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Review Article

Acute Health Care Provision in Rural Long-Term Care Facilities: A Scoping Review of Integrated Care Models

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ABSTRACT

Keywords:
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Objectives: We aimed to map integrated care models for acute health care in rural long-term care facilities (LTCFs) for future investigation.
Design: Systematic scoping review.
Setting and Participants: Residential LTCFs in rural areas worldwide.
Methods: The common health-related online databases were systematically searched complemented by a manual search of gray literature. Following the 5-stage framework of Arksey and O'Malley, the extent of included literature was identified and findings were summarized using qualitative meta-summary.
Results: A total of 35 references were included for synthesis, predominantly primary research on completed and ongoing projects reporting on integrated health care services in rural LTCFs. Incorporating previous research, we extracted 5 approaches of integrated acute-health care models: (1) Availability of Specialists, (2) Networks, (3) Quality Management (QM) and Organization, (4) Telemedicine, and (5) Telehealth.
Conclusions and Implications: This research presents the result of a literature review examining integrated care models as a way to improve acute health care in LTCFs in rural areas. Integrated care models in rural settings can help face the challenging situation and fulfil the complex health care needs of LTCF residents by reducing fragmentation and thereby improve continuity and coordination of acute health care services. These results can guide policy making in creating interventions and support adequate implementation of care models by knowledge translation in health care.

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Long-term care facilities (LTCFs) have received increasing attention in the past decades given the rising demand of complex care needs in the aging population.[1] People living in LTCFs, by definition, suffer from frailty, multimorbidity, and medical care dependency.[2-5] Chronic incurable illnesses and functional disabilities render them unable to live independently. Hence, residents of LTCFs tend to have greater health care needs than aged-matched community dwelling cohorts.[6-9]

Recent research points to an increase of (re)hospitalizations and emergency department (ED) transitions in the population of LTCF residents, with emergency care contacts up to 3 times per year.[10-12] At the same time, transfer to hospital is accompanied by a higher risk of emotional discomfort, delirium, infections, and mortality for the LTCF residents.[13,14] Moreover, the lack of access to practitioners after hours, missing advance care planning, and palliative care, as well as poor communication between health care providers, patients, and relatives, are associated with higher inappropriate hospital transmissions.[15-17]

A person's place of residence influences their access to and the quality of health care services.[18] When compared to urban areas, rural residents are faced with numerous factors resulting in poor access to health care. Further, people residing in rural areas are older on average and more likely to deal with chronic conditions.[19-21] Although the reasons for insufficient health care supply are complex, a lack of primary care and specialist staffing, as well as limited economic

conditions, offer an image of rural health care delivery.[22,23] Health systems and care approaches in rural areas exhibit significant variability due to local infrastructure and the distance to medical facilities, which can impede consistent access to health care services. Consequently, rural areas may face challenges in terms of limited resources to prevent the transfer of LTCF residents to hospitals and emergency departments.[24] The decision-making process in case of an emergency is complex and requires efficient, safe, and patient-centered options as alternatives considered by health professionals and caregivers to be effective for residents.

Health care provision in LTCFs is most commonly provided by general practitioners (GPs). The increasing demand for complex health care services for LTCF residents has led to gaps in care provision and burden in terms of workload for GPs, skilled nurses, and EDs, especially in rural areas.[21] Alternative health care models, such as "integrated care," could provide an opportunity to meet the challenges faced due to the aging population and their varying needs to ensure continuity and consistency of skilled (health-)care provision in the LTCF setting. Integrated care is considered to improve access, quality, and continuity in health care services, especially for people with multidimensional needs. The complexity of underlying concepts in integrated care challenges its definition. As a consequence, different terminologies (eg, "coordinated care," "collaborative care") are used to frame the key components of integrated care, which primarily imply defragmented, demand-oriented, and person-centered interprofessional health care services.[25] Introducing integrated care into LTCFs may reduce the workload of involved caregivers and increase quality in terms of work content, communication, and motivation.[26-28] Kates et al[29] define integrated health care as a framework with the person and its family support as partners of care in the core, surrounded by the primary care team providing health care services and coordinating community resources and social services. All components build on continuous interaction and improvement for better health and cost (Figure 1).

The needs of residents in LTCFs are complex, emerging from medical, physical, psychological, and social properties. Cure and care are mainly the demands of LTCF residents that require a variety of services to be delivered continuously by different stakeholders.[30] Fulfilling these complex needs in a rural LTCF integrated care model can serve as an effective way of centralizing the residents and their relatives in an interprofessional collaboration and network to create a demand-oriented caring and living environment under constant supervision.

Objectives

At the present time, there are few if any detailed investigations into the underlying causes of integrated acute health care models in rural LTCFs. To close this gap, a scoping review was conducted, following the methodological framework of Arksey and O'Malley.[31] We aimed to present an overview of the large, diverse body of integrated care and map the full range of elements used in the field. Following the 5 stages of (1) identifying the research question, (2) identifying relevant literature, (3) selection of studies, (4) charting the data summary, and (5) reporting the results in the current review, the reports of running and completed projects have been included to get a complete overview for existing knowledge on this topic.[32]

Methods

Study Identification and Selection

The comprehensive systematic literature search was conducted in May 2020 using 3 common health-related databases: MEDLINE, Web
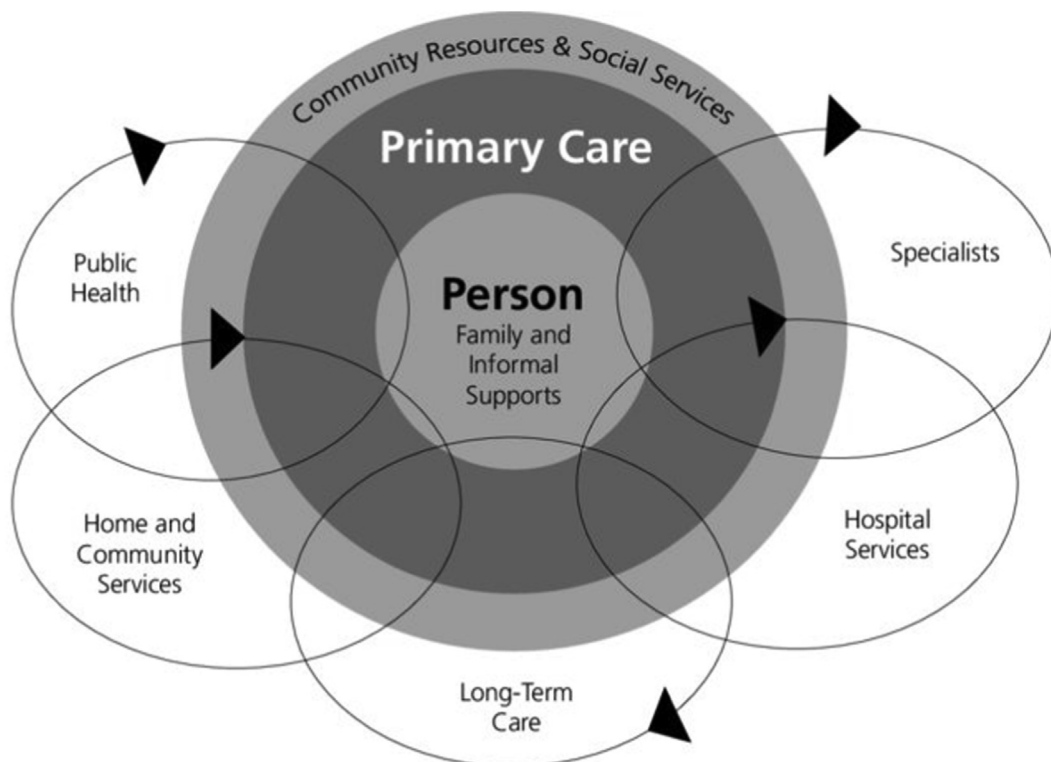

Fig. 1. A conceptual framework for an Integrated Health care System. Source: Kates (2012).[29]

of Science, and Cochrane Library. Although the focus was on bibliographic databases, we also used sources that include gray literature for manual search: Google Scholar and 2 (inter)national project databases [US National Library of Medicine and the Federal Joint Committee (G-BA)].

The search strategy was developed following the PICo framework relating to the key concepts "residential aged care facilities," "acutehealth care," "integrated care," and "rural areas." The search string was piloted in PubMed and subsequently adapted to the other databases (see Supplementary Material for the final search strategy). After removing duplicates, retrieved results were screened by title and abstract for their eligibility for inclusion. The Google Scholar search was based on combined search terms and controlled vocabulary; results were sorted by relevance and the first 200 hits were screened for inclusion by title and abstract. Manual search was completed by eligibility screening (title and abstract or summary) of all reports listed in the mentioned databases above. Further, relevant articles were identified through forward and backward citation searches of included papers. As our aim was to give a full overview of existing projects, primary studies reporting on ongoing or completed projects (peer reviewed and non–peer reviewed) of acute health care in LTCFs in rural and remote areas, published in English or German since 2010, were eligible for inclusion. Studies focusing on dental care or eye care, and not reporting on rural settings, were excluded. As there is no standardized definition of rural areas worldwide, the issue of classifying rural areas remains a limitation in the literature.[33] For the purposes of this review, rural was considered self-defined referring to the definitions of the "Degree of Urbanization."[34]

Data Extraction and Analysis

Data from included literature were extracted and charted in Microsoft Excel Panel with information on authors, country, settings, focus of the article, type of care model, status of study completion,
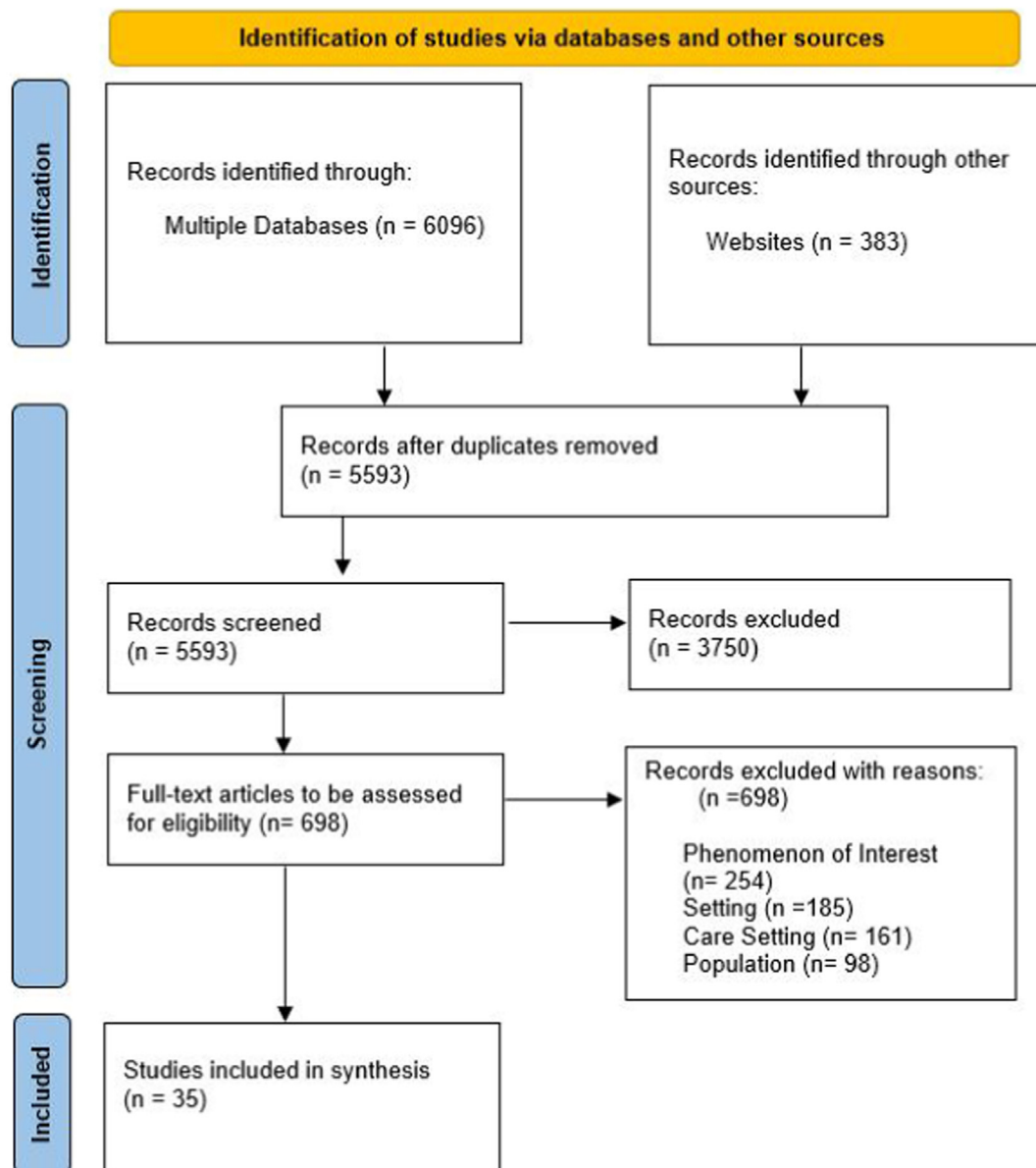

Fig. 2. PRISMA flow diagram of the study selection process for the current scoping review.

Table 1
Study Characteristics of the 35 Included Studies Identifying Aims and Approaches of Integrated Care

Author(s)	Title	Country	Type of Literature	Project Aims and Approaches	Project Status
Association of Statutory Health Insurance Physicians (2017)[36]	ElVi—Electronic Visits in Nursing Homes	Germany	Gray literature, report	- Integration of an electronic system in nursing homes in a rural area in Germany to request a virtual doctor's visit in acute health conditions - ElVi serves as a support system for nursing staff and doctors, relieving their workload, and providing a significant added value in patient care in rural areas where there is a growing shortage of doctors and nursing personnel	Completed
Association of Statutory Health Insurance Physicians (2018)[37]	CoCare (Coordinated medical care)	Germany	Project handbook	- Improve the medical care of residents in rural nursing homes Baden-Wuerttemberg (Germany) and reduce the number of avoidable hospital admissions and transfers for nursing home residents - Improvement of information flow and communication, as well as the promotion of collaboration between primary care physicians, specialists, and nursing staff	Ongoing
Bergrath et al (2013)[38]	Implementation Phase of a Multicentre Prehospital Telemedicine System to Support Paramedics: Feasibility and Possible Limitations	Germany	Case study, quantitative	- Develop a mobile telemedicine system to support paramedics in 3 rural emergency medical services to evaluate the feasibility and possible limitations of the telemedicine system in acute health conditions	Completed
Better Care Sooner (2010)[39]	Better Care Sooner	Canada	Gray literature	- Improve emergency care in Nova Scotia using resources more strategically - Provision of comprehensive minimum emergency standard care to set and raise quality care - Make emergency care more streamlined and patient-centered - Provide better care for seniors, people with mental illness, and complex needs such as LTCF residents	Completed
Bond et al (2018)[40]	Advance Care Planning in an Accountable Care Organization Is Associated With Increased Advanced Directive Documentation and Decreased Costs	USA	Quantitative study: case control study	- Improve access, including efforts to improve the number and qualifications of advance care planning facilitators in emergency cases relating to urban and rural categories for skilled nursing facilities	Completed
Bongartz (2017)[41]	County Doctors Network (Landarztnetz Lahn-Dill)	Germany	Gray literature, report	- Support availability of medical practices in 5 rural areas in Germany	ongoing
Bradford et al (2015)[42]	Telehealth Services in Rural and Remote Australia: A Systematic Review of Models of Care and Factors Influencing Success and Sustainability	Australia	Systematic review	- Collate, review, and synthesize available literature regarding telehealth services in rural and remote locations of Australia to identify the factors associated with their sustained success in health care	Completed
Conway et al (2010)[43]	A Multi-organisation Aged Care Emergency Service for Acute Care Management of Older Residents in Aged Care Facilities (ACE)	Australia	Case study, quantitative	- Introduction of a multiorganisation aged care emergency (ACE) service for older people in residential aged care facilities (RACFs). - Enhance and support the ability of staff in LTCFs and meet residents' acute care needs within the facility - Reduce emergency department transfers	Completed
Croll et al (2012)[44]	Telehealth Opportunities in Regional Queensland: A Scoping Study	Australia	Scoping study, quantitative	- Determine the potential for telehealth in rural areas in Australia with the aim to meet health service needs	Completed
Ervin et al (2019)[45]	Implementation of an Older Person's Nurse Practitioner in Rural Aged Care in Victoria, Australia: A Qualitative Study	Australia	Qualitative study: interviews and focus groups	- Explore barriers and enablers to implementing nurse practitioners in LTCFs for acute settings - Describe mechanisms required for successful implementation of nurse practitioners in rural residential aged care settings	Completed
Gabriel (2012)[46]	Digital Practitioner'S Visit	Germany	Gray literature, report	- Introduce practitioners visits via electronic devices to meet health care needs in rural areas (including LTCF residents) - Use of a video-conferencing tool aiming to support organizational processes	Completed
Georgeton et al (2015)[47]	General Practitioner Adherence to Recommendations From Geriatric Assessments Made During Teleconsultations for the Elderly Living in Nursing Homes	France	Quantitative cohort study	- Determine the factors associated with GP adherence to recommendations from geriatric assessments made during teleconsultations in nursing homes in rural Vendee (France)	Completed

GeriNoVe (2019)[48]	Regional Geriatric Emergency Care Center	Germany	Gray literature, report	- Establish a regional Geriatric Emergency Care Center (GeriNoVe) in a rural region in Germany to avoid unnecessary hospital stays and provide needs-based care	Ongoing
Gloth and Gloth (2010)[49]	A Comparative Effectiveness Trial Between a Post-Acute Care Hospitalist Model and a Community-Based Physician Model of Nursing Home Care	USA	Quantitative study: comparative trial	- Evaluate whether a designated post-acute care hospitalist could improve outcomes in the long-term care setting compared with a traditional cadre of community physicians in LTCFs in a remote setting of Baltimore	Completed
Gurung et al (2020)[50]	Understanding Registered Nurse Decision-Making, Communication and Care Delivery Between Emergency Departments and Residential Aged Care Facilities: A Research Protocol	Australia	Mixed-methods study	- Explore the perceptions of registered nurses about the decision and communication process between nursing homes and the emergency department in a remote area of Queensland	Completed
Hentrich and Schwerdt (2011)[51]	Nursing Home Practitioner's Model (Heimarztmodell)	Germany	Gray literature, report	- Optimize health care quality and well-being of LTCF residents in rural regions of Germany by integration of nursing home practitioners - Support communication between health care professionals, nurses, and informal caregivers to prevent acute health impairments	Ongoing
Hofmeyer et al (2016)[52]	Implementation of Telemedicine Consultation to Assess Unplanned Transfers in Rural Long-Term Care Facilities	USA	Pilot study, quantitative	- Creation and implementation of a telemedicine approach to assess residents from rural LTC facilities for potential transfer to hospitals	Completed
Intrator et al (2014)[53]	Nursing Home Control of Physician Resources	USA	Survey study, quantitative	- Investigate the structure of physician involvement in nursing homes to prevent ED transfers of LTCF residents	Completed
Klie and Monzer (2018)[54]	ReKo—Regional Care Competence Centers	Germany	Book, report	- Investigate how a differentiated, care-oriented case management system and a digital ecosystem can contribute to improving the security and quality of care in rural areas in Germany - Enhance the coordination and collaboration between different health care providers and improve the overall care delivery and reduce hospitalizations	Ongoing
Lauven (2020)[55]	Hand in Hand: GP and Care Professional Hand in Hand	Germany	Gray literature, compendium	- Delegating medical tasks to practical and academically trained nursing experts in a selected rural region - Involving nursing experts and utilizing electronic health records, the project seeks to improve patient care, enhance collaboration between health care professionals, and ultimately enhance health outcomes of e.g. LTCF residents	Ongoing
Ling et al (2019)[56]	Cost Analysis of an Integrated Aged Care Program for Residential Aged Care Facilities	Australia	Cost analysis, quantitative	- Annual costs of an intervention for acutely unwell older residents in residential age care facilities (RACFs) with usual care - The intervention, the Aged Care Emergency (ACE) program, includes telephone clinical support aimed to reduce avoidable ED transfers of RACF residents in the Hunter Valley Remote Area	Completed
Morrisson et al (2016)[57]	Reducing Preventable Hospitalizations With Two Models of Transitional Care	USA	Retrospective cohort study, quantitative	- Describe the approach and outcome of 2 distinct transitional care programs serving different populations: clinical nurse specialists with a chronic disease self-management focus vs physicians specializing in palliative in a small rural state in the United States, LTCF residents are included	Completed
Newbould et al (2019)[58]	Remote Health Care Provision in Care Homes in England: An Exploratory Mixed Methods Study of Yorkshire and the Humber	United Kingdom	Mixed-methods study	- Explore the use of videoconferencing to access (acute) health care in care homes, identifying levels of knowledge of, and attitudes towards videoconferencing	Completed
Ouslander et al (2016)[59]	Root Cause Analyses of Transfers of Skilled Nursing Facility Patients to Acute Hospitals: Lessons Learned for Reducing Unnecessary Hospitalizations	USA	Quantitative study	- Describe the results of structured, retrospective Root Cause Analysis performed using the INTERACT-QI Pathway by nursing home staff on hospital transfers including rural areas in the United States	Completed

Table 1 (*continued*)

| Author(s)	Title	Country	Type of Literature	Project Aims and Approaches	Project Status
Perrin et al (2017)[14]	Factors predisposing nursing home residents to inappropriate transfer to an emergency department. The FINE study protocol	France	Case-control observational study, quantitative	- Determine the factors predisposing NH residents to inappropriate transfer to EDs - Assess the cost of the transfers to ED and study the evolution of NH residents' functional status, and psychotropic and inappropriate drugs prescription between before and after the transfer - Calculate the prevalence of potentially avoidable transfers to ED and identify the factors predisposing NH residents to potentially avoidable transfer to ED representing e.g. rural areas in France	Completed
Pike and Mongan (2014)[60]	The Integration of Health and Social Care Services	USA	Gray literature	- Examine possibilities of Integrated Health Care structures for different remote areas in the United States e.g. with impact on variables of emergency care	Completed
Pimperl et al (2017)[61]	Gesundes Kinzigtal	Germany	A quasi-experimental study, quantitative	- Improve population health through Integrated Acute Health Care - Reduce unnecessary costs with a focus on patients with complex needs such as LTCF residents in a rural area of Germany	Ongoing
Picton et al (2020)[62]	The Role of Medication Advisory Committees in Residential Aged Care Services	Australia	Qualitative study: interviews and focus groups	- Explore the current structures and functioning of medical advisory committees in RACFs in rural and regional Victoria, Australia - Identify opportunities of medical advisory committees to better promote safe and effective medication use and its consequences for health conditions	Completed
Raslan (2018)[63]	PORT - Patient Centered Acute and Long-Term Care	Germany	Gray literature, report	- Delivery of comprehensive, coordinated, and continuous health care services to improve primary and acute health care for LTCF residents in a rural area in Germany	Completed
Schulz et al (2020)[9]	Differences in Medical Specialist Utilization Among Older People in Need of Long-Term Care—Results From German Health Claims Data	Germany	Quantitative study: Regression analysis	- Investigate whether differences in the utilization of 12 medical specialties exist between older people in need of long-term care and older people who are not in need of long-term care e.g. in rural areas - Indicate perceived access barriers and inequalities in medical care utilization among care dependent older people and its effect on health status	Completed
Smith et al (2014)[64]	Generating New Telehealth Services Using a Whole of Community Approach: Experience in Regional Queensland	Australia	Mixed-methods study	- Generate telehealth activity in hospitals, general practice and selected residential aged care facilities e.g. in rural Darling Downs, Australia - Provide telehealth education and training to clinicians to support health care provision	Completed
Squire (2020)[65]	TRAC—Telehealth for Residential Aged Care Facilities Program	Australia	Gray literature: program toolkit	- Support multidisciplinary care activities to assist older people with complex and chronic health needs who would benefit from higher levels of coordinated care and treatment to prevent emergencies - Deliver general practitioner, allied health, and specialists consultations to aged care residents in residential aged care facilities using video consultation	Ongoing
Stadler et al (2019)[66]	Reducing Avoidable Facility Transfers (RAFT): Outcomes of a Team Model to Minimize Unwarranted Emergency Care at Skilled Nursing Facilities	USA	Quantitative study: Prospective cohort, pre/post study	- Provide a potential new model for Skilled Nursing Facilities in Broken Hill, Western Australia - Deliver on-site, goal-driven primary and on-call care by a small team of providers to improve concordance with patients' wishes and lower the rates of hospitalization and ED visits	completed
Theile et al (2011)[67]	Home Visits—Central to Primary Care, Tradition or an Obligation? A Qualitative Study	Germany	Qualitative study: interviews	- Explore general practitioners' attitudes with regard to the feasibility, burden, and outlook of continued home visits in primary care in Germany (Hannover and rural surrounding)	Completed
Tupper et al (2015)[68]	Safety of Rural Nursing Home-to-Emergency Department Transfers: Improving Communication and Patient Information Sharing Across Settings	USA	Mixed-methods study	- Improve the safety of nursing facility transfers to hospital emergency departments by developing tools and protocols for standardizing critical interfacility communication and information-sharing pathways in rural nursing homes	Completed
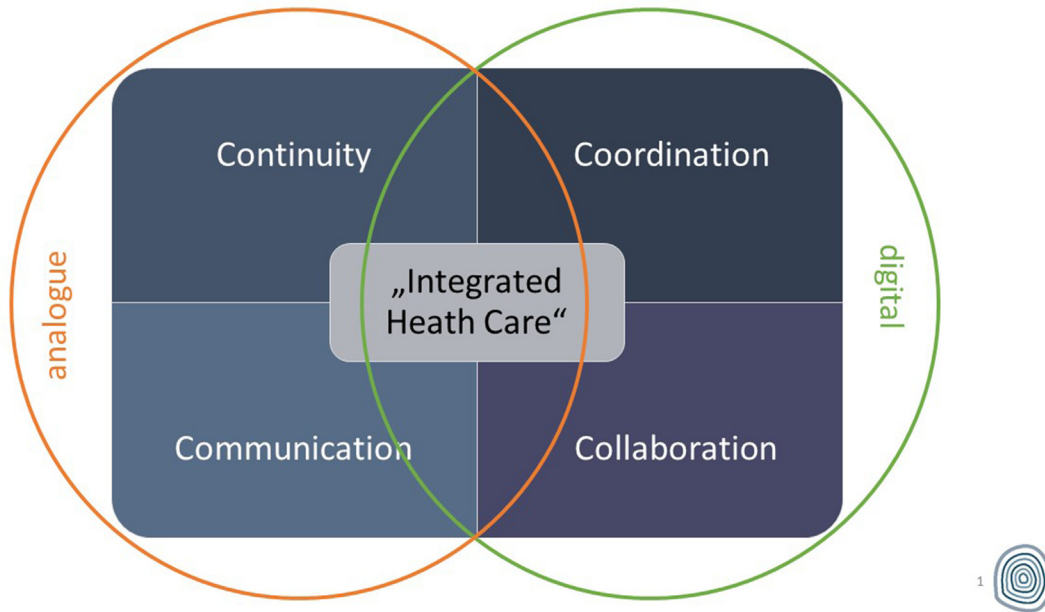
Fig. 3. Representation of "Integrated Health Care" in rural LTCFs.

implementation characteristics, and intervention outcomes. To summarize and disseminate research findings, themes were extracted iteratively with line-by-line coding using MAXQDA Analytics Pro 2020 (VERBI software, Berlin). Narrative synthesis based on the qualitative meta-summary by Sandelowski and Barroso[35] was used to describe the broad themes emerging from this field. Consistent with the exploratory approach of this study and the conventional methods of a scoping review, the quality of the included articles was not assessed. The research articles were sorted by article data according to the type of literature (eg, peer-reviewed article vs gray literature) and project status (current vs ongoing).

Results

After removal of duplicates, 5593 titles and abstracts were screened using inclusion criteria. Of these, 698 full-text articles were retrieved for full review (Figure 2).

Characteristics of Included Literature

As the purpose of the scoping review was to map all existing care models in the literature and to identify what is available in existing knowledge, a total of 35 references were included, predominantly primary research on completed projects (n = 27; 74.14%) and ongoing projects (n = 8; 22.86%). Among research reports on projects, the majority were published in peer-reviewed journals (n = 23; 65.71%), including 15 quantitative, 5 mixed-methods, and 3 qualitative designs. Other article types were gray literature (n = 12; 34.29%), including governmental and academic reports, working papers, or case reports. Most studies were conducted in Germany (n = 13), the United States (n = 9), and Australia (n = 9). A detailed bibliography of the included literature and an overall summary of relevant characteristics are presented in Table 1.

Integrated Health-Care Models in rural LTCFs

The analysis of the different reports resulted in 5 descriptive themes providing different approaches of integrated care models: (1) availability of specialists, (2) organization and quality management (QM), (3) networks, (4) telemedicine, and (5) telehealth. In our case, we defined telemedicine as the provision of health care services through the use of telecommunications technology by physicians and other specialists whereas telehealth as mainly electronic services referring to health information services, health care education, and health care networks.

Availability of Specialists

A large number of included care models (n = 17) comprises the implementation of specialists for health care services in rural LTCFs. In this category, the use of special nurse practitioners (NPs) and home-visit programs of physicians in LTCFs dominated.

Nurse practitioners

The overall aim of having a nurse practitioner (NP) in LTCFs was to coordinate the patients' medical needs and make decisions pertaining to residential care and well-being.[39,45,50,53,57] The active period of NPs varied in contracted time slots from 4 to 12 hours per week.[45,50] However, mostly no information was given about NPs' working times in the LTCFs. Although the primary roles of the NPs were quite similar, they focused on different work fields and showed varying competencies. NPs in Ervin et al[45] were supervised by geriatricians but had no full access to diagnostics, prescriptions, and referrals for specialist medical professionals. By contrast, registered nurses (RNs) in the report of Gurung et al[50] were expected to make substantial decisions in the absence of a GP or other physicians. Especially decision making processes of the NPs regarding ED transitions were

consolidated by offering proactively alternatives in case of emergencies.[39,50] Avoiding (re)hospitalizations and improving care coordination were central reasons for NP integration. Morrisson et al[57] reported on specialized NPs, visiting LTCF residents during hospital stay up to 3 months posthospitalization in their care homes to coordinate transitional care and support the patients' understanding of new medications and treatments. Out of working hours, availability of phone support by specialist nurses based was mentioned.[43,56]

Home-visit programs

Seven interventions reported on physician home-visit programs for rural LTCFs. Physicians specialized in internal and palliative care visited LTCFs to assess the residents' needs in cooperation with their primary care providers, hospital care managers, or family members.[57,67] Their interventions included disease, symptom, and medication management, acute illness treatments, and the improvement of home safety and advance care planning. Two different settings were described: 1 physician per LTCF responsible for regular visits for at least 3 days per week during business hours on weekdays[51,67] vs specialized physician teams who circulatory attended to the LTCF residents. Teams of minimum 4 practitioners guaranteed home visits every week to ensure monthly routine visits.[37,48] The number of reported visits varied from 1 to 3 times per week,[37,48,51,67] up to continuous physician availability during business hours on weekdays.[37]

Organization and QM

(Standardized) care coordination (framework)

Some care models underline that standardized care coordination pathways exist to support clinical decision making in common acute-onset events: needs and wishes of residents and their relatives could be taken into account following a standardized framework.[37,43,48,56] Additionally, findings show an integration of advance care plans and advance care directives, including acute care preferences as an important element of the coordination framework.[43,56,59,66] Stadler et al[66] established advance care plans early in LTCFs with open access for all health care providers. Monthly reports reminded of missing documents or data.

Apart from frameworks, interventions included care coordinators to supervise change management processes and support the use of framework elements, mediating as impartial persons between practitioners, residents, and NH staff.[39,41,43,48,56,59] Responsibilities of the care coordinators in LTCFs varied from organizing the residents' actual health care goals up to improving advance care plans and considering a palliative care plan as an alternative to hospitalization.[43,56,59] Intrator et al[53] identified a well-coordinated medical staff structure and involvement as a key element of better resident outcomes relying on care quality and well-being.

Interdisciplinary Networks

A common approach among the included interventions to support interdisciplinary work in the LTCFs was the engagement of special network committees that created regular meetings between different stakeholders to maintain constant communication and relationships between the different care providers. These meetings were used to discuss case reviews with the focus on patient goals, missed opportunities, or medication management considering the varying stakeholders' organizational structures.[37,55,56,61,63,66] Interdisciplinary case conferences strengthened the team-building process and increased efficiency through improved joint use of resources and defined information standards.[61,63] The frequency of team meetings varied from twice per month[66] to quarterly or yearly.[61]

There were also reports of successful cooperation with medication advisory committees consisting of physicians and pharmacists with the aim to give advice and review the safety and quality of medication use to prevent patients from polypharmacy.[61,62]

Another reported network described creation of specialist centers with the intention of merging the broad range of health care services in one place as a central health care point.[41,43,48,54,56] Assistants and local case and care managers serve as health care coordinators to connect patients with different medical staff and services.[54,63]

The German care model ReKo[54] provides the opportunity to connect all regional LTCFs, support collaboration and share resources. By engaging in the idea of welfare, self-help and volunteer organizations found space in their offers.

Interdisciplinary networks were also used for educational support: closer connections between current practice and academic research strengthen knowledge and awareness of health issues.[54,63] Educational programs represent an important role in several care models in order to assist formal and informal caregivers in core aspects of delivered services.[43,48,55,56,66]

Telemedicine

As a digital intervention, the use of telemedicine is often seen in recent research. Rural LTCFs were consulted via phone or video by physicians and aged care experts.[41,43,56] Besides, telephone consultation was also integrated as a clinical guidance and support tool for LTCF staff in case of emergencies to derive better resident management. Another telemedical advice, as shown by Georgeton et al[47] and Smith et al,[64] was the use of real-time video communication software installed in a special room in the LTCFs or as a platform accessed on portable hardware that can be easily transported to the resident's room.

In general, telemedical home visits can be requested by the GPs, NH staff,[65] or special telemedicine assistants[47] when residents experience sudden health issues. The practitioners get in touch with the NH staff and initiate a virtual medical inspection of the resident's health status. The NH staff report on the patient's medical and treatment histories and are available to help the patient during the examination if needed.[36,46,47,52] Special software and additional tools enable the monitoring of the patient's physical functions via mobile medical electrocardiogram (ECG) or pulse oximeter.[36] The intervention of Hofmeyer et al[52] is a special electronic long-term care (eLTC) pilot model with a complex technical infrastructure that allows health care professionals to listen to a resident's lungs, heart, and abdomen from distance. Moreover, for a closer view of the patient, special equipment such as a 2-way stethoscope and high-definition camera, with the support of a special core group of staff is used in Smith et al.[64] After video consultation, recommendations concerning pharmacologic or nonpharmacologic treatment, urgent personal home visits, and expert medical advice, including hospitalization, and referral to other specialists can be made.[36,46,47,52] Documents such as reports or assessments can be printed, saved digitally on the platform, or sent by email or fax to the resident's GP.[36,46,47]

Telemedicine is also used as an open digital consultation room that is available during fixed hours. Moreover, this system is used for internal educational and supervisory programs by the practitioners to support LTCF staff so that patients receive integrative and interdisciplinary care.[46]

The main aim of telemedicine is to constantly cover interdisciplinary health care services, including expertise through physicians and other specialists (ie, wound care, drug administration, and emergency assistance) as well as geriatric assessments and triaging in case of acute health crises.[36,43,52,56,58] Reported access to telemedical solutions differed from 5 working days, "nine to five"[46] up to a 23- to 24-hour availability, on 7 days per week.[47,52] The use of video consultation predominantly addressed health problems linked to residents with frailty, multimorbidity, and extensive nursing care needs,[36,58] and a higher frequency of telemedicine use was documented for this group in contrast to more vital residents.[36] The effects

of video conferencing with practitioners were quantified in a survey and revealed improved continuity of care, staff confidence, resident comfort, and clinical outcomes, whereas variables such as workload and residents' mental health were not influenced.[58]

Telehealth

Reports on telehealth or e-health in the included literature were mainly based on electronic communication and documentation services. In principle, telehealth is described as a tool for increasing organizational structures and developing electronic networks for relevant health care providers.[48,54,55,61,65] An essential key element in the majority of telehealth interventions was the use of an electronic health record system with access to protected health data depending on the medication, advance care plans, and advance care directives.[14,44,59,64,65] These records enable a quick data transfer and transparency of delivered health care services. A range of strategies were employed to ensure continuous communication between health care providers; cross-sectoral cooperation,[48,55,61,64] especially in transitional care; and quick identification of existing gaps.[54] Telehealth systems were also for coordination of medical appointments.[48] Telehealth support reduces organizational distress of LTCF staff and supports external medical and paramedical staff by creating care plans and visit times.[48,65] The interview study of Croll et al[44] yielded that telehealth in LTCFs was used in particular for education, administration, and training of residents and staff.

Discussion

The aim of this study was to map existing literature on integrated acute health care in rural LTCFs and their underlying concepts. In this scoping review, we identified 35 reports that underline the complexity and wide range of components of integrated care in LTCFs, with 5 main categories as a result of the meta-analysis. However, no consensus was found on the typology of integrated health care in rural LTCFs. Our results show that different innovative constituents are applicable for use and go beyond previous regulatory health care supply in rural areas all over the world. These findings reflect the polymorphic character of integrated care and underline the need for defragmentation in health care provision to reduce acute health conditions in LTCF residents ending in ED transfers and hospitalizations.[69-71]

Although the goal is to reduce factors contributing to ED transmissions, the challenge is to establish an organizational and cultural change in existing structures within health care by focusing on continuity, communication, coordination, and collaboration in health care delivery as the main characteristics of integrated care (Figure 3).

Such an establishment requires equality and acceptance of the different stakeholders' competencies. The predominant lack of trust in LTCF care settings and capacities affirms the uncertainty in the decision-making processes of LTCF nurses.[72] Given the hierarchical structure within health care settings, nurses in LTCFs often report changes in a resident's condition, particularly regarding acute health issues, to the supervising physicians. Because of limited expertise and restricted authority in geriatric health assessments and care delivery (such as medication administration), the absence of palliative care and advance directives in LTCFs can lead LTCF nurses to delegate various interventions and the decision making to GPs when faced with acute health conditions.[73-76]

The ability to provide rural acute health care services using technology such as wireless tools, email, 2-way video, smartphones, digital physical assessments, electronic transmission images, and the monitoring of vital signs can help overcome long distances and support continuity in health care delivery.[77-79]

Several studies documented positive attitudes and satisfaction towards telecommunication devices and further suggest that telemedicine and telehealth in rural areas have the potential to improve access to health care and efficacy in LTCFs.[80-84] An increase in future opportunities provided by telemedicine and telehealth suggests an expansion in the installations of comprehensive networks in rural settings, which is still absent.[85]

The results of our study propound a complex scenery of analog and digital health care services to support constant improvement of health care needs in the setting of rural LTCFs.

Strengths and Limitations

To our knowledge, this is the first study mapping out the huge range of integrated acute health care models in rural LTCFs. The results of our review enable a comprehensive view of innovative health services delivered in LTCFs in rural areas to support demand-oriented interprofessional LTC environments. However, there are several limitations that have to be considered. First, the included literature varied in quality and status. As we intended to depict the variety of integrated care, both completed and ongoing reports were included. Consequently, an analysis of the realization and effects of the reported models was not feasible. Second, although the scoping review framework[31] was followed, relevant studies may have been missed because the study selection was realized by one reviewer (YÖ) with team support in case of questions. The extracted literature is also limited by the exclusion of languages other than English and German. Further, because of the specific selection of the databases and a fixed period for research (January 2010−May 2020) there is a possibility of dissemination bias. The precise definition of "rural and remote" remains an additional limitation as definitions and measurements vary across countries and studies. Finally, as this was a scoping review, the quality of the included literature was not assessed. As described in the PRISMA extension for scoping reviews, quality assessment is not typical unless it corresponds with the objectives of the review.[86] Besides, a meaningful assessment of quality would be very limited owing to the heterogeneity of the included reports and would not have influenced the main findings of this study.[87]

Conclusion and Implications

Integrated care is multivarious in nature. In the setting of rural LTCFs, integrated health care services provide the chance to employ patient-centered support to fulfil residents' needs by maintaining quality of care. Here, acute health care delivery remains a crucial aspect in case of emergencies; however, the regulatory use of recent care innovations may sustainably impact the workload of health care professionals as well as patient satisfaction in rural LTCFs.

Health care policy initiatives to build capacities within LTFs in rural regions are indispensable and include bettering access to (tele) communication, supporting collaboration, and ensuring continuity of health care delivery, with the aim of achieving a demand-oriented high quality of care for LTCF residents. As this scoping review explored a broad field, further research should focus on specific areas and the effects of integrated care models in the rural LTCF setting to derive best practices for future implementation.

Acknowledgments

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Supplementary File 1. Search strategy for PubMed

((((((((((((((((((((((((((("Rural Nursing"[Mesh]) OR "Rural Health Services"[Mesh]) OR "Rural Health"[Mesh]) OR "Hospitals, Rural"[Mesh]) OR "Suburban Health Services"[Mesh])))))) OR "Rural Population"[Mesh]) OR rural*[Title/Abstract]) OR (((rural[Title/Abstract]) AND area[Title/Abstract]) OR areas[Title/Abstract])) OR ((rural[Title/Abstract]) AND (((region[Title/Abstract]) OR regions[Title/Abstract]))))) OR ((rural[Title/Abstract]) AND ((district[Title/Abstract]) OR districts[Title/Abstract])))) OR suburban*[Title/Abstract]) OR (((suburban[Title/Abstract]) AND areas[Title/Abstract]) OR area[Title/Abstract])) OR ((suburban[Title/Abstract]) AND (((region[Title/Abstract]) OR regions[Title/Abstract])))) OR ((suburban[Title/Abstract]) AND ((district[Title/Abstract]) OR districts[Title/Abstract]))) OR remote*[Title/Abstract]) OR (((remote[Title/Abstract]) AND area[Title/Abstract]) OR areas[Title/Abstract])) OR ((remote[Title/Abstract]) AND (((region[Title/Abstract]) OR regions[Title/Abstract]))))) OR ((remote[Title/Abstract]) AND ((district[Title/Abstract]) OR districts[Title/Abstract])))) OR countrysid*[Title/Abstract]) OR ((commune[Title/Abstract]) OR communes[Title/Abstract])) OR (((rural[Title/Abstract]) AND ((community[Title/Abstract]) OR communities[Title/Abstract])))) OR ((suburban[Title/Abstract]) AND ((community[Title/Abstract]) OR communities[Title/Abstract]))) OR (((remote[Title/Abstract]) AND ((community[Title/Abstract]) OR communities[Title/Abstract])))) OR ((provinc*[Title/Abstract]) AND rural[Title/Abstract]))) AND (((community[Title/Abstract] OR communities[Title/Abstract])) OR Community Health Centers[Mesh] OR community health services[MeSH Terms] OR Social Planning[Mesh] OR Family Practice[Mesh] OR (((social[Title/Abstract]) AND support[Title/Abstract])) OR (((social[Title/Abstract]) AND network*[Title/Abstract])) OR Social Networking[Mesh] OR Community Integration[Mesh] OR Community Health Planning[Mesh] OR ((((mobile[Title/Abstract]) AND care[Title/Abstract]))) OR electronic[Title/Abstract] OR (((mobile[Title/Abstract]) AND health[Title/Abstract])) OR cyber[Title/Abstract] OR (((technology[Title/Abstract]) OR technologies[Title/Abstract])) OR digital[Title/Abstract] OR e-health[Title/Abstract] OR telehealth[Title/Abstract] OR telemed*[Title/Abstract] OR Telemedicine[Mesh] OR ((((case[Title/Abstract]) OR care[Title/Abstract]) AND management[Title/Abstract])) OR ((multidisciplinary[Title/Abstract]) AND medicine[Title/Abstract]) OR (((multidisciplinary[Title/Abstract]) AND health[Title/Abstract]) AND care[Title/Abstract]) OR multidisciplinary[Title/Abstract] OR (((integrative[Title/Abstract]) AND health[Title/Abstract]) AND care[Title/Abstract]) OR ((innovative[Title/Abstract]) AND medicine[Title/Abstract]) OR medicine[Title/Abstract] OR (((innovative[Title/Abstract]) AND health[Title/Abstract]) AND care[Title/Abstract]) OR innovat*[Title/Abstract] OR "Community Health Nursing"[Mesh] OR "Community Health Planning"[Mesh] OR "Nurses, Community Health"[Mesh] OR Community Networks Mesh OR Integrative Medicine[Mesh] OR Delivery of Health Care, Integrated[Mesh])) AND ((((((((((("Emergency Medical Services"[Majr]) OR "Emergencies"[Majr]) OR "Emergency Medical Service Communication Systems"[Majr]) OR "Emergency Medicine"[Majr]) OR ((Emergency[Title/Abstract]) AND care[Title/Abstract])) OR (((acute[Title/Abstract]) AND health[Title/Abstract]) AND care[Title/Abstract])) OR ((acute[Title/Abstract]) AND care[Title/Abstract])) OR ((((emergency[Title/Abstract]) OR emergencies[Title/Abstract])) AND ((services[Title/Abstract]) OR service[Title/Abstract]))) OR ((emergency[Title/Abstract]) AND department*[Title/Abstract]))) OR (((((((((("Primary Health Care"[Mesh]) OR "General Practitioners"[Mesh]) OR ((general[Title/Abstract]) AND practice[Title/Abstract])) OR (((general[Title/Abstract]) AND practitioners[Title/Abstract]) OR practitioner[Title/Abstract])) OR ((primary[Title/Abstract]) AND care[Title/Abstract])) OR "General Practice"[Mesh]) OR "Health Services for the Aged"[Mesh]))))))))) AND ((((((((((("Nursing Homes"[Majr]) OR "Residential Facilities"[Majr]) OR "Homes for the Aged"[Mesh]) OR "Skilled Nursing Facilities"[Majr]) OR "Long-Term Care"[Mesh]) OR ((((long[Title/Abstract]) AND term[Title/Abstract]) AND care[Title/Abstract]) AND ((facility[Title/Abstract]) OR facilities[Title/Abstract]))) OR (((resident*[Title/Abstract]) AND aged[Title/Abstract]) AND care[Title/Abstract])) OR (((nursing[Title/Abstract]) AND ((home[Title/Abstract]) OR homes[Title/Abstract])) AND resident*[Title/Abstract])) OR ((nursing[Title/Abstract]) AND ((facility[Title/Abstract]) OR facilities[Title/Abstract]))) OR ((care[Title/Abstract]) AND ((home[Title/Abstract]) OR homes[Title/Abstract])))