁴⁶ • Use video conference to enable goals of care discussions with patients and their loved ones, enable access to spiritual, religious and existential care, guarantee the presence of family members in isolation at end of life^{17,41,44,46,47,59} • Assess a family or patient's capacity to use a technology prior to setting up a session; some education or an interpreter may be required^{17,43} • Train providers on how to set-up virtual visits with patient and their family, and source necessary equipment (e.g., tablet and adequate sound)³⁸ • Provide phones that automatically answer on the patient side when dialed to preserve PPE and limit nurses need to enter the room⁴⁶ • Build capacity for virtual care/telehealth;¹⁰ palliative care physicians can provide education regarding the clinical situation and cultivate prognostic awareness using virtual care⁴¹ 	Six case studies, ^{41-44,46,47} two guidelines, ^{10,17} one tool, ¹⁹ one cohort study, ⁵⁹ and one qualitative study ³⁸
Early Referral and Advanced Care Planning	<ul style="list-style-type: none"> • Have timely, clear and realistic conversations with families to clarify end of life directives for patients and their families to preserve values and respect for all those involved^{10,13,17,27,31,42,59,63} • Foster relationship-based care early in the ICU stay¹³ • Ensuring timely specialist consultation of palliative care, particularly given visitor restrictions and rapid decline of patients¹⁷ 	Three guidelines, ^{10,13,17} two chart reviews, ^{27,31} one case study, ⁴² one cohort study, ⁵⁹ and one controlled non-randomized study ⁶³
Patient/Family Well-Being and	<ul style="list-style-type: none"> • Install windows in solid doors to improve assessment of patients' symptoms while allowing for PPE preservation and limiting nursing and provider's need to enter the room⁴⁶ 	Three case studies, ^{42,46 47} two guideline, ^{13,17} and

Suggestion	Considerations	Type of Evidence
Engagement	<ul style="list-style-type: none"> • For ICU patients, ask families for photos so teams can see who they were before becoming ill²² • Ask families if the patient has a favorite type of music and play it in their hospital room²² • Place a <i>Getting to know you poster</i> on the patient’s door, created by a staff member with a family member over the phone²² • Suggest families make an audio recording that can be played by staff for the patient, telling them the things they would tell them in person²² • Depending on infection status, consider tracing handprints or making hand molds of the patient²² • Preparing the family regarding the patient’s condition and what they might see in the ICU room⁴⁷ • Have a triage team available for consultation throughout the day with at least one ethicist, two senior healthcare professionals and a palliative medicine physician¹³ • Provide psychological support for patient, family, and healthcare providers¹³ • Help families and patients process their grief and feel supported at end of life¹⁷ 	one review ²²
Staffing and Training	<ul style="list-style-type: none"> • Use digital health solution that can bring palliative care resources to frontline clinicians (e.g., PalliCOVID)²⁰ • Enable current care nurses to provide palliative sedation during other scheduled medication administration to limit health care worker exposure and PPE usage⁴⁶ • Involve palliative medicine team in supporting healthcare professionals in the ICU and those caring for patients not allocated ICU beds¹³ 	One guideline, ¹³ one tool, ²⁰ and one case study ⁴⁶
Symptom Management and Patient Care	<ul style="list-style-type: none"> • Advocate for adequate sedation of patients receiving mechanical ventilation when appropriate¹⁷ • Ensure adequate pain management for patients with chronic or cancer pain, in addition to sedatives and necessary anxiolytic support¹⁷ • Treatment of dyspnea, gastrointestinal distress and other symptoms to optimize comfort and function¹⁷ • Partner with palliative care pharmacist and other specialists for complex symptoms and patients with multimorbidity¹⁷ • Use the Preadmission Palliative Performance Scale to predict mortality in patients hospitalized with COVID-19, and to make informed decisions about life-sustaining therapy⁵⁷ • Use standardized order sheets and protocols with precise instructions in order to make adjustments to medications as quickly as possible⁴² 	Two case studies, ^{42,46} one cohort study, ⁵⁷ and one guideline ¹⁷

6.3.2.5 Hospice Setting

Two studies reported suggestions and considerations for hospice setting (Table 10). Many of the suggestions overlap with suggestions in other settings, including utilizing telehealth and virtual visitation to reduce exposure and reduce feelings of isolation, having adequate PPE to protect staff, and providing psychological and bereavement support for families.

Table 10. Suggestions for End of Life Care during COVID-19: Hospice Setting

Suggestion	Considerations	Type of Evidence
Access to Medication and Equipment	<ul style="list-style-type: none"> • Protection of health care providers against COVID-19 through use of barrier precautions should be the highest priority to avoid illness and mitigate psychological distress. Suggestion of hand hygiene, mask, gown, goggles and gloves to be used for any confirmed or suspected COVID-19 case³⁶ • Reduce use of personal protective equipment by using telehealth services³⁹ 	Two cross-sectional surveys ^{36,39}
Patient/Family Well-Being and Engagement	<ul style="list-style-type: none"> • Daily phone calls facilitated between families and patients³⁶ • Telehealth solutions used more generally in palliative care and hospice may contribute to cost savings, increased clinical effectiveness, and increased quality of care³⁹ • Telehealth increases feelings of connection to providers among palliative care and hospice patients in rural settings; video telehealth was perceived to improve access and enhance feelings of connection between patients and providers³⁹ 	Two cross-sectional surveys ^{36,39}
Staffing and Training	<ul style="list-style-type: none"> • Education on symptom management and end of life care³⁶ • Involvement of allied care workers in providing psychological and bereavement support³⁶ 	One cross-sectional survey ³⁶
Symptom Management and Patient Care	<ul style="list-style-type: none"> • Develop setting-specific guidelines for end of life care³⁶ 	One cross-sectional survey ³⁶

6.3.3 Symptoms of COVID-19 at End of Life

Ten studies reported COVID-19 symptoms specific to those who were at end of life (Table 11). Patients were all adults, predominately over 65 years of age. There was a wide variety of symptoms, with the most being delirium, dyspnea, fever, and agitation. The least commonly reported symptoms were tachypnea, runny nose, myoclonus, headache, discomfort, decreased appetite, and anxiety.

Table 11. Symptoms of COVID-19 at End of Life

		Chart Reviews						Case Study/Case Series		Review	Guideline
		Chidiac et al. ²⁸	Alderman et al. ²⁶	Heath et al. ²⁹	Sun et al. ³²	Hetherington et al. ³⁰	Lovell et al. ⁵⁶	Pahuja et al. ⁴⁶	Rao et al. ⁴¹	Perrotta et al. ⁵²	Damani et al. ¹⁰
Symptoms	Agitation	X	X	X		X	X				
	Anxiety				X						
	Breathlessness	X	X	X			X				
	Chills							X			
	Cough					X	X		X	X	
	Decreased Appetite							X			
	Delirium		X	X	X	X	X				X
	Diarrhea							X	X	X	
	Discomfort										X
	Drowsiness or Weakness	X				X	X	X			
	Dyspnea				X	X			X	X	X
	Fever	X				X	X		X	X	
	Headache									X	
	Myoclonus				X						
	Nausea				X			X			
	Pain				X	X	X				X
	Pneumonia									X	
	Runny Nose									X	
Sputum					X	X			X		
Tachypnea									X		
Vomiting				X			X				

6.4 Conclusions

We conducted a rapid review to synthesize the published literature on best practices for care and support of persons receiving end of life care in the community, long-term care facilities, hospice, or hospital during the COVID-19 pandemic. Of the 1,140 citations captured in our search, 56 met our inclusion criteria. Of the included studies, we identified ten overarching suggestions for best practices in caring and supporting patients, and their families, at end of life during COVID-19. Suggestions were stratified by care setting: unspecified, community, long-term care, hospital, and hospice. Most of the studies were guidelines, tools/frameworks, or observational studies conducted in the United States, United Kingdom, and India. Quality assessment was not conducted due to the range of study designs included. No meaningful comparative quality assessment was feasible.

Based on the literature synthesized in this rapid review, it appears that there are no “one-size-fits-all” recommendations for best practice, but rather an extensive list of considerations to be made based on the setting of care, the patient’s needs, and needs of the families and healthcare providers. Many suggestions consider the impact isolation has had on end of life care, and acknowledge that needs of the patient and their family/caregivers may have changed due to the COVID-19 pandemic. There is general consensus across settings that visitor restrictions are not encouraged. However, given the varying public health protocols in place, if in-person visitation must be restricted, virtual visits must be supported. This requires adequate infrastructure (e.g., tablets, internet connection, trained staff) to enable successful connection between patients and their loved ones. Early and transparent communication between healthcare providers and the patient and their family were often discussed, as it is a necessity for allowing the patient and family to make appropriate decisions about the patient’s care and treatment plan. Being transparent about how COVID-19 has impacted end of life care (e.g., isolation, prognosis if patient should contract COVID-19) is crucial to ensure the patient’s needs and wishes are met. Additionally, social, psychological, and spiritual support may be more important now than ever given the additional burden of isolation and feelings of uncertainty COVID-19 has placed on end of life care. Many studies suggested that a collaborative effort between the healthcare team, community (e.g., social) networks, spiritual guidance, and counselling may best support the patient and their family. There were some innovative ideas for reducing PPE use such as utilizing

telehealth to limit face-to-face interaction, and providing medication within the community setting by utilizing different medication delivery services to reduce home care visits.

Given the recent emergence and rapidly evolving impacts of COVID-19, extensive best practices on delivering end of life care during this pandemic have not yet been developed. However, the results of this rapid review provide the most up-to-date suggestions to provide effective end of life care that mitigates the burden of isolation, meets the wishes of the patient and loved ones, and supports the healthcare providers.

7 Rapid Review on Effective Technology Use during COVID-19 Isolation or Quarantine

Summary:

- A rapid review identified seven studies examining the effective use of technology to support individuals during COVID-19 isolation or quarantine.
- Four broad categories of technologies were identified: 1) provider-initiated active teleconsultations; 2) Zoom-based training/interventions; 3) interactive technology; and 4) apps offering medical advice.
- Provider-initiated teleconsultations resulted in improved quality of life for patients with chronic skin diseases, reductions in anxiety and depression in patients quarantined due to suspected COVID-19, and prevented deterioration in cognitive status and quality of life in patients with a neurocognitive disorder.
- Zoom-based fitness classes resulted in reductions in anxiety in patients with cancer, and Zoom-based training for patients with type 1 diabetes led to comparable glycemic outcomes to face-to-face training.
- Older adults with mild cognitive impairment or mild dementia who used a television-based assistive integrated technology performed significantly more memory exercises than their counterparts who only received regular care; no other significant differences in health, well-being, or activities performed were observed.
- Use of a medical advice app resulted in shorter time to treatment in patients diagnosed with acute STEMI who underwent primary PCI compared to patients who did not use the app; no differences were observed with respect to in-hospital and 30-day adverse events following the primary PCI procedure.
- Technology interventions appear to be helpful substitutes for regular care when in-person communication is not possible, such as during COVID-19 isolation/quarantine. However, these results should be interpreted with caution given the limited quantity and quality of the literature identified.

7.1 Purpose

To synthesize the published literature on the effective use of technology or other “distance tools” to support individuals (and/or their families, friends, and caregivers) during COVID-19 isolation or quarantine.

7.2 Methods

7.2.1 Search Strategy

A rapid review was completed. The literature search was conducted by following the Cochrane interim guidance for rapid reviews.¹ MEDLINE and CINAHL were searched for studies. Given that COVID-19 emerged in 2019, the search was limited to studies published from 2019 until

October 3, 2020. Terms aimed at capturing the technologies of interest, including “telemedicine” and “telehealth” were combined with virus terms, such as “coronavirus” and “COVID-19,” using the Boolean Operator “and.” Terms were searched as text words in titles and abstracts and as MeSH subject headings when applicable. The search was limited to English or French language studies. The search strategy was developed by a research librarian and peer review of electronic search strategies (PRESS) was conducted by another research librarian.² The full search strategy is available in Appendix C.

In recognition of the rapid development of literature on COVID-19, Google scholar was searched for grey literature or literature not yet peer-reviewed. The reference lists of any systematic reviews identified during abstract or full-text review were hand-searched to ensure all relevant literature was captured. This rapid review was registered in the International Prospective Register of Systematic Reviews (PROSPERO - CRD42020211089).

7.2.2 Study Selection

Screening calibration was completed by all reviewers involved in this rapid review prior to starting abstract screening and full-text screening. After >70% agreement was reached, screening of citations was completed by two independent reviewers using Microsoft Excel. Abstracts proceeded to full-text review if they: reported on individuals (or families, friends, or caregivers) who are socially isolated or quarantined due to COVID-19; reported on technology or “distance tools” which aim to improve health or quality of life while isolated; reported on the health impact, mental health impact, or quality of life related to the technology intervention; and included any or no comparator. Citations were excluded if they failed to meet the inclusion criteria above, or if they: were editorials, letters, reviews, case studies, or commentaries; or were published in languages other than English or French (Table 12). All abstracts selected for inclusion by any reviewer proceeded to full-text review. This initial screen was intentionally broad to ensure that all relevant literature was captured.

Studies included after abstract review proceeded to full-text review. Full-text review was completed by four independent reviewers. All studies selected for inclusion by any reviewer at the full-text screening stage proceeded to data extraction.

Table 12. Inclusion and Exclusion Criteria for Rapid Review of Technology

Inclusion Criteria	Exclusion Criteria
<ul style="list-style-type: none"> • Individuals (or families, friends, caregivers) who are socially isolated or quarantined due to COVID-19 <ul style="list-style-type: none"> ○ Social isolation may be due to general social isolation related to the pandemic ○ OR could be due to mandatory quarantine from testing positive or being identified as a close contact • Technology or “distance tools” which aim to improve health or quality of life while isolated. Examples include (but are not limited to): <ul style="list-style-type: none"> ○ Telehealth/telemedicine ○ Telephones ○ Video calls/FaceTime/Zoom ○ Virtual reality ○ Window visits ○ Online support tools • Any, or no comparator • Reported health related impact, mental health impact, or quality of life outcome 	<ul style="list-style-type: none"> • Commentaries, reviews, editorials, letters, and case studies • Studies published in languages other than English or French

7.2.3 Data Extraction and Analysis

Data were extracted by a single reviewer using a standard data extraction form and verified by another reviewer. For all studies, year of publication, country, study design characteristics, patient demographics, and health outcomes were extracted. Discrepancies between reviewers during data extraction were resolved through consensus. Data were analyzed using a narrative synthesis methodology. Similar technologies were grouped together, and findings for each study were summarized individually.

7.2.4 Quality Assessment

Quality assessment was conducted using the ROBINS-I tool,⁶⁴ which assesses the following potential risk of bias domains: confounding, selection of participants into the study, classification of interventions, deviations from intended interventions, missing data, measurement of outcomes, reporting of results, and overall risk of bias. Signaling questions across the seven

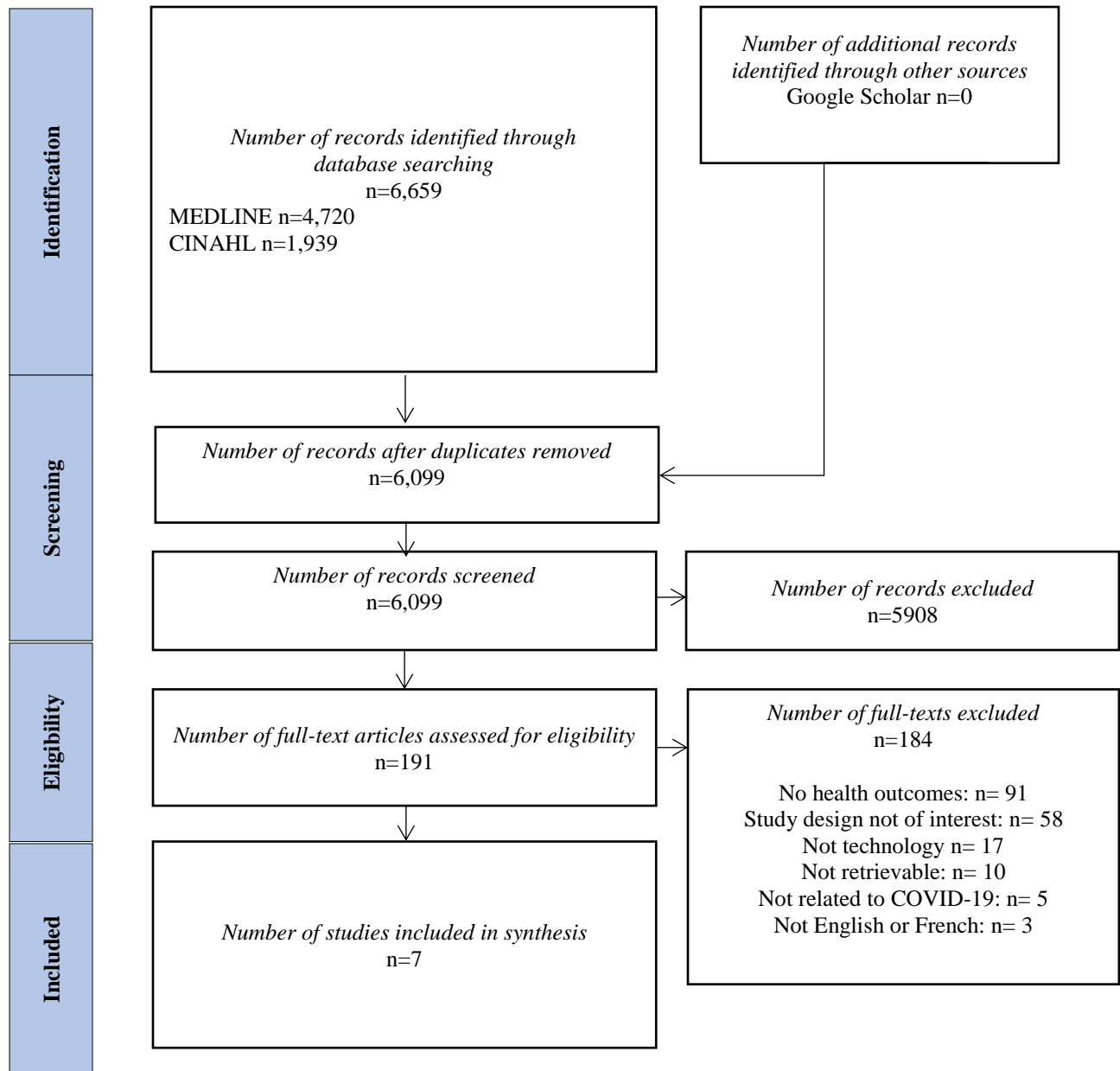
domains are answered using the following response options: “yes,” “probably yes,” “no,” “probably no,” “not applicable,” and “no information.” Based on these answers, risk of bias for each domain and the overall study is rated as either: “low,” “moderate,” “serious,” “critical,” or “no information.”

7.3 Results

7.3.1 Study Characteristics

The database search yielded 6,659 unique citations. After abstract review, 191 studies proceeded to full-text review. One hundred and eighty-four studies were excluded for the following reasons: no health outcomes reported (n=91); study design not of interest (n=58); not technology (n=17); not retrievable (n=10); not related to COVID-19 (n=5); and not in English or French (n=3). A total of seven relevant studies were included in the final dataset (Figure 5).

Figure 5. PRISMA Flowchart of Included Studies



All included studies were observational cohort studies published in 2020 (Table 14). Three of the studies were from China,^{6,65,66} two from the USA,^{67,68} one from Italy,⁶⁹ and one from Spain.⁵ Two of the studies focused on the community setting,^{5,6} one reported on patients quarantined in a hospital,⁶⁶ two focused on virtual Zoom presentations for community dwelling patients,^{67,68}, and one did not report the setting but it appeared to report on a community setting.⁶⁹ Populations examined across studies were: older adults with mild cognitive impairment or mild dementia,⁵ older adults with neurocognitive disorder (NCD) and their caregivers,⁶ patients with chronic skin diseases,⁶⁹ patients diagnosed with acute ST segment elevation myocardial infarction (STEMI) who underwent primary percutaneous coronary intervention (PCI),⁶⁵ adults with cancer,⁶⁷ individuals with type 1 diabetes,⁶⁸ and adults in quarantine suspected of having COVID-19 disease.⁶⁶

7.3.2 *Quality Assessment*

Quality assessment was conducted using the ROBINS-I tool (Table 13).⁶⁴ All studies were assessed to have a serious risk bias with respect to confounding, except for one study⁶ which had a moderate risk. The risk of bias with respect to participant selection was generally low, but was found to be moderate in one study,⁶⁷ serious in another study,⁶⁵ and critical in one study.⁶⁸ Studies were generally at a low risk of bias for missing data, except for one study which was at a serious risk⁶⁷ and another study which had no information.⁶⁸ The risk of bias stemming from measurement of outcomes was found to be low or moderate in most studies but serious in one study.⁶⁷ All studies were at a low risk of bias with respect to classification of interventions, deviations from intended interventions, and selection of reported results. The overall risk of bias was deemed to be serious in four studies, moderate in one study,⁶ and critical in another.⁶⁸

Table 13. Quality Assessment of Studies Included in the Technology Rapid Review

Author, Year	Confounding	Selection of Participants	Classification of Interventions	Deviations from Intended Interventions	Missing Data	Measurement of Outcomes	Selection of Reported Results	Overall Bias
Goodman-Casanova, 2020 ⁵	Serious	Low	Low	Low	Low	Moderate	Low	Serious
Lai, 2020 ⁶	Moderate	Low	Low	Low	Low	Low	Low	Moderate
Marasca, 2020 ⁶⁹	Serious	Low	Low	Low	Low	Moderate	Low	Serious
Nan, 2020 ⁶⁵	Serious	Serious	Low	Low	Low	Low	Low	Serious
Trevino, 2020 ⁶⁷	Serious	Moderate	Low	Low	Serious	Serious	Low	Serious
Vigersky, 2020 ⁶⁸	Serious	Critical	Low	Low	No information	Low	Low	Critical
Zhou, 2020 ⁶⁶	Serious	Low	Low	Low	Low	Moderate	Low	Serious

7.3.3 Themes Identified

Technology interventions examined across studies broadly fell into four categories (

Figure 6): provider-initiated active teleconsultations;^{6,66,69} Zoom-based training/interventions;^{67,68} interactive technology aiming to boost patient knowledge, interaction, and cognitive stimulation;⁵ and apps offering medical advice upon patient request.⁶⁵ Studies across these four categories are synthesized individually below, with a summary provided in

Table 15. Full findings from the included studies are reported in Appendix C.

Figure 6. Technology Interventions Identified in the Technology Rapid Review

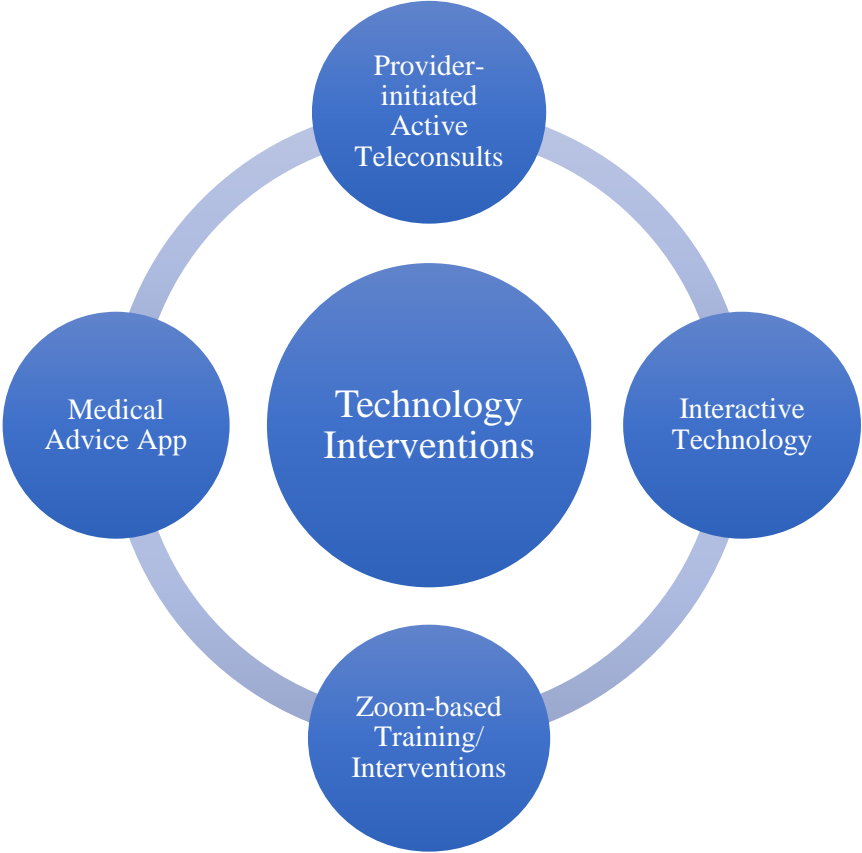


Table 14. Characteristics and Findings from Studies Included in the Technology Rapid Review

Author, Country	Setting	Population	Technology Intervention	Comparator	Findings
Interactive Technology					
Goodman-Casanova, Spain ⁵	Community	Older adults with mild cognitive impairment or mild dementia (n=93)	<p>TV-AssistDem (n=47):</p> <ul style="list-style-type: none"> • Television-based interface, a webcam, and a centralized back-end service with a web-based interface. • Provides visualization of videos of physical activity at home; communication with loved ones and health professionals through video calls; and cognitive stimulation with Stimulus memory games. • COVID-19 adaptations include detailed information on COVID-19; videos on recommendations and basic care measures, such as hand washing. • Given daily access to the service in their home environment and received follow-up visits at 6 and 12 months. 	Treatment as usual (n=46); received follow-up visits at 6 and 12 months	<ul style="list-style-type: none"> • Respondents with TV-AssistDem performed more memory exercises (24/93, 52% vs 8/93, 17.4%; p<.001) than control respondents. • Significantly more respondents in the control group kept pets or plants compared to the TV-AssistDem group respondents (10/93 vs 2/93, p=0.01) • There were no significant differences in health, well-being, or activities performed between the intervention and control groups.
Provider-initiated Active Teleconsultations					
Lai, China ⁶	Community	Older adults with neurocognitive disorder (NCD) and their caregivers (n=60 patients and 60 caregivers)	<p>Telephone + video care service (n=30):</p> <ul style="list-style-type: none"> • Caregivers received weekly telephone calls for 4 weeks covering topics and information relevant to older adults' well-being of community living, focusing on healthy aging, psychosocial needs, and physical well-being. • Caregivers also received weekly 30 minutes health services delivered through video communication apps, namely, Zoom, WhatsApp, or 	<p>Telephone care service only (n=30):</p> <ul style="list-style-type: none"> • Caregivers received weekly telephone calls for 4 weeks covering topics and information relevant to older adults' well-being of community living, focusing on 	<p>For patients:</p> <ul style="list-style-type: none"> • Intervention significantly prevented the deterioration in cognitive status [MoCA: p <0.001, $\eta_p^2 = 0.50$) and quality of life [QoL-AD: p <0.001, $\eta_p^2 = 0.23$] which was observed in the control group. • No differences in problem behaviours (RMBPC) <p>For caregivers:</p>

Author, Country	Setting	Population	Technology Intervention	Comparator	Findings
			FaceTime. The NCD care-recipients were always present during video conference, and the healthcare provider was able to communicate directly to them.	healthy aging, psychosocial needs, and physical well-being.	<ul style="list-style-type: none"> Intervention resulted in significant improvements in physical and mental health [SF36v2: $p < 0.001$, $\eta_p^2 = 0.51$ and $p < 0.001$, $\eta_p^2 = 0.46$, respectively] perceived burden [ZBI: $p < 0.001$, $\eta_p^2 = 0.25$] and self-efficacy [RCSES: $p < 0.001$, $\eta_p^2 = 0.23$], which were not observed in the control group. <p>There was a strong positive correlation between patient improvement and caregiver improvement in the intervention group [$r = +0.50$, $df = 28$, $p = 0.005$, $R^2 = 0.25$] but not in the control group [$r = +0.07$, $df = 28$, $p = 0.70$, $R^2 = 0.005$].</p>
Marasca, Italy ⁶⁹	NR (presumably community)	Chronic skin diseases (n=23)	Psychological video-consultations through the clinic's teledermatology-services; 3 consultations performed for each patient every 2 weeks	None	<ul style="list-style-type: none"> Intervention resulted in significant improvements in DLQI from baseline to weeks 2 and 4 (both $p < 0.05$) but no change in PGWB.
Zhou, China ⁶⁶	Hospital (quarantine wards)	Adults in quarantine suspected of having COVID-19 disease (n=15)	<p>WeChat™-based individual consultation:</p> <ul style="list-style-type: none"> Two 10-minute WeChat consultation sessions scheduled daily during quarantine. <p>The intervention was based on individual patient's need. The in-charge nurse first listened to the patients and then tried to help them through positive dialogues and</p>	None	<ul style="list-style-type: none"> Intervention resulted in significant improvements in anxiety and depression symptoms, as measured by the HADS, HADS-A, and HADS-D (all $p < 0.01$)

Author, Country	Setting	Population	Technology Intervention	Comparator	Findings
			emotional and material supports. The in-charge nurse also provided accurate, comprehensive, and timely information about COVID-19 and successful stories of other quarantined patients.		
Medical Advice App					
Nan, China ⁶⁵	Hospital, Community	Patients diagnosed with acute ST segment elevation myocardial infarction (STEMI) (n=60)	<p>Tiantanzhixin app (n=8):</p> <ul style="list-style-type: none"> Allows patients to communicate with doctors online anytime using voice messages, text messages, or pictures. Trained professionals answer the patients' questions. All of the patients who visited the outpatient clinic or chest pain center, or were hospitalized in the department for any reason were recommended to install this app. 	No app use (n=52)	<ul style="list-style-type: none"> Patients who used the Tiantanzhixin app had significantly shorter time from symptom onset to calling an ambulance (p=0.007), door to balloon time (p=0.01), and total ischemia time (p=0.001) than patients who did not use the app. There were no significant differences between groups with respect to time from calling an ambulance to first medical contact, time from first medical contact hospital arrival time, and in-hospital and 30-day adverse events following the primary PCI procedure.
Zoom-based Training/Interventions					
Trevino, USA ⁶⁷	Virtual; Community; Academic cancer center	Adults with cancer (n=3902)	30-45 minutes of free mind-body group therapy sessions in fitness, meditation, yoga, dance, tai chi, and music delivered by an integrative medicine clinician using Zoom video conferencing	None	<ul style="list-style-type: none"> Intervention resulted in reduced stress and anxiety, with 83.8% (n=3268) of participants reporting extreme anxiety/stress reductions. Anxiety/stress reduction ratings were highest for music and

Author, Country	Setting	Population	Technology Intervention	Comparator	Findings
					fitness classes (p < 0.001).
Vigersky, USA ⁶⁸	Virtual; Community	Individuals with type 1 diabetes (n=NR)	Training on MiniMed 670 G system use conducted via Zoom video conferencing application (conducted during COVID-19)	In-person training on the MiniMed 670 G system; usually done in three sessions (conducted pre- COVID-19)	<ul style="list-style-type: none"> Participants who completed the Zoom training and participants who completed the in-person training had comparable glycemic outcomes

Abbreviations: COVID-19: Coronavirus Disease 2019; DLQI: Dermatology Life Quality Index; HADS: Hospital Anxiety and Depression Scale; MoCA: Montreal Cognitive Assessment; n: number; NCD: neurocognitive disorder; NR: not reported; PCI: percutaneous coronary intervention; PGWB: Psychological General Well-Being Index; QoL-AD: Quality of Life in Alzheimer's Disease; RCSES: Revised Caregiving Self-Efficacy Scale; RMBPC: Revised Memory and Behavior Problem Checklist; SF36v2: Short Form 36 version 2; STEMI: ST segment elevation myocardial infarction; ZBI: Zarit Burden Interview Scale

7.3.4 Findings

7.3.4.1 Provider-initiated Active Teleconsultations

Lai et al. found that a telephone plus video consultation (n=30) resulted in more favorable outcomes than a telephone-only teleconsultation (n=30) in community dwelling older adults with neurocognitive disorder and their caregivers.⁶ Both groups received telephone consultations delivered weekly for four weeks, which provided information relevant to older adults' well-being, focusing on healthy aging, psychosocial needs, and physical health. Caregivers in the telephone plus video group also received a weekly 30-minute health services consultation delivered through video communication apps, namely, Zoom, WhatsApp, or FaceTime. In patients, the telephone and video intervention was found to significantly prevent deterioration in cognitive status (Montreal Cognitive Assessment [MoCA]: $p < 0.001$, $\eta_p^2 = 0.50$) and quality of life (Quality of Life in Alzheimer's Disease [QoL-AD]: $p < 0.001$, $\eta_p^2 = 0.23$); deterioration was observed in the telephone only group. No significant differences were observed in problem behaviours (as per Revised Memory and Behavior Problem Checklist [RMBPC] scores). In caregivers, the telephone and video intervention resulted in significant improvements in physical and mental health (Short Form 36 version 2 [SF36v2]: $p < 0.001$, $\eta_p^2 = 0.51$ and $p < 0.001$, $\eta_p^2 = 0.46$, respectively), perceived burden (Zarit Burden Interview Scale [ZBI]: $p < 0.001$, $\eta_p^2 = 0.25$), and self-efficacy (Revised Caregiving Self-Efficacy Scale [RCSES]: $p < 0.001$, $\eta_p^2 = 0.23$), which were not observed in the telephone only group. Patient improvement was strongly related to caregiver improvement in the telephone and video group ($r = +0.50$, $df = 28$, $p = 0.005$, $R^2 = 0.25$) but not in the telephone only group.

Psychological video-consultations provided to patients with chronic skin diseases (n=23) in a study by Marasca et al. resulted in significant improvements in health-related quality of life.⁶⁹ Three psychological video-consultations were performed for each patient every two weeks; setting was not provided, but patients were presumed to reside in the community. Significant improvements were observed from baseline to weeks two and four in the patients' Dermatology Life Quality Index (DLQI) scores (both $p < 0.05$) but not in Psychological General Well-Being (PGWB) Index scores.

In a study by Zhou et al. WeChat-based individual consultations resulted in significant improvements in psychological symptoms in hospitalized patients (n=15) quarantined due to suspected COVID-19.⁶⁶ Two 10-minute WeChat consultations were delivered daily during quarantine and provided patients with material and emotional supports, and accurate information about COVID-19. The intervention resulted in significant improvements from baseline in patients' anxiety and depression symptoms, as measured by their Hospital Anxiety and Depression Scale (HADS), HADS-Anxiety (HADS-A), and HADS-Depression (HADS-D) scores (all $p < 0.01$).

7.3.4.2 Zoom-based Training/Interventions

Trevino et al. found that fitness sessions delivered via Zoom resulted in reduced stress and anxiety in community dwelling adults with cancer (n=3902).⁶⁷ The sessions were free, 30-45 minutes long, and focused on fitness, meditation, yoga, dance, tai chi, and music. The Zoom fitness sessions led to reduced stress and anxiety, with 83.8% of participants reporting extreme anxiety/stress reductions; the largest improvement in anxiety/stress was seen for music and fitness classes ($p < 0.001$).

In a study by Vigersky et al., Zoom training sessions on using a closed-loop system (MiniMed 670G) led to comparable glycemic outcomes in patients with type 1 diabetes who completed the training in-person pre-COVID-19.⁶⁸ Sample size was not reported.

7.3.4.3 Interactive Technology

Goodman-Casanova et al. found that community-dwelling older adults with mild cognitive impairment or mild dementia (n=93) performed significantly more memory exercises after using a television-based assistive integrated technology (TV-AssistDem; n=47) than did their counterparts who received treatment as usual (n=46).⁵ TV-AssistDem is a home-based service that provides visualization of videos of physical activity at home; communication with loved ones and health professionals through videocalls; and, cognitive stimulation with Stimulus memory games. Participants in the TV-AssistDem group were given daily access in their home environment. Both groups were followed up at six and 12 months. Participants in the TV-AssistDem group performed significantly more memory exercises than participants in the control

group (24/93, 52% versus 8/93, 17.4%, respectively; $p < .001$). Participants in the control group kept significantly more pets or plants compared to the TV-AssistDem participants (10/93 versus 2/93, $p = 0.01$). Otherwise, there were no significant differences in health, well-being, or activities performed between the two groups.

7.3.4.4 Medical Advice App

In a study by Nan et al., use of a medical advice app (Tiantanzhixin app; $n = 8$) resulted in shorter time to treatment in patients diagnosed with acute ST segment elevation myocardial infarction (STEMI) who underwent primary PCI compared to patients who did not use the app ($n = 52$).⁶⁵ The Tiantanzhixin app allows patients to communicate with doctors online anytime using voice messages, text messages, or pictures; patients' questions are answered by trained professionals. All of the patients who visited the authors' outpatient clinic or chest pain center, or were hospitalized in the department for any reason were recommended to install this app. STEMI patients who underwent PCI and used the app had significantly shorter time from symptom onset to calling an ambulance ($p = 0.007$), door to balloon time ($p = 0.01$), and total ischemia time ($p = 0.001$), than patients who did not use the app. There were no significant differences between groups with respect to time from calling an ambulance to first medical contact, time from first medical contact hospital arrival time, and in-hospital and 30-day adverse events following the primary PCI procedure.

Table 15. Summary of Findings from Technology Intervention Studies

Technology Intervention	Health Outcomes with No Statistically Significant Change	Health Outcomes with Statistically Significant Improvement
Telephone plus video teleconsultation	Problem behaviours in patients (RMBPC scale)	Prevention of deterioration in cognitive functioning (MoCA scale) and quality of life (QoL-AD scale) in patients; physical and mental health (SF36v2 scale), perceived burden (ZBI scale), and self-efficacy (RCSES scale) in caregivers
Psychological video-consultation	Quality of life (PGWB scale)	Quality of life (DLQI scale)
WeChat Consultation	--	Anxiety (HADS-A scale), depression (HADS-D scale)
Zoom Fitness and Music Classes	Stress, anxiety	--
Zoom Training Sessions	Glycemic outcomes	--
TV-AssistDem	Health, well-being, activities performed	More memory exercises performed
Medical Advice Support App	Time from calling an ambulance to first medical contact, time from first medical contact hospital arrival time, in-hospital and 30-day adverse events following the primary PCI procedure	Shorter time from symptom onset to calling an ambulance, door to balloon time, total ischemia time

Abbreviations: DLQI: Dermatology Life Quality Index; HADS: Hospital Anxiety and Depression Scale; MoCA: Montreal Cognitive Assessment; PCI: Percutaneous Coronary Intervention; PGWB: Psychological General Well-Being Index; QoL-AD: Quality of Life in Alzheimer’s Disease; RCSES: Revised Caregiving Self-Efficacy Scale; RMBPC: Revised Memory and Behavior Problem Checklist; SF36v2: Short Form 36 version 2; ZBI: Zarit Burden Interview Scale

7.4 Conclusions

This rapid review examined the published literature on the effective use of technology or other “distance tools” to support individuals (and/or their families, friends, and caregivers) during COVID-19 isolation or quarantine. Seven studies were included. Technology interventions examined across studies broadly fell into four categories: 1) provider-initiated active teleconsultations; 2) Zoom-based training/interventions; 3) interactive technology aiming to boost patient knowledge, interaction, and cognitive stimulation; and 4) an app offering medical advice upon patient request.

Across studies, technology interventions administered through Zoom, apps, telephone and video conferencing, and TV generally resulted in health outcomes that were either beneficial or comparable to regular care. As a result, technology interventions appear to be helpful substitutes for regular care when in-person communication is not possible, such as during COVID-19 isolation/quarantine. Given that many people are experiencing social isolation during the pandemic, some potential benefit experienced from technology interventions is advantageous. However, these results should be interpreted with caution given the scarcity and the quality of the literature identified. Most studies were judged to be at a serious risk for bias. Furthermore, many of them were characterized by considerable methodological flaws: notably, some had very small sample sizes (e.g., $n=8$ in the technology group); about half did not use validated outcome measures; and about half did not have a control group. Future studies should include larger sample sizes, use validated outcome measures, and include a control group.

8 Report Conclusions

This report presents an evidence synthesis on best care practices for persons with cognitive impairments and persons who are at end-of-life during COVID-19, as well as effective use of technology during COVID-19. Three rapid reviews were conducted focusing on: 1) care and engagement of persons with cognitive impairments who are socially isolated/quarantined, 2) care and support of persons who are at end-of-life, and 3) effective use of technology to support patients (and/or their families, friends, or caregivers).

Five studies were included in the rapid review of best practices for care and engagement for persons with cognitive impairments who are required to isolate/quarantine during COVID-19. Suggestions for care and engagement broadly focused on the use of telehealth services, cognitive stimulation, and social support for caregivers. All studies focused on the community setting; no recommendations for hospitalized persons or those in long-term or supportive care facilities were identified. Evidence suggests that multi-modal telehealth services, including online, telephone, and videoconferencing methods, are important for the well-being of community dwelling persons with cognitive impairment during COVID-19 confinement. The importance of continuous cognitive and environmental stimulation for this patient group, as well as social support for their caregivers was also highlighted.

Fifty-six studies were identified in the rapid review of best care practices for persons at end-of-life during COVID-19. Most of the included studies were guidelines, tools/frameworks, and observational studies conducted in the United States, United Kingdom, and India. Studies generally focused on how isolation and uncertainty have changed the needs of patients and their families at end-of-life due to COVID-19. The practices reported most often were related to communication; patient and family support/well-being and symptom management; and, adequate medication and equipment supply. Based on the literature synthesized in this rapid review, it appears that there are no “one-size-fits-all” recommendations for best practice, but rather an extensive list of practices to consider based on the setting of care, the patient’s needs, and needs of the families and healthcare providers.

Seven studies were included in the rapid review of effective technology use to support individuals during COVID-19 isolation or quarantine. Four broad categories of technologies were identified: 1) provider-initiated active teleconsultations; 2) Zoom-based training/interventions; 3) interactive technology; and 4) an app offering medical advice. Across studies, technology interventions administered through Zoom, apps, telephone and video conferencing, and TV generally resulted in health outcomes that were either beneficial or comparable to regular care. As a result, technology interventions appear to be helpful substitutes for regular care when in-person communication is not possible, such as during COVID-19 isolation/quarantine. However, these results should be interpreted with caution given the scarcity and the quality of the literature identified.

Overall, the findings of this evidence synthesis suggest that the literature related to best care practices of patients who are cognitively impaired or are at end-of-life and the literature on effective technology use during COVID-19 is limited. The most robust evidence was identified for best care practices of patients at end-of-life, broadly suggesting that care should be tailored to the needs of the patient, their family, and healthcare providers, as well as the setting of care. Limited evidence suggests that care of persons with cognitive impairment should emphasize communication, cognitive stimulation, and social support for the patients and their caregivers. Lastly, technology interventions appear to be broadly beneficial, or at least comparable, to regular care for the select groups of patients included in the studies, can be administered in a multitude of modalities, including Zoom, apps, telephone and video conferencing, and TV-based interventions, and represent helpful substitutes for regular care when in-person communication is not possible.

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Appendix A

Search Strategy for Cognitive Impairment Rapid Review

MEDLINE

1. exp Coronaviridae Infections/
2. exp Coronavirus/
3. (2019-nCoV* or 2019nCov* or 19nCov or betacoronavir* or coronavir* or corona or covid or covid19* or SARS-COV-2* or SARS-COV2* or SARSCoV-2* or SARSCoV2* or severe acute respiratory syndrome or Hubei pneumonia or Wuhan pneumonia or Wuhan virus).tw,kf.
4. 1 or 2 or 3
5. animals/ not humans/
6. 4 not 5
7. limit 6 to yr="2019 - 2021"
8. limit 7 to (english or french)
9. Quarantine/
10. Patient Isolation/
11. exp Social Isolation/
12. Loneliness/
13. (confinement or isolat* or lonely or loneliness or quarantin* or social* distan*).tw,kf.
14. 9 or 10 or 11 or 12 or 13
15. exp Neurocognitive Disorders/
16. ((cognition or cognitive or neurocogniti) adj3 (declin* or defect* or deficit* or disabilit* or disorder* or dysfunction* or impair*).tw,kf.
17. (alzheimer* or delirium or dementia* or mci).tw,kf.
18. 15 or 16 or 17
19. 8 and 14 and 18

EMBASE

1. exp Coronaviridae infection/
2. exp coronaviridae/

3. (2019-nCoV* or 2019nCov* or 19nCov or betacoronavirus or coronavir* or corona or covid or covid19* or SARS-COV-2* or SARS-COV2* or SARSCoV-2* or SARSCoV2* or severe acute respiratory syndrome or Hubei pneumonia or Wuhan pneumonia or Wuhan virus).tw,kw.
4. 1 or 2 or 3
5. animals/ not human/
6. 4 not 5
7. limit 6 to yr="2019 - 2021"
8. limit 7 to (english or french)
9. cognitive behavioral therapy/
10. exp cognitive defect/
11. exp "disorders of higher cerebral function"/
12. ((cognition or cognitive or neurocogniti) adj3 (declin* or defect* or deficit* or disabilit* or disorder* or dysfunction* or impair*)).tw,kw.
13. (alzheimer* or delirium or dementia* or mci).tw,kw.
14. 9 or 10 or 11 or 12 or 13
15. 8 and 14
16. exp social isolation/
17. exp isolation/
18. quarantine/
19. social distance/
20. (confinement or isolat* or lonely or loneliness or quarantin* or social* distan*).tw,kw.
21. 16 or 17 or 18 or 19 or 20
22. 15 and 21

PsycINFO

1. (2019-nCoV* or 2019nCov* or 19nCov or betacoronavirus or coronavir* or corona or covid or covid19* or SARS-COV-2* or SARS-COV2* or SARSCoV-2* or SARSCoV2* or severe acute respiratory syndrome or Hubei pneumonia or Wuhan pneumonia or Wuhan virus).tw.
2. animal/ not human/
3. 1 not 2
4. limit 3 to yr="2019 - 2021"

5. limit 4 to (english or french)
6. exp cognitive impairment/ or exp dementia/ or exp intellectual development disorder/ or exp neurocognitive disorders/
7. alzheimer's disease/ or exp senile dementia/
8. ((cognition or cognitive or neurocogniti) adj3 (declin* or defect* or deficit* or disabilit* or disorder* or dysfunction* or impair*)).tw.
9. (alzheimer* or delirium or dementia* or mci).tw.
10. 6 or 7 or 8 or 9
11. 5 and 10

CINAHL

1. ((MH "Coronaviridae+") OR (MM "Coronaviridae Infections")) OR TI ((2019-nCoV* or 2019nCov* or 19nCov or betacoronavir* or coronavir* or corona or covid or covid19* or SARS-COV-2* or SARS-COV2* or SARSCoV-2* or SARSCoV2* or severe acute respiratory syndrome or Hubei pneumonia or Wuhan pneumonia or Wuhan virus)) OR AB ((2019-nCoV* or 2019nCov* or 19nCov or betacoronavir* or coronavir* or corona or covid or covid19* or SARS-COV-2* or SARS-COV2* or SARSCoV-2* or SARSCoV2* or severe acute respiratory syndrome or Hubei pneumonia or Wuhan pneumonia or Wuhan virus))
2. (MH "Quarantine") OR (MH "Stay-at-Home Orders") OR (MH "Social Isolation+") OR (MH "Patient Isolation") OR (MH "Social Distancing")) OR TI ((confinement or isolat* or lonely or loneliness or quarantin* or stay at home or social* distan*)) OR AB ((confinement or isolat* or lonely or loneliness or quarantin* or stay at home or social* distan*))
3. 1 and 2
4. ((MH "Cognition Disorders+") OR (MH "Alzheimer's Disease") OR (MH "Dementia, Multi-Infarct") OR (MH "Dementia+") OR (MH "Delirium")) OR TI (((cognition or cognitive or neurocogniti) N3 (declin* or defect* or deficit* or disabilit* or disorder* or dysfunction* or impair*))) OR AB (((cognition or cognitive or neurocogniti) N3 (declin* or defect* or deficit* or disabilit* or disorder* or dysfunction* or impair*))) OR TI ((alzheimer* or delirium or dementia* or mci)) OR AB ((alzheimer* or delirium or dementia* or mci)
5. 3 and 4

Published Date: 20190101-; Language: English, French

Total 20 studies

Commentaries, Editorials, and Letters Excluded from the Cognitive Impairment Rapid Review

Table A1. Commentaries, Editorials, and Letters Excluded from the Cognitive Impairment Rapid Review

Author	Country	Study Design	Setting of Care
Barry et al. ⁷⁰	United Kingdom	Commentary	Community
Bhaskar et al. ⁷¹	Multinational	Commentary	Hospital and Community
Canevelli et al. ⁷²	Italy	Editorial	Community
Chen et al. ⁷³	Ireland, France and Singapore	Commentary	Hospital and Community
Courtenay et al. ⁷⁴	United Kingdom	Commentary	Hospital and Community
Devita et al. ⁷⁵	Italy	Commentary	Unspecified
Edelman et al. ⁷⁶	USA	Editorial	Supportive Living Facility
Greenberg et al. ⁷⁷	USA	Commentary	Community
Hampel et al. ⁷⁸	USA	Editorial	Community and Supportive Living Facility
Low et al. ⁷⁹	Australia	Commentary	Supportive Living Facility
McGonigal et al. ⁸⁰	USA	Commentary	Hospital
O'Shea et al. ⁸¹	Ireland	Letter	Community
Padala et al. ⁸²	USA	Letter	Supportive Living Facility
Rais et al. ⁸³	Singapore	Letter	Community
Simard et al. ⁸⁴	Australia and USA	Editorial	Supportive Living Facility
Wang et al. ⁸⁵	China	Letter	Community, Supportive Living Facility and Hospital

Appendix B

Search Strategy for End-of-life Rapid Review

MEDLINE

1. exp Coronaviridae Infections/
2. exp Coronavirus/
3. (2019-nCoV* or 2019nCov* or 19nCov or betacoronavir* or coronavir* or corona or covid or covid19* or SARS-COV-2* or SARS-COV2* or SARSCoV-2* or SARSCoV2* or severe acute respiratory syndrome or Hubei pneumonia or Wuhan pneumonia or Wuhan virus).tw,kf.
4. 1 or 2 or 3
5. animals/ not humans/
6. 4 not 5
7. limit 6 to yr="2019 - 2021"
8. limit 7 to (english or french)
9. Quarantine/
10. Patient Isolation/
11. exp Social Isolation/
12. Loneliness/
13. (confinement or isolat* or lonely or loneliness or quarantin* or social* distan*).tw,kf.
14. 9 or 10 or 11 or 12 or 13
15. exp Neurocognitive Disorders/
16. ((cognition or cognitive or neurocogniti) adj3 (declin* or defect* or deficit* or disabilit* or disorder* or dysfunction* or impair*).tw,kf.
17. (alzheimer* or delirium or dementia* or mci).tw,kf.
18. 15 or 16 or 17
19. 8 and 14 and 18

EMBASE

1. exp Coronaviridae infection/
2. exp coronaviridae/

3. (2019-nCoV* or 2019nCov* or 19nCov or betacoronavirus or coronavir* or corona or covid or covid19* or SARS-COV-2* or SARS-COV2* or SARSCoV-2* or SARSCoV2* or severe acute respiratory syndrome or Hubei pneumonia or Wuhan pneumonia or Wuhan virus).tw,kw.
4. 1 or 2 or 3
5. animals/ not human/
6. 4 not 5
7. limit 6 to yr="2019 - 2021"
8. limit 7 to (english or french)
9. cognitive behavioral therapy/
10. exp cognitive defect/
11. exp "disorders of higher cerebral function"/
12. ((cognition or cognitive or neurocogniti) adj3 (declin* or defect* or deficit* or disabilit* or disorder* or dysfunction* or impair*)).tw,kw.
13. (alzheimer* or delirium or dementia* or mci).tw,kw.
14. 9 or 10 or 11 or 12 or 13
15. 8 and 14
16. exp social isolation/
17. exp isolation/
18. quarantine/
19. social distance/
20. (confinement or isolat* or lonely or loneliness or quarantin* or social* distan*).tw,kw.
21. 16 or 17 or 18 or 19 or 20
22. 15 and 21

PsycINFO

1. (2019-nCoV* or 2019nCov* or 19nCov or betacoronavirus or coronavir* or corona or covid or covid19* or SARS-COV-2* or SARS-COV2* or SARSCoV-2* or SARSCoV2* or severe acute respiratory syndrome or Hubei pneumonia or Wuhan pneumonia or Wuhan virus).tw.
2. animal/ not human/
3. 1 not 2
4. limit 3 to yr="2019 - 2021"

5. limit 4 to (english or french)
6. exp cognitive impairment/ or exp dementia/ or exp intellectual development disorder/ or exp neurocognitive disorders/
7. alzheimer's disease/ or exp senile dementia/
8. ((cognition or cognitive or neurocogniti) adj3 (declin* or defect* or deficit* or disabilit* or disorder* or dysfunction* or impair*)),tw.
9. (alzheim* or delirium or dementia* or mci).tw.
10. 6 or 7 or 8 or 9
11. 5 and 10

CINAHL

1. ((MH "Coronaviridae+") OR (MM "Coronaviridae Infections")) OR TI ((2019-nCoV* or 2019nCov* or 19nCov or betacoronavir* or coronavir* or corona or covid or covid19* or SARS-COV-2* or SARS-COV2* or SARSCoV-2* or SARSCoV2* or severe acute respiratory syndrome or Hubei pneumonia or Wuhan pneumonia or Wuhan virus)) OR AB ((2019-nCoV* or 2019nCov* or 19nCov or betacoronavir* or coronavir* or corona or covid or covid19* or SARS-COV-2* or SARS-COV2* or SARSCoV-2* or SARSCoV2* or severe acute respiratory syndrome or Hubei pneumonia or Wuhan pneumonia or Wuhan virus))
2. (MH "Quarantine") OR (MH "Stay-at-Home Orders") OR (MH "Social Isolation+") OR (MH "Patient Isolation") OR (MH "Social Distancing")) OR TI ((confinement or isolat* or lonely or loneliness or quarantin* or stay at home or social* distan*)) OR AB ((confinement or isolat* or lonely or loneliness or quarantin* or stay at home or social* distan*))
3. 1 and 2
4. ((MH "Cognition Disorders+") OR (MH "Alzheimer's Disease") OR (MH "Dementia, Multi-Infarct") OR (MH "Dementia+") OR (MH "Delirium")) OR TI (((cognition or cognitive or neurocogniti) N3 (declin* or defect* or deficit* or disabilit* or disorder* or dysfunction* or impair*))) OR AB (((cognition or cognitive or neurocogniti) N3 (declin* or defect* or deficit* or disabilit* or disorder* or dysfunction* or impair*))) OR TI ((alzheim* or delirium or dementia* or mci)) OR AB ((alzheim* or delirium or dementia* or mci)
5. 3 and 4

Published Date: 20190101-; Language: English, French

Characteristics of Studies Included in the End-of-life Rapid Review

Table B1. Characteristics of Studies Included in the End-of-life Rapid Review

Author	Country	Study Design	Primary Setting of Care Discussed within Study
Alderman et al. ²⁶	United Kingdom	Chart review	Hospital
Anneser et al. ⁴²	Germany	Case study	Hospital
National Institute for Health and Care Excellence ⁸	United Kingdom	Clinical guidelines	Community
Antunes et al. ³³	United Kingdom	Cross-sectional	Community
Atreya et al. ³⁴	India	Cross-sectional	Hospital
Battisti et al. ⁹	United Kingdom	Clinical guidelines	Unspecified
Bettini et al. ⁴³	United states	Case study	Hospital
Biswas et al. ⁵³	India	Case series	Community
Biswas et al. ³⁵	India	Cross-sectional	Hospital
Brown et al. ¹⁸	United States	Tools/frameworks	Unspecified
Burke et al. ²⁷	United States	Chart review	Hospital
Chidiac et al. ²⁸	United Kingdom	Chart review	Hospital
Costantini et al. ³⁶	Italy	Cross-sectional	Hospice
Damani et al. ¹⁰	India	Clinical guidelines	Unspecified
Dhavale et al. ⁶⁰	India	Qualitative - interviews/focus groups	Hospital
Etkind et al. ⁴⁸	United Kingdom	Review	Unspecified
Fiorentino et al. ⁵⁷	United States	Cohort	Hospital
Frydman et al. ¹⁹	United States	Tools/frameworks	Hospital
Galazzi et al. ⁴⁴	Italy	Case study	Hospital
Gilissen et al. ¹¹	United States	Clinical guidelines	Continuing Care/long term care
Gupta et al. ⁵⁴	India	Case series	Hospital
Harden et al. ⁵⁵	United States	Case series	Unspecified
Hawkins et al. ⁴⁹	United Kingdom	Review	Unspecified
Heath et al. ²⁹	United Kingdom	Chart review	Hospital
Hetherington et al. ³⁰	United Kingdom	Chart review	Hospital
Ho et al. ⁴⁵	United Kingdom	Case study	Unspecified
Jain et al. ³⁷	India	Cross-sectional	Hospital
Janssen et al. ¹²	Netherlands	Clinical guidelines	Unspecified
Krishna et al. ¹³	Singapore	Clinical guidelines	Hospital
Kuntz et al. ³⁸	United States	Cross-sectional	Hospital
Lai et al. ²⁰	United States	Tools/frameworks	Unspecified

Author	Country	Study Design	Primary Setting of Care Discussed within Study
Lee et al. ³¹	United States	Chart review	Hospital
Lovell et al. ⁵⁶	United Kingdom	Case series	Hospital
Mercadante et al. ⁶¹	Italy	Qualitative - interviews/focus groups	Unspecified
Mitchell et al. ⁵⁰	United Kingdom	Review	Unspecified
Mohile et al. ²¹	United States	Tools/frameworks	Unspecified
Montalbano et al. ⁵¹	Switzerland	Review	Unspecified
Moore et al. ³⁹	United States	Cross-sectional	Hospice
Morris et al. ²²	United States	Tools/frameworks	Hospital
Mrabti et al. ¹⁴	Morocco	Clinical guidelines	Unspecified
O'Connell et al. ²³	United States	Tools/frameworks	Hospital
Obata et al. ⁶³	United States	Controlled - non-randomized	Hospital
Page et al. ¹⁵	India	Clinical guidelines	Community
Pahuja et al. ⁴⁶	United states	Case study	Hospital
Pegg et al. ¹⁶	France	Clinical guidelines	Unspecified
Perrotta et al. ⁵²	Italy	Review	Continuing Care/long term care
Radbruch et al. ²⁴	United States	Tools/frameworks	Unspecified
Rao et al. ⁴¹	United States	Case series	Hospital
Ritchey et al. ⁴⁷	United States	Case study	Hospital
Rosa et al. ¹⁷	United States	Clinical guidelines	Hospital
Santini et al. ⁶²	Italy	Qualitative - interviews/focus groups	Community
Selman et al. ²⁵	United Kingdom	Tools/frameworks	Hospital
Sharma et al. ⁵⁸	India	Cohort	Community
Strang et al. ⁵⁹	Sweden	Cohort	Unspecified
Strang et al. ⁴⁰	Sweden	Cohort	Continuing Care/long term care
Sun et al. ³²	United States	Chart review	Hospital

Commentaries, Editorials, and Letters Excluded from the End-of-life Rapid Review

Table B2. Commentaries, Editorials, and Letters Excluded from the End-of-Life Rapid Review

Author	Country	Setting of Care
Hospice and Palliative Nurses Association ⁸⁶	Canada	Unspecified
Adams et al. ⁸⁷	United States	Hospital
Andrist et al. ⁸⁸	United States	Hospital
Tahan et al. ⁸⁹	United States	Unspecified
Apoeso et al. ⁹⁰	United States	Hospital
Arya et al. ⁹¹	Canada	Hospital
Bakar et al. ⁹²	United States	Unspecified
Bloomer et al. ⁹³	Australia	Hospital
Blot et al. ⁹⁴	France	Hospital
Bowers et al. ⁹⁵	United Kingdom	Community
Carr et al. ⁹⁶	United States	Unspecified
Chapman et al. ⁹⁷	Australia	Unspecified
Chase et al. ⁹⁸	Canada	Continuing Care/long term care
Chidiac et al. ⁹⁹	United Kingdom	Hospital
Chong et al. ¹⁰⁰	Malaysia	Unspecified
Clarfield et al. ¹⁰¹	Israel	Unspecified
Cooper et al. ¹⁰²	United States	Hospital
Davies et al. ¹⁰³	United Kingdom	Unspecified
Desai et al. ¹⁰⁴	United States	Unspecified
Dingfield et al. ¹⁰⁵	United States	Continuing Care/long term care
Dingfield et al. ¹⁰⁶	United States	Hospital
Domenico et al. ¹⁰⁷	Switzerland	Unspecified
Ellis et al. ¹⁰⁸	United States	Hospice
Eriksen et al. ¹⁰⁹	Norway	Continuing Care/long term care
Estella et al. ¹¹⁰	Spain	Hospital
Fadul et al. ¹¹¹	United States	Unspecified
Fausto et al. ¹¹²	United States	Unspecified
Feder et al. ¹¹³	United States	Not reported
Ferguson et al. ¹¹⁴	New Zealand	Unspecified
Ferrell et al. ¹¹⁵	United States	Hospital
Fusi-Schmidhauser et al. ¹¹⁶	Switzerland	Hospital
Gracey et al. ¹¹⁷	United States	Unspecified
Hafi et al. ¹¹⁸	India	Not reported
Hahn et al. ¹¹⁹	Canada	Hospital
Hannon et al. ¹²⁰	Canada	Hospital

Author	Country	Setting of Care
Hendin et al. ¹²¹	Canada	Hospital
Hill et al. ¹²²	United Kingdom	Unspecified
Humphreys et al. ¹²³	United States	Hospital
Kent et al. ¹²⁴	United States	Unspecified
Khatri et al. ¹²⁵	Singapore	Community
Khosravani et al. ¹²⁶	Canada	Continuing Care/long term care
Kluger et al. ¹²⁷	United States	Unspecified
Knights et al. ¹²⁸	United Kingdom	Unspecified
Kumari et al. ¹²⁹	India	Community
Kuntz et al. ¹³⁰	Switzerland	Unspecified
Lapid et al. ¹³¹	United States	Unspecified
Lazzarin et al. ¹³²	Italy	Unspecified
Mehta et al. ¹³³	United States	Unspecified
Mishra et al. ¹³⁴	India	Unspecified
Montauk et al. ¹³⁵	United States	Hospital
Moore et al. ¹³⁶	United Kingdom	Unspecified
Mottiar et al. ¹³⁷	Canada	Hospital
Nakagawa et al. ¹³⁸	United States	Hospital
Niki et al. ¹³⁹	Japan	Hospital
Norris et al. ¹⁴⁰	NY	Hospital
Nyatanga et al. ¹⁴¹	United Kingdom	Unspecified
Ofosu-Poku et al. ¹⁴²	Ghana	Hospital
Pattison et al. ¹⁴³	United Kingdom	Hospital
Petriceks et al. ¹⁴⁴	United States	Unspecified
Powell et al. ¹⁴⁵	United States	Unspecified
Pruthi et al. ¹⁴⁶	India	Hospital
Raftery et al. ¹⁴⁷	Australia	Community
Rhee et al. ¹⁴⁸	Australia	Unspecified
Rim et al. ¹⁴⁹	United States	Hospital
Roland et al. ¹⁵⁰	Switzerland	Community
Rosa et al. ¹⁵¹	United States	Unspecified
Salins et al. ¹⁵²	India	Unspecified
Santos et al. ¹⁵³	Brazil	Unspecified
Scheffer et al. ¹⁵⁴	United Kingdom	Unspecified
Schoenmaekers et al. ¹⁵⁵	Netherlands	Unspecified
Sese et al. ¹⁵⁶	United States	Hospital

Author	Country	Setting of Care
Simard et al. ⁸⁴	Australia	Continuing Care/long term care
Sullivan et al. ¹⁵⁷	United States	Hospital
Ting et al. ¹⁵⁸	United Kingdom	Hospital
Tran et al. ¹⁵⁹	United States	Unspecified
Vergano et al. ¹⁶⁰	Italy	Hospital
Vincent et al. ¹⁶¹	Belgium	Unspecified
Wallace et al. ¹⁶²	United States	Unspecified
Wang et al. ¹⁶³	Singapore	Unspecified
Wang et al. ¹⁶⁴	Singapore	Hospital
Wei et al. ¹⁶⁵	United States	Unspecified
Hsu et al. ¹⁶⁶	Taiwan	Hospice
Yardley et al. ¹⁶⁷	United Kingdom	Hospital
Zhou et al. ¹⁶⁸	China	Hospital

Appendix C

Search Strategy for Technology Rapid Review

CINAHL

1. ((MH "Coronaviridae Infections") OR (MH "Coronavirus Infections+") OR (MH "COVID-19") OR (MH "Coronavirus+")) OR TI ((2019-nCoV* or 2019nCov* or 19nCov or betacoronavirus or coronavir* or corona or covid or covid19* or SARS-COV-2* or SARS-COV2* or SARSCoV-2* or SARSCoV2* or severe acute respiratory syndrome or Hubei pneumonia or Wuhan pneumonia or Wuhan virus)) OR AB ((2019-nCoV* or 2019nCov* or 19nCov or betacoronavirus or coronavir* or corona or covid or covid19* or SARS-COV-2* or SARS-COV2* or SARSCoV-2* or SARSCoV2* or severe acute respiratory syndrome or Hubei pneumonia or Wuhan pneumonia or Wuhan virus))
2. ((MH "Blogs") OR (MH "Internet+") OR (MH "Teleconferencing") OR (MH "Telehealth+") OR (MH "Telepsychiatry") OR (MH "Videoconferencing") OR (MH "Text Messaging") OR (MH "Telecommunications") OR (MH "Instant Messaging") OR (MH "Mobile Applications") OR (MH "Social Media") OR (MH "Webcasts") OR (MH "Computers, Hand-Held") OR (MH "Email") OR (MH "Telemedicine+") OR (MH "Telenursing") OR (MH "Online Social Networking") OR (MH "Therapy, Computer Assisted"))
3. (MH "Smartphone") OR (MH "Cellular Phone") OR (MH "Virtual Reality")
4. TI ((apps or augmented reality or blog* or cell phone* or cellphone* or chat room* or communications technolog* or computer based or digital therapeutic* or digital technolog* or ehealth or e-health or email or e-mail or e-resources or e-support* or facebook or facetime or google meet* or ICT or instant messag* or IMS or internet or iphone* or messaging or mobile health or mhealth or m-health or online or remote consult* or smartphone* or skype or SMS or social media* or tablets or teleconsult* or tele-consult* or telehealth or tele-health* or telemedic* or tele-medic* or telemonitor* or tele-monitor* or telephone or telepsychiatr* or tele-psychiatr* or teletherap* or tele-therap* or text messag* or texting or twitter or videoconferenc* or video conferenc* or virtual care or virtual reality or virtual visit* or web-based or web-page* or webpage* or web site* or webex or whatsapp or window visit* or zoom)) OR AB ((apps or augmented reality or blog* or cell phone* or cellphone* or chat room* or communications technolog* or computer based or digital therapeutic* or digital technolog* or ehealth or e-health or email or e-mail or e-resources or e-support* or facebook or facetime or google meet* or ICT or instant messag* or IMS or internet or iphone* or messaging or mobile health or mhealth or m-health or online or remote consult* or smartphone* or skype or SMS or social media* or tablets or teleconsult* or tele-consult* or telehealth or tele-health* or telemedic* or tele-medic* or telemonitor* or tele-monitor* or telephone or telepsychiatr* or tele-psychiatr* or teletherap* or tele-therap* or text messag* or texting or twitter or videoconferenc* or video conferenc* or virtual care or virtual reality or virtual visit* or web-based or web-page* or webpage* or web site* or webex or whatsapp or window visit* or zoom)
5. 2 or 3 or 4
6. 1 and 5

Limit to: Published Date: 20190101-20201231; Language: English, French

Exclude Publication Type: Case Study, Commentary, Editorial, Letter, Review

MEDLINE

1. exp Coronaviridae Infections/
2. exp Coronavirus/
3. (2019-nCoV* or 2019nCov* or 19nCov or betacoronavirus or coronavir* or corona or covid or covid19* or SARS-COV-2* or SARS-COV2* or SARSCoV-2* or SARSCoV2* or severe acute respiratory syndrome or Hubei pneumonia or Wuhan pneumonia or Wuhan virus).tw,kf.
4. 1 or 2 or 3
5. animals/ not humans/
6. 4 not 5
7. limit 6 to yr="2019 - 2021"
8. limit 7 to (english or french)
9. exp Telecommunications/ or Mobile Applications/
10. online social networking/ or social media/
11. Therapy, Computer-Assisted/
12. ((inform* or communicat* or interact*) adj6 (computer* or technolog* or software)).tw,kf.
13. ((care or consultation* or health* or intervention* or treat* or therap* or selfmanag* or self-manag*) adj5 (computer* or digital or electronic or online or remote or software)).tw,kf.
14. (apps or augmented reality or blog* or cell phone* or cellphone* or chat room* or communications technolog* or computer based or digital therapeutic* or digital technolog* or ehealth or e-health or email or e-mail or e-resources or e-support* or facebook or facetime or google meet* or ICT or messag* or IMS or internet or iphone* or mobile health or mhealth or m-health or online or remote consult* or smartphone* or skype or SMS or social media* or tablets or teleconsult* or tele-consult* or telehealth or tele-health* or telemedic* or tele-medic* or telemonitor* or tele-monitor* or telephone or telepsychiatr* or tele-psychiatr* or teletherap* or tele-therap* or text messag* or texting or twitter or videoconferenc* or video conferenc* or virtual care or virtual reality or virtual visit* or web-based or web-page* or webpage* or web site* or webex or whatsapp or window visit* or zoom).tw,kf.
15. exp Medical Records Systems, Computerized/
16. 9 or 10 or 11 or 12 or 13 or 14 or 15

17. 8 and 16

18. limit 17 to (case reports or comment or editorial or letter or "review")

19. 17 not 18

20. limit 17 to "systematic review"

21. ((critical or scoping or systematic) adj (review* or overview* or synthesis)).tw.

22. 17 and 21

23. 19 or 20 or 22

Full Findings from Studies Included in the Technology Rapid Review

Table C1. Full Findings from Continuous Outcome Studies Included in the Technology Rapid Review

Author, Country	Setting	Population	Eligibility Criteria	Technology Intervention	Control Group	Outcome	Technology Group Baseline Score	Technology Group Post-Intervention Score	Control Group Baseline Score	Control Group Post-Intervention Score	Finding Summary/Effect Size
Lai, China ⁶	Community	Older adults with NCD and their caregivers (n=60 patients and 60 caregivers)	People who were between 65 and 80 with a diagnosis of NCD according to DSM-5 and were cared at home with their spouse as the primary caregiver	Telephone + video care service n=30 (13 women) Age: Mean=72.87 years (SE=0.84)	Telephone care service only n=30 (12 women) Age: Mean=72.73 years (SE=0.84)	MoCA scores for patients	20.79	20.88	21.42	19.55	Deterioration was prevented in the intervention group, as per group x time ANOVA [MoCA: F(1,58) = 57.18, p <0.001, np2 = 0.50]
						QoL-AD scores for patients	24.47	31	28.49	26.72	Deterioration was prevented in the intervention group, as per group x time ANOVA [QoL-AD: F(1,58) = 17.17, p <0.001, np2 =0.23]
						RMBPC scores for patients	61.93	61.93	62.37	62.48	No significant effects (all F's <1)
						SF-36v2 Physical scores for caregivers	27.37	30.6	27.37	26.16	Intervention associated with positive impact on caregivers, as per group x time ANOVA [F(1,58) = 60.30, p <0.001, np2 = 0.51]
						SF-36v2 Mental scores for caregivers	29.63	32.64	32.64	31.41	Intervention associated with positive impact on caregivers, as per group x time ANOVA [F(1,58) = 49.13, p < 0.001, np2 = 0.46]
						ZBI scores for caregivers	57.44	53.55	57.61	59.23	Intervention associated with positive impact on caregivers, as per group x time ANOVA [ZBI scale of perceived burden: F(1,58) = 19.04, p <0.001, np2 = 0.25]
						RCSES score for caregivers	0.54	0.61	0.56	0.55	Intervention associated with positive impact on caregivers, as per group x time ANOVA [RCSES self-efficacy score: F(1,58) = 17.30, p <0.001, np2 = 0.23]
						Correlative Improvement Between Care-Recipients and					A strong positive association [R2 = 0.53] was evident across

Author, Country	Setting	Population	Eligibility Criteria	Technology Intervention	Control Group	Outcome	Technology Group Baseline Score	Technology Group Post-Intervention Score	Control Group Baseline Score	Control Group Post-Intervention Score	Finding Summary/Effect Size
						Caregivers					all 60 dyads [Pearson's $r = +0.73$, $df = 58$, $p < 0.001$]. An association of moderate effect size was detected in the intervention group [$r = +0.50$, $df = 28$, $p = 0.005$, $R^2 = 0.25$] but not in the control group [$r = +0.07$, $df = 28$, $p = 0.70$, $R^2 = 0.005$].
Marasca, Italy ⁶⁹	NR (presumably outpatient clinic)	Chronic skin diseases (n=23)	Patients suffering from chronic-skin-diseases visited through tele dermatology-service	Psychological video-consultations n=23 (13 women) Age: Mean=35.4 years	None	DLQI	4.4 ± 3.9	week 2: 2.1 ± 2.3 week 4: 1.6 ± 2.5	NA	NA	Baseline to week 2, $p < 0.05$ Baseline to week 4, $p < 0.05$
						PGWB	68.5 ± 15	week 2: 75.4 ± 15.4 week 4: 77.1 ± 16	NA	NA	Baseline to weeks 2 and 4, $p = ns$
Vigersky, USA ⁶⁸	Hospital	Individuals with type 1 diabetes (n=NR)	Patients with data stored in CareLink Personal (with at least 10 days of SmartGuard auto mode usage) who were new to MiniMed 670 G system use during the pre-COVID-19 and the intra-COVID-19 eras.	Zoom training during COVID-19 n=NR Age: NR	In-person training pre-COVID-19 n=NR Age: NR	Sensor Glucose (mg/dl)	NR	157.4 (15.3)	NR	160.2 (18.0)	The glycemic results were similar between those getting in-person training compared with those receiving virtual training, although marginally better in the former cohort.
						% time in range: <54mg/dl	NR	0.5% (0.8)	NR	0.5% (0.8)	
						% time in range: <54-69g/dl	NR	1.7% (1.8)	NR	1.7% (1.8)	
						% time in range: 70-180g/dl	NR	70.4% (10.6)	NR	68.4% (11.9)	
						% time in range: >181-250g/dl	NR	28.0% (10.4)	NR	29.9% (12.1)	
						Time in range: >250	NR	6.5% (5.8)	NR	7.6% (7.0)	
Zhou, China ⁶⁶	Hospital (quarantine wards)	Adults in quarantine suspected of having COVID-19 disease (n=15)	Patients were at least 18 years of age, suspected COVID-19 cases, able to access a smartphone with WeChat and	WeChat-based individual consultation n=15 Age: NR	None	HADS-A	12.6 (SD=3.6)	6.1 (2.1)	NA	NA	$t = 6.5$, $p < 0.01$
						HADS-D	10.1 (2.8)	4.4 (2.2)	NA	NA	$t = 6.1$, $p < 0.01$

Author, Country	Setting	Population	Eligibility Criteria	Technology Intervention	Control Group	Outcome	Technology Group Baseline Score	Technology Group Post-Intervention Score	Control Group Baseline Score	Control Group Post-Intervention Score	Finding Summary/Effect Size
			without pre-existing mental health disorders. HADS score >8			HADS	22.7 (6.2)	10.6 (4.2)	NA	NA	t =6.4, p<0.01

Abbreviations: COVID-19: Coronavirus Disease 2019; DLQI: Dermatology Life Quality Index; HADS: Hospital Anxiety and Depression Scale; Montreal Cognitive Assessment; n: number; NCD: neurocognitive disorder; n: number; NA: not applicable; NR: not reported; PCI: percutaneous coronary intervention; PGWB: Psychological General Well-Being Index; QoL-AD: Quality of Life in Alzheimer's Disease; RMBPC: Revised Memory and Behavior Problem Checklist; SE: standard error; SF36v2: Short Form 36 version 2; STEMI: ST segment elevation myocardial infarction; ZBI: Zarit Burden Interview Scale

Table C2. Full Findings from Categorical Outcome Studies Included in the Technology Rapid Review

Author, Country	Setting	Population	Eligibility Criteria	Technology Intervention	Control Group	Outcome	Technology outcome results	Control outcome results	Finding Summary/Effect Size/p-value
Goodman-Casanova, Spain ⁵	Community	Older adults with mild cognitive impairment or mild dementia (n=93)	Age >60 years, self-perceived cognitive impairment or caregiver's perception of cognitive impairment that was present for at least 6 months, score of 23-27 points on the Mini-Mental State Examination, independent living, informal caregiver, pharmacological treatment, and written consent	TV-AssistDem n=47 (31 women) Age: Mean=74.00 years (SD=6.16)	Treatment as usual n=46 (29 women) Age: Mean=72.67 years (SD=5.98)	Memory exercises performed	24	8	p=0.001
						No COVID-19 symptoms	45	44	Chi-square: 1.33 (df=2), p=0.51
						COVID-19 symptoms without test	1	2	NR
						COVID-19 symptoms and positive test	0	0	NR
						Hospitalized due to COVID-19	0	0	NR
						ICU inpatient due to COVID-19	1	0	NR
						Deceased due to COVID-19	0	0	NR
						Feeling well	27	30	Chi-square: 0.41 (df=1), p=0.52
						Feeling calm	3	5	Chi-square: 0.55 (df=1), p=0.46
						Feeling sad	17	10	Chi-square: 2.57 (df=1), p=0.11
						Feeling worried	7	13	Chi-square: 2.30 (df=1), p=0.13
						Feeling afraid	6	4	Chi-square: 0.45 (df=1), p=0.5
						Feeling anxious	8	14	Chi-square: 2.15 (df=1), p=0.14
						Feeling bored	6	7	Chi-square: 0.09 (df=1), p=0.74
Sleep quality maintained	35	30	Chi-square: 2.01 (df=1), p=0.16						
Sleep quality altered	8	14	NR						

Author, Country	Setting	Population	Eligibility Criteria	Technology Intervention	Control Group	Outcome	Technology outcome results	Control outcome results	Finding Summary/Effect Size/p-value
						Sleep quality unknown	0	0	NR
						No physical activity	8	4	Chi-square: 1.43 (df=1), p=0.23
						Walking	23	30	Chi-square: 2.51 (df=1), p=0.11
						Stair climbing	5	5	Chi-square: 0.01 (df=1), p=0.97
						Gymnastics	12	7	Chi-square: 1.52 (df=1), p=0.22
						House chores	6	2	Chi-square: 2.09 (df=1), p=0.27
						Other physical activity	3	9	Chi-square: 3.59 (df=1), p=0.058
						Reading	13	11	Chi-square: 0.22 (df=1) p=0.63
						Playing games	1	5	Chi-square: 2.85 (df=1) p=0.
						Needlework	6	12	Chi-square: 2.49 (df=1), p=0.11
						Painting	5	3	Chi-square: 0.55 (df=1), p=0.71
						Watching television	28	27	Chi-square: 0.04 (df=1), p=0.83
						Listening to radio or music	3	6	Chi-square: 1.11 (df=1), p=0.48
						Playing with information and communications technology	4	4	Chi-square: 0 (df=1), p>.99
						House chores	18	23	Chi-square: 1.1 (df=1), p=0.29
						Keeping pets or plants	2	10	Chi-square: 6.13 (df=1), p=0.01
						Home visits	24	22	Chi-square: 0.1 (df=1), p=0.75
						Calls	46	45	Chi-square: <0.001 (df=1), p=0.99
						Video calls	23	22	Chi-square: 0.01 (df=1), p=0.91
						Texting	25	21	Chi-square: 0.53 (df=1), p=0.47
Nan, China ⁶⁵	Hospital	Patients diagnosed with acute STEMI (n=60)	Patients diagnosed with acute STEMI who underwent primary PCI within 24 h after symptom onset at our center	Tiantanzhixin app n=8 (3 women) Age: Median=67.5 years (Quartiles 1 and 3: 53.25–81.25)	No app n=52 (20 women) Age: Median=71.5 years (Quartiles 1 and 3: 56.75–77.75)	Symptom onset to call ambulance time (min)	47.5 (45–60)	70 (60–90)	p=0.007
						Call ambulance time to first medical contact time (min)	17.5 (15–22.5)	20 (17–24)	p=0.315
						First medical contact to door time (min)	17.5 (12.5–21)	17 (14.25–21)	p=0.948
						Door to balloon time (min)	65 (56.25–73.5)	77 (70–86.5)	p=0.01

Author, Country	Setting	Population	Eligibility Criteria	Technology Intervention	Control Group	Outcome	Technology outcome results	Control outcome results	Finding Summary/Effect Size/p-value
						Total ischaemia time (min)	144.5 (132.75– 162.5)	188 (171– 213)	p=0.001
						In-hospital all-cause of death	1	8	p=1
						In-hospital cardiac death	1	8	p=1
						In-hospital major cardiovascular event	1	10	p=1
						In-hospital non-fatal myocardial infarction	0	4	p=1
						In-hospital stroke	0	1	p=1
						In-hospital any revascularization	0	0	p=1
						In-hospital definite or probable stent thrombosis	0	0	p=1
						In-hospital new renal replacement therapy	0	11	p=0.33
						30-day all-cause of death	1	8	p=1
						30-day cardiac death	1	8	p=1
						30-day major cardiovascular event	2	15	p=1
						30-day non-fatal myocardial infarction	0	8	p=0.582
						30-day stroke	0	3	p=1
						30-day any revascularization	0	2	p=1
						30-day definite or probable stent thrombosis	0	1	p=1
						30-day new renal replacement therapy	2	13	p=1
Trevino, USA ⁶⁷	Virtual; Community; Academic cancer center	Adults with cancer (n=3902)	Patients with cancer age ≥ 18 years enrolled in a single academic cancer center's online patient portal	Zoom group therapy sessions n=3902 Age: NR	None	Self-reported extreme anxiety/stress reduction	3268 (83.8%)	NA	Anxiety/stress reduction ratings were highest for music and fitness classes (X ² (5, n = 3902) = 41.61, p < 0.001).

Abbreviations: COVID-19: Coronavirus Disease 2019; n: number; NR: not reported; NA: not applicable; SE: standard error; STEMI: STEMI: ST segment elevation myocardial infarction