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Medizinische Fakultät
Departement Public Health

Pflegewissenschaft
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A nurse-led care model to strengthen geriatric expertise in nursing homes: **The development and content of the INTERCARE model.**

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A nurse-led care model to strengthen geriatric expertise in nursing homes: **The development and content of the INTERCARE model.**

Authors
Kornelia Basinska
Raphaëlle-Ashley Guerbaai
Michael Simon
Sabina De Geest
Nathalie I.H. Wellens
Christine Serdaly
Carlo De Pietro
Mario Desmedt
Reto W. Kressig
Dunja Nicca
Andreas Zeller
Anja Vaes
Franziska Zúñiga

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About this report

This report can be downloaded from our website
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About the report

Similar to many countries worldwide, Switzerland is experiencing transformations in health care service delivery driven by demographic, economic and technological trends. Faced with an ageing population, the number of older people in need of constant nursing care is increasing, meanwhile it is difficult to recruit enough staff to work in long-term care. Nurse-led care models are one possible solution to this challenge, as they offer comprehensive care for older people with chronic conditions by means of targeted skill mix, the potential to strengthen geriatric expertise in place and add attractiveness to the nursing profession in the long-term care sector.

This national report contains the description and development of a nurse-led model within the INTERCARE study ("Improving **INTER**professional **CARE** for better resident outcomes – **INTERCARE**"). Using implementation science principles, e.g., combining evidence-based interventions with contextual information, we developed a contextually appropriate, sustainable nurse-led model to improve the quality of care, foster interprofessional collaboration, and reduce unplanned hospitalisations. The INTERCARE model meets the needs and resources of Swiss nursing homes and this report provides the basis for future scale up of the model.

The 4 year (2017-2020) national implementation science study is funded by the Swiss National Science Foundation (SNSF) as part of the National Research Program "Smarter Health Care" (NRP 74, Grant 407440_167458), the Nursing Science Foundation Switzerland and the Ebnet Stiftung, Switzerland. In Phase A (2017-2018), the INTERCARE model was developed. In Phase B (2018-2020), the INTERCARE model was implemented in 11 Nursing Homes (NHs) in the German-speaking part of Switzerland and evaluated for its clinical effectiveness with the main outcome being unplanned hospitalizations.

INTERCARE research group

The research group is comprised of different professionals with a wide range of skills and experience not only in long-term care but also in primary and acute care settings, as well as in private, government and non-government sectors. Professional backgrounds include clinical settings, health promotion, research and academia and project management.

Institute of Nursing Science (INS), Faculty of Medicine, University of Basel, Switzerland
Prof. Dr. M. Simon (principal investigator)
Dr. F. Zúñiga (project leader)
Prof. Dr. D. Nicca
Prof. Dr. S. De Geest
K. Basinska
R.A. Guerbaai
N. Zimmermann
Dr. J. Bartakova

Faculty of Medicine, University of Basel, Switzerland
Center for Primary Health Care, University of Basel, Switzerland
Prof. Dr. med. A. Zeller

Faculty of Medicine, University of Basel, Switzerland
University Department of Geriatric Medicine FELIX PLATTER, Basel, Switzerland
Prof. Dr. med. R. W. Kressig

Department of Business Economics, Health and Social Care at the University of Applied Sciences and Arts of Southern Switzerland, Lugano, Switzerland
Dr. C. De Pietro

Department of Public Health and Social Affairs of the Canton of Vaud, Lausanne, Switzerland
Dr. N. Wellens

Foundation Asile des Aveugles, Lausanne, Switzerland
Dr. M. Desmedt

Serdaly & Ankers, Conches, Switzerland
C. Serdaly

Stakeholders

The work of the research group is supported by a Swiss stakeholder group. The stakeholders kindly support the INTERCARE study in the development, implementation and evaluation phases of the study.

Institutions represented	Type
SPO Swiss Patient Organisation	*Patients, residents and older people*
Swiss Alzheimer Association	
Dementia Network of both Cantons of Basel	
FMH Swiss Medical Association	*Professionals*
Swiss Society for Geriatrics SFGG	
Swiss Association of Health Education Centers (BGS)	
Academic Society for Gerontological Nursing (AFG Gerontologie)	
Swiss Interest Group of Nurse Aides	
Swiss Association for Nursing Science (VFP)	
Swiss Professional Association for Long-term Care	
Spitex Association for Home Care Switzerland	
Palliative ch	
IG Swiss ANP, Advanced Nursing Practice Interest Group	
Swiss Professional Association of Nurses SBK-ASI	
Swissuniversities, Bern	
Curaviva Switzerland – Swiss Association of Institutions for Persons Requiring Support	*Healthcare providers and insurance companies*
Curaviva Baselland – Cantonal Association of Institutions for Persons Requiring Support	
Association of Fribourg Nursing Homes (AFIPA – VFA)	
Senesuisse – Swiss association of economically independent retirement and care homes	
University Hospital Basel	
Swiss Nurse Leaders	
Curafutura	
Tarifsuisse ag	
Federal Office of Public Health (FOPH)	*Policymakers*
Swiss Conference of Cantonal Health Directors (GDK / CDS)	
Swiss Health Observatory (OBSAN)	

Acknowledgements

This report reflects the efforts of all members of the research group, the nursing homes we visited during the contextual analysis, and the nursing homes that participated in the INTERCARE study over a two-year period.

The development of the INTERCARE model and this report would not have been possible without the 14 Swiss nursing homes which took part in the contextual analysis, including their nurse experts, directors of nursing and physicians, who filled out questionnaire surveys, participated in the interviews and provided unpublished information about their care models. We thank them for their time and efforts, both for the interviews and for reading and giving feedback on the descriptions of their models.

We also thank the 11 nursing homes who participated in the implementation part of INTERCARE with great effort and enthusiasm, and were ready to embark on a two-year journey and share their experiences with us. At the beginning of our journey, they helped us to clarify the content of the model's core elements and gave feedback on all the documents and tools needed for successful implementation of the model.

The stakeholder group was very supportive throughout the duration of the study. Their input helped build a care model that fitted the Swiss context, and allowed to tackle obstacles in implementation which contributed to a sustainable intervention. We highly appreciated their engagement and participation.

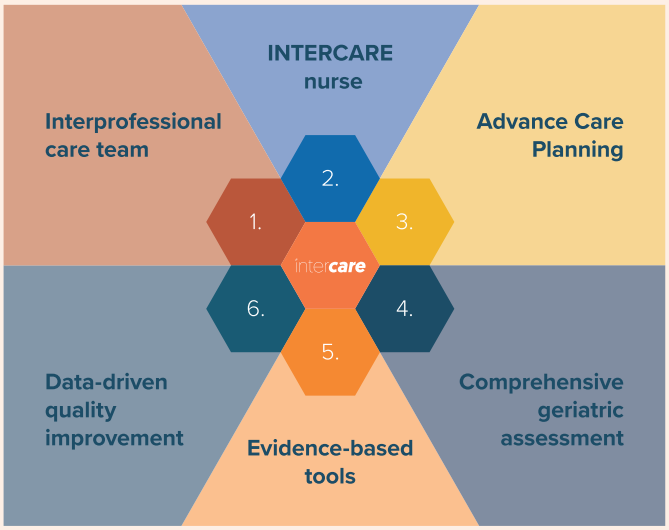
Structure of the report

A short introduction to the INTERCARE study is presented in **chapter one**. **Chapter two** includes an overview of the implementation science principles used to develop the INTERCARE model. **Chapter three** concentrates on the description of the nurse-led care model (i.e., "INTERCARE model"), and is the main focus of this report. The last part of chapter three addresses practical information about what strategies can be used to facilitate the implementation of the INTERCARE model in NHs.

Chapter four focuses on the development of the INTERCARE model based on the results obtained from four research studies during phase A of INTERCARE: a literature review, case studies, a modified Delphi method with Swiss stakeholders and focus group interviews with residents and family members. In **chapter five**, the INTERCARE model is discussed in light of its core elements and chapter six summarises recommendations for research and practice.

Appendix one includes the individual descriptions of the 14 Swiss nursing homes that served as case studies for nurse-led care models in the national context. Models from the German speaking part of Switzerland are available in German, and models from the French- and Italian speaking part of Switzerland are available in French. **Appendix two** summarises potential factors influencing the model's implementation. The appendix two is available in English and German. Both appendices are available on our website (*https://intercare.nursing.unibas.ch*).

Overview of the INTERCARE model



The INTERCARE model consists of six core elements:

1. Interprofessional care team
2. INTERCARE nurse
3. Advance Care Planning
4. Comprehensive geriatric assessment
5. Evidence-based tools
6. Data-driven quality improvement

The central element of the model is the interprofessional care team and INTERCARE nurse, a registered nurse in an expanded role (RNX), who has additional competencies and responsibilities compared to the traditional registered nurse's (RN) role. INTERCARE nurses, supported by the nursing home (NH) leadership, take the responsibility for the clinical lead in complex resident situations, empower care teams by coaching and supporting them, and facilitate interprofessional collaboration. INTERCARE nurses address gaps in geriatric expertise to prevent harm and improve the quality of care. Moreover, INTERCARE nurses, in collaboration with NH leadership, drive the implementation of the Comprehensive Geriatric Assessment (CGA) and Advance Care Planning (ACP), while analysing available data to monitor and optimise quality of care.

Chapter 1 – **Introduction**

The number of care-dependent older people in need of good quality of care and professional health services in NHs is constantly increasing worldwide, due to increasing life expectancy and a growing number of chronic conditions with multi-morbidity and dementia [1]. However, the number of professional carers such as nurses and general practitioners (GPs) cannot cover the growing demand, leading to a considerable shortage of health professionals in long-term care [2]. As a consequence, care delivered in NHs is mostly provided by non-tertiary level care workers with little health care training, education and geriatric expertise [1, 3]. Indeed, evidence shows that tasks performed by non-tertiary care workers without higher supervision leads to suboptimal quality of care, without chronic care management and late detection of deteriorations of health conditions. Additionally, high turnover rates in long-term care add to discontinuity of care and a heavy workload [4]. Further, the current organization of NH physicians in Switzerland, with 77% of off-site GPs treating residents in NHs [5], makes care coordination challenging and hinders rapid resident assessment in the event of an acute situation [6-8]. All aforementioned challenges increase the likelihood of adverse events and hospital transfers [9-11]. In Switzerland, in 2013, 42% of all hospitalisations from NHs were potentially avoidable, and these cost the health care system between 89 to 105 million Swiss francs [12]. Internationally, the numbers indicate that between 19% and 67% of hospitalizations from NHs are potentially avoidable [13]. Avoidability refers to cases where the condition for which the resident was hospitalised could have been prevented with earlier recognition of deterioration and better management in the NH [12].

Maintaining care quality requires the most effective possible use of existing qualified health professionals. Also, the COVID-19 pandemic underlined that NHs must be able to quickly react to new challenges and crisis situations. Nurse-led care models, including higher levels of geriatric-focused clinical leadership, have been successfully developed and evaluated in several countries [10, 14-18]. These models describe the delivery and coordination of care led by nurses in expanded roles, who work closely with patients, residents or clients. The extent to which nurses carry out activities independently from physicians within nurse-led care models varies depending on their educational level and scope of practice, and to some extent depends on the physician's level of trust [19].

Internationally, nurse-led care models are mostly led by Advanced Practice Nurses (APNs[1]) [20, 21]. However, APNs in Switzerland, similarly to other European countries, are not readily available. To date, 70% of European countries do not have APNs in any health care sector [22]. Moreover, internationally established nurse-led care models working with APNs are not easily adaptable to the Swiss context. Thus, in the meantime, to increase the capacity of geriatric nursing expertise in NHs, other types of expert nurses need to be included in the development of nurse-led care models. Additionally, nurse-led care models consist of multiple interacting elements, involving different staff – such as nurses, physicians, or physiotherapists – each with different practice patterns (i.e., standards or methods of care) and scopes of practice (permitted procedures, actions or processes of a healthcare professional). This makes care models complex to develop, implement and sustain. Therefore, to develop a sustainable nurse-led care model adapted to the needs and resources of Switzerland, the INTERCARE study was designed using implementation science principles [23].

[1]The International Council of Nurses defines an APN as "*a registered nurse who has acquired the expert knowledge base, complex decision-making skills and clinical competencies for expanded practice, the characteristics of which are shaped by the context and/or country in which s/he is credentialed to practice. A Master's degree is recommended for entry level*" (ICN, 2008).

Chapter 2 – INTERCARE: An implementation science study

Implementation science

Implementation science aims to facilitate the uptake of evidence-based practice (EBP) or interventions (e.g., care models shown to be effective in a real-world setting like for example the NHs) [24]. The strength of implementation science is a combination of multiple methodological considerations including contextual analysis, stakeholder involvement, or theory driven intervention development. Additionally, within implementation science, the development of implementation strategies, i.e., methods or techniques helping the EBP or intervention to work under real conditions, is required [25]. Implementation science theoretical frameworks are available to guide researchers in the various steps of the study. Theoretical frameworks are needed to think of the basic conceptual structure of any implementation process and underpin the added-value and necessity to involve local stakeholders [24, 26]. To support the understanding of the different steps and describe the different phases of the implementation process we used the EPIS framework (**E**xploration, **P**reparation, **I**mplementation, **S**ustainment) throughout the INTERCARE study [27]. This report focuses on the exploration and preparation phase described in the EPIS framework. The implementation and sustainment phase will be described in a second national report.

Implementation science applied to INTERCARE

If the local context is poorly understood in the exploration and preparation phase, the new care model will most likely not be implemented nor will it be sustainable [28]. A poorly understood context includes too little information about the target setting, lack of involvement of stakeholders, lack of proper contextual adaptations of the intervention and limited local leadership support. Phase A of the INTERCARE study included the exploration and preparation phase of the EPIS framework in the implementation process [27]. The exploration phase included four studies: i) a literature review (**study 1**) to identify evidence-based models, specifically nurse-led models that successfully reduced unplanned hospitalisations, ii) a contextual analysis (**studies 2 - 4**) to assess barriers and facilitators for model implementation and to better understand how to locally adapt the new care model for successful implementation. To structure the collected information, we used two theoretical frameworks: 1) the Consolidated Framework for Implementation Research (CFIR) [29] and, 2) The Hamric framework for advanced practice nursing [30] (see box 1 for detailed description). As for the preparation phase, we defined six core elements or foundations for the INTERCARE model, elaborated the implementation strategies tailored to the needs of the recipient NHs and individually supported every NH to prepare for implementation of the INTERCARE model.

Phases of the implementation process

In the following chapter the main findings from the four studies are briefly described. Chapter 4 includes detailed descriptions.

Exploration phase

Literature review (study 1). The exploration phase started with a literature review (**study 1**) looking for international evidence-based nurse-led care models which successfully reduced unplanned hospitalisations from NHs. We identified five evidence-based models [15-18, 31] with key components contributing to the reduction of unplanned hospitalisations such as the role of APNs. During this stage, we also used Swiss medical data to determine the main diagnoses associated to resident transfers from NHs to an acute setting [12].

Contextual analysis (study 2-4). Next, we started with the exploration of the Swiss context using case studies (**study 2**). Through members of the research group, we identified Swiss NHs working with nurse-led care models. We then asked those NHs to recommend further NHs that would fulfil our criteria, also known as snowball sampling. Given the fact that there are very few APNs working in NHs, we searched for NHs working with registered nurses in expanded roles (RNXs), often referred to as nurse experts. RNXs are registered nurses with additional education in a specific clinical area, e.g., Master of Advanced Studies in Gerontology or Palliative Care. We used survey questionnaires followed by interviews with leadership and RNXs. Also, telephone interviews were conducted with GPs working in the respective NHs, to shed light on interprofessional collaboration, practice patterns, as well as competencies and expected outcomes of RNXs in Swiss NHs [32].

CFIR

The Consolidated Framework for Implementation Research (CFIR) provided concepts associated with effective implementation of interventions, which were developed based on a comprehensive literature review of 500 sources across 13 scientific disciplines. We used CFIR to assess the context prospectively and to guide decisions about implementation strategies that could support the implementation.

CFIR consists of 38 constructs organized in five domains, each of which may affect an intervention's implementation: (1) intervention characteristics i.e., key attributes influencing the intervention (e.g., source of the intervention, the adaptability of intervention to the individual setting) (2) characteristics of the individuals involved (e.g., knowledge and beliefs about the feasibility of the intervention, educational level of staff involved) (3) inner setting (e.g., existing organizational structures, organizational culture) (4) implementation processes (e.g., planning, monitoring and evaluation of the intervention) that have been associated with effective implementation, (5) outer setting (e.g., health care structures, guidelines). Based on identified barriers within the CIFR constructs, implementation strategies addressing those were developed to ease the implementation [29].

HAMRIC FRAMEWORK

The Hamric framework for advanced practice nursing describes seven core competency areas of nurses in an advanced practice role:

(1) clinical practice, (2) coaching, (3) clinical and professional leadership, (4) interprofessional collaboration, (5) research skills, (6) ethical decision-making, (7) consultation.

Although the Hamric framework is primarily used for the description of APNs, we applied this framework to create a clear description of the expanded nursing roles in accordance with international developments and the competencies needed. Standardised definitions facilitate exchange and dissemination of the results in a meaningful way [18].

Box 1. *INTERCARE frameworks*

Additionally, we used questionnaire and interviews to identify factors that could influence (support or hinder) the implementation of such models in the Swiss context. For the contextual analysis, we used nine case studies from the French- (n=2) and German-speaking (n=7) region of Switzerland. In a later stage, we identified five further NHs in the German- (n=1), French- (n=2) and in the Italian-speaking (n=2) region of Switzerland. However, the five models identified at later stage were not used in the development of the INTERCARE model, due to time constraints but provided valuable information for future development of the INTERACRE model.

Based on the synthesis of the nine case studies and the literature review, we then involved the national stakeholder group of INTERCARE (see Box 2) to rate appropriate competencies and outcomes for the RNXs' role in the Swiss context using modified RAND UCLA Delphi method (**study 3**) [33]. The results helped to identify which competencies were appropriate for the RNXs in the INTERCARE model and to discuss further factors which may influence (support or hinder) its implementation.

Stakeholders refer to experts who work in an area related to long-term care in Switzerland. The stakeholders in the INTERCARE study are representatives of: SPO Patienten Protection Organization, Swiss Alzheimer Association, Dementia Network of both canton of Basel, FMH Swiss Medical Association, Swiss Geriatric Medicine Society (SFGG/SPSG), Swiss Association of Education Centers (BGS), Academic Association for Gerontological Nursing (AFG Gerontology), Swiss intrest group of nurse aides (IG NHSRK), Swiss Association for Nursing Science (VFP), Long-term care Switzerland, Spitex Association for home care Switzerland, Palliative ch, IG Swiss ANP, Swiss Nursing Association (SBK-ASI), Swissuniversities, Curaviva Switzerland and Baselland, Fribourg Association of Institutions for the Elderly (AFIPA – VFA), Swiss association of economically independent retirement and care homes – Senesuisse, Swiss Nursing Leaders, Federal Office of Health (BAG), Swiss Conference of the Cantonal Health Directors (GDK/CDS), Curafutura, tarifsuisse, Swiss Health Observatory (OBSAN), University Hospital Basel.

Box 2. *Stakeholders in the INTERCARE study*

Lastly, we conducted focus group interviews with residents and family members (**study 4**) to explore experiences and preferences regarding care in acute situations [34]. Seven residents and 11 family members in three NHs (two in the German- and one in the French-speaking part of Switzerland) working with nurse experts, participated. We identified differing expectations regarding care, to take into consideration during the implementation of the INTERCARE model [34].

Preparation phase

Based on the results from the studies 1-4, we developed the INTERCARE model with six core elements (chapter 3). Each core element includes minimal requirements which are mandatory for implementation and peripheral requirements which can be tailored to each NH. Additionally, we gained insight into organisational (e.g., culture, climate, leadership) and individual (e.g., work experience) variations of nurse-led care models throughout Switzerland, as well as factors influencing (supporting or hindering) model implementation.

Once the INTERCARE model was defined, NHs participating in phase B were able to discuss specific issues or clarify their understanding during meetings. They received support for the preparation of the implementation of the core elements and tailored peripheral requirements of the INTERCARE model to their individual contexts. During the first six months of the implementation stage, we made further adaptations to the minimal requirements based on the NHs' first experiences. The adaptations were made based on the information pertaining to aspects of the core elements which were feasible and those which were not (e.g., how communication between various professionals was structured). Once the INTERCARE nurses completed teaching modules about the core elements of the INTERCARE model it helped to further adapt the core and peripheral elements. The description of the core elements of the INTERCARE model and the corresponding minimal requirements were validated and made definite once the last NH started with the implementation (February 2019). After this, minimal requirements were no longer adapted. Moreover, we used the information from the contextual analysis to further tailor implementation strategies to help the implementation of the INTERCARE model in the NHs.

The role of the research group

The development and implementation of the INTERCARE model was a team effort. The implementation team consisted of members from fields of nursing, medicine/geriatrics and clinical practice representing several institutions and three language regions of Switzerland with unique expertise, knowledge and skills in:

- establishing new nurse-led care models in the Swiss health care system and internationally
- quantitative and qualitative research methods
- quality of care and organisational development in the Swiss and German NH settings
- the development and implementation of new nursing roles in NHs, including APNs
- geriatrics from the hospital and the primary healthcare perspective
- health care organisations and public service
- management and shared governance
- health professions' regulation and human resources management in healthcare organizations
- health economics

The unique expertise of all members shaped the definition of the INTERCARE model, and further supported the preparation, implementation and sustainability phase.

Chapter 3 – INTERCARE: A nurse-led care model for nursing homes

Overview of the INTERCARE model

The six core elements of the INTERCARE model (described below) were implemented by eleven NHs in the German-speaking part of Switzerland and evaluated by the research team. As each NH is unique (e.g., size, number and model of physicians, staff skill-grade mix), a certain degree of flexibility was required. Therefore, each core element has minimal requirements that the NHs were asked to implement and peripheral requirements to ensure that each NH could tailor each of the core elements to their internal structures and processes, as recommended in CFIR.

The INTERCARE model contains six core elements described in the following chapter:

1. Interprofessional care team
2. INTERCARE nurse
3. Advance care planning
4. Comprehensive geriatric assessment
5. Evidence-based tools
6. Data-driven quality improvement

An overview of how the core elements may interact with each other is displayed in figure 1. The development of the core elements is based on the four studies and described in more detail in chapter four.

Initially, it was planned to introduce the INTERCARE model in both the German- and French-speaking regions of Switzerland. Due to limited time and funding resources and in favour of the curriculum development to train INTERCARE nurse, we decided otherwise. We believe that the INTERCARE model can be easily tailored to the French and Italian language regions by entering in discussion with local stakeholders and interested NHs, and especially if the curriculum is tailored to prepare the INTERCARE nurse for their role [18].

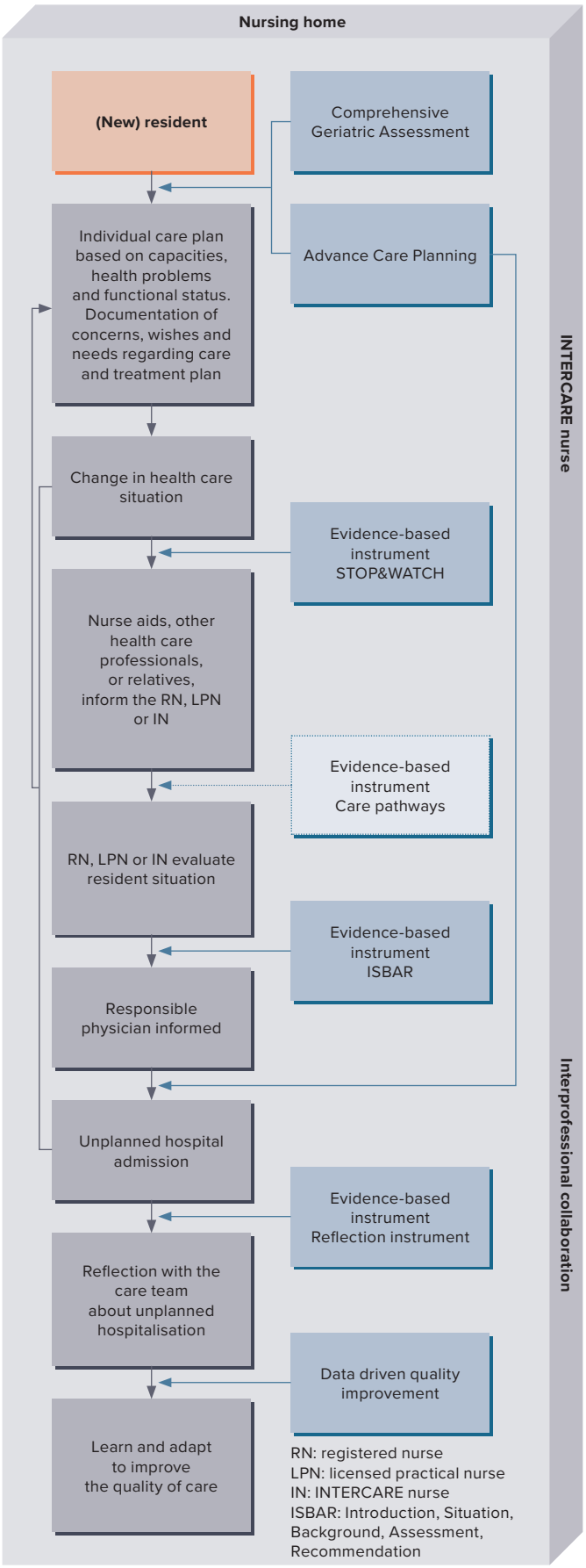


Figure 1. *Overview of the core elements and their dependencies*

Core elements of the INTERCARE model

Interprofessional care team

This core element provides a basis for the INTERCARE model, focusing on the importance of collaboration and partnership between all health professionals involved in resident care. The interprofessional care team is a prerequisite for high-level quality of care tailored to the individual needs of residents and family members. The needs and capacities of residents and family members are complex and thus complementarity between professions guarantees to cover all needs and to address all capacities. For INTERCARE, this interprofessional care team is defined as at least two different professionals such as nurses, physicians, representatives of therapeutic professions, or social workers, who work together to positively impact individual needs of residents [35]. The interprofessional care team contributes to the best possible treatment and care of residents, resulting in person-centred care and reduction of unplanned hospitalisations. Yet, working interprofessionally requires mutual trust, respect, understanding and acceptance of all involved professions, their individual competencies as well as clinical expertise and interpersonal skills to develop partnerships.

Minimal requirements. To ensure interprofessional collaboration, each of the NHs needs to define a clear structure facilitating the communication between at least two different professionals (e.g., meetings, visits) and clearly communicate it within the NH. Generally, the care team is expected to liaise with relevant professionals to address resident problems. The goal is to establish resident care by first applying assessment, interpreting the results and to formulate an interprofessional care plan in collaboration with the resident and their family. Last but not least, as most NHs work with off-site primary care physicians and not with an in-house physician, a person who supports and facilitates the communication process between physicians and the care team is necessary. The INTERCARE nurse, the core element described next, fulfils this role.

To guide the NHs in their definition of interprofessional collaboration, we asked them to reflect upon existing structures which facilitate interprofessional collaboration e.g., which meetings are planned with which professions and how frequently; and are there guidelines available to prepare and conduct these meetings or visits? If so, are they still valid or do they need adjustments? Are additional structures needed?

Peripheral requirements. Accordingly, each NH is free to decide how communication between care teams and physicians or other professions should occur and with what intensity, for instance, routine physician visits or on demand visits. The INTERCARE nurse's support in facilitating communication between physicians and care teams in NHs should fit the current situation as it strongly depends on the individual INTERCARE nurse as well as on the skills of the care team. For example, the INTERCARE nurse can coach the care team by helping them prepare a conversation with a physician or act as an example by showing the team how to handle a call first.

INTERCARE nurse

The INTERCARE nurse is the second core element of the INTERCARE model. INTERCARE nurses are hired by and work in the NH, and their work focuses on clinical leadership, clinical practice, coaching care teams, and facilitation of interprofessional collaboration. Overall, the role of the INTERCARE nurse is to effectively support care teams in the management of (complex) resident situations, and facilitate interprofessional collaboration with the goal of improving residents' quality of life and reducing negative clinical outcomes such as falls or hospitalizations. In their everyday work, the INTERCARE nurses collaborate closely with the leadership, especially with ward managers and other professionals. They provide the care teams with continuous access to geriatric expertise, nurturing a feeling of security and support.

Minimal requirements for the INTERCARE nurse. To become an INTERCARE nurse, the following criteria need to be fulfilled:

- Certified as a registered nurse (RN)
- At least three years' experience in a NH as a RN
- Working at minimum 60% per 80 beds

Further, we defined four core competencies of the INTERCARE nurse:

1. Clinical leadership
2. Clinical practice
3. Coaching
4. Facilitation of the interprofessional collaboration

1. Clinical leadership

Minimal requirements. Clinical leadership is a pivotal part for the INTERCARE nurse's role and influences all of their activities. The INTERCARE nurse takes on the clinical leadership role to improve quality, consistency, and efficiency in care delivery, and to evaluate the results of care provided. Furthermore, clinical leadership encompasses the INTERCARE nurse's knowledge and skills to identify needs for innovation and change in the NH and to develop and implement strategies to achieve best possible clinical care. They take up clinical leadership through coaching and support of care teams in everyday practice. The overarching goal of clinical leadership is to guide and support care teams especially in conducting and evaluating assessments, in the management of typical geriatric issues (e.g., urinary tract infections, dementia and behavioral and psychological symptoms of dementia, falls, delirium, pressure ulcers or skin care, pain management), as well as during nursing care and improve critical thinking. For example, when a resident is deteriorating, the INTERCARE nurse can be called to support the care team in prioritizing and organizing various tasks (e.g., referral, calling the physician, calling family members or organizing a transfer, helping staff to communicate with a resident showing aggression, or taking over if communication with family members proves challenging).

The INTERCARE nurse is also responsible for the implementation of the evidence-based instruments (STOP&WATCH, ISBAR and reflection instruments) in their NHs, a further core element of the INTERCARE model.

Peripheral requirements. The extent to which the INTERCARE nurse is involved in quality improvement may vary according to context. While some might be involved in the analysis of the Swiss national quality indicators [36] and the development of quality improvement based on internal results, others may be less involved.

2. Clinical practice

Minimal requirements. The direct and indirect clinical practice is a core activity of the INTERCARE nurse, regardless of their educational level. Both direct and indirect clinical practice enable timely identification of specific problems and needs of residents to prevent complications and to maintain their health as well as cognitive/communicative capacity. The INTERCARE nurse identifies knowledge gaps and the care teams' training needs with the goal of empowering them improving quality of care. Furthermore, clinical practice enables the INTERCARE nurse to foster partnerships between residents and other professionals, as they assess changes in residents' condition and communicate these to the care staff or other professionals directly. Depending on the INTERCARE nurse's educational background as well as their skills and expertise, they assess residents in acute situations when called by a member of the care team e.g., by auscultation or palpation or performing a focused assessment on different symptoms. The INTERCARE nurse supports care teams in providing person-centred care and to consider each resident's capacities. Indirect clinical practice, refers to activities such as the development of care plans with care teams to help them develop specific resident interventions, improve documentation of resident changes if appropriate and conversations with families.

Peripheral requirements. The competencies of the INTERCARE nurse in direct clinical practice are directly linked to their educational level in addition to the RN training. An INTERCARE nurse with a CAS in dementia care will have a different scope of practice than an INTERCARE nurse with a Master's degree and in-depth clinical training under supervision of a physician, especially in the area of physical examination. Accordingly, the scope of clinical practice of the INTERCARE nurse will depend on their level of training, experience in clinical skills as well as the support received from physicians on site which also contributes to further developing their clinical competencies, e.g., in the areas of comprehensive geriatric assessment or physical examination.

3. Coaching

Minimal requirements. The coaching competency of the INTERCARE nurse is the ability to support and empower care teams (E.g., increasing geriatric expertise to improve clinical decision making) through various educational activities, such as bed-side coaching. Based on this, care teams can increase their ability to manage complex situations, improve their symptom recognition and monitoring of chronic conditions, competently handle acute care situations and thus, reduce hospitalizations.

Informal bedside training and direct coaching of care teams is a central task of the INTERCARE nurse. The topics of coaching are based on resident needs, care teams' wishes, or knowledge gaps identified by the INTERCARE nurse or other professionals (e.g., ward manager). Based on the local needs, the INTERCARE nurse plans and executes formal educational sessions for care teams e.g., structured care discussions about malnutrition or the management of diabetes.

Peripheral requirements. The INTERCARE nurse's educational focus depends on NH organizational factors (e.g., NH size and care profile, resident's acuity, staff skill-mix, number of nurse experts) and residents' characteristics (e.g., care needs, medical conditions). The INTERCARE nurse is free to vary the way and frequency in which they deliver educational sessions based on local needs.

4. Facilitation of interprofessional collaboration

Minimal requirements. The INTERCARE nurse facilitates the communication between physicians and care teams (see description of the core element Interprofessional care team) and ensures efficient, congruent communication between residents, care teams, other professionals and other external service providers. The INTERCARE nurse supports care teams in the preparation of phone calls or visits, or leads difficult conversations in the interprofessional team.

Peripheral requirements. The extent to which the INTERCARE nurse supports the communication process between physicians and care teams, e.g., whether the INTERCARE nurse is involved in visits or not, can vary.

Peripheral requirements for the INTERCARE nurse

In addition to the four core elements with their minimal and peripheral requirements, we defined overall peripheral requirements for the INTERCARE nurse. These refer to how the INTERCARE nurse is embedded in the NH and to what extent they execute the abovementioned four core elements of the role. Since the INTERCARE nurse's role needs to be tailored to the individual NH's structures and needs (e.g., physician model, most common resident conditions), as well as to the staff's skill mix, it might vary locally. Furthermore, each INTERCARE nurse brings their unique set of skills. While INTERCARE nurses are required to have at least a diploma of nursing, they can have a range of higher or further education including a Bachelor or Master's of Nursing, Certificate or Diploma of Advanced Studies or Higher Education level I and level II or they might have some specialization in the clinical field (e.g., palliative care or dementia). Depending on their educational background, additional training may be necessary (see chapter on implementation strategies). As for the recruitment, there might be a person already working in the NH who could take over the role of the INTERCARE nurse as it is described here, as a career step or the NH might decide to hire an external nurse to fulfil the position. Although we defined a working percentage of a minimum of 60% for 80 beds (i.e., 25h/week for 80 beds), the number of residents and wards can vary i.e., the INTERCARE nurse might as well start off with just one or fewer wards and slowly expand the role. Another option could be job-sharing e.g., two RNs sharing both the position of an INTERCARE nurse and the responsibility for residents, e.g. by both working part-time and covering all week days.

Comprehensive geriatric assessment (CGA)

CGA is a further core element of the INTERCARE model. CGA is a multidimensional, interdisciplinary process intended to detect and assess frailty, assess an older person's medical conditions, mental health, functional capacity and social circumstances, and to identify their care and treatment needs.

Considering residents' capacities and abilities are important to promote functioning and interaction with their environment. These should be recognized and serve as a basis for the overall care plan. Inevitably, residents often suffer from complex problems due to multimorbidity, frailty, polypharmacy or functional limitations when living in a nursing home. Moreover, the current medical problems, symptoms and disabilities must always be seen in the context of the residents' values and beliefs, life expectancy, as well as social and economic context. Accordingly, residents in NHs require treatment and care with a holistic approach. The CGA evaluates capacities, health problems and functional status, including communication, cognition (e.g., dementia, delirium), mood, mobility, appetite, weight, bowel and bladder function, medical conditions, and medications, social preferences, and behaviour. Based on the CGA results, an interprofessional care plan is put into place to promote the resident's well-being and autonomy.

Minimal requirements. The INTERCARE nurse is actively involved and supports the care team in thinking about and assessing the five dimensions of CGA: physical, functional, mental, social, and economic. This includes the medical diagnoses and symptoms, functional impairments, psychological aspects as well as environmental and social issues that affect the resident's well-being. Considering all five dimensions indirectly facilitates interprofessional collaboration since comprehensive geriatric care is certainly linked to interprofessional care. The INTERCARE nurse ensures that residents and family members are involved in the decision-making process and that their wishes are integrated in the care process (including advance care planning – an additional core element).

For successful CGA collaboration, the INTERCARE nurse needs to clarify who contributes to which dimension and thus ensures that different perspectives lead to a full and complete assessment. Based on the CGA results and the care plan developed, each profession fulfils their role: a physician (which depending on the situation may be a geriatrician) ensures that medical treatments are given safely; the nurse covers all aspects of care; an occupational therapist covers activities, aids and appliances; a physiotherapist focuses on transfers and mobility; and a social worker considers social support mechanisms, interventions and financing (if required).

Peripheral requirement. The NH can freely select which assessment instruments they would like to introduce and use for each component of CGA. A NH should select what makes sense for their particular context based on internal discussions with all professional groups involved and corresponding to the current staff training and experience.

We advise against implementing several assessment instruments at the same time, but rather to start slowly when introducing the INTERCARE model. The implementation timeframe will be different depending on the number of instruments to be introduced and the resources available in the NH.

Advance Care Planning (ACP)

This core element of the INTERCARE model entails clarifying the existence of an advanced directive, as well as residents' wishes concerning resuscitation, possible hospitalisation and antibiotic therapy with each newly admitted resident, and the development of an emergency care plan if needed.

The goal of this core element is to ensure that the resident, family members and/or legal representatives are well-informed about options and consequences of possible medical interventions and to guarantee that their concerns, wishes and needs are included in the care and treatment plan. This process starts when a resident is admitted and is repeatedly evaluated. ACP should directly contribute to the reduction of unplanned hospital admissions e.g., at the end of life [37, 38].

Minimal requirements. Implementing ACP as a routine process takes time and resources and should be considered a cultural change. Considering the limited time and staff resources in the NHs and the training needed to lead comprehensive ACP conversations, our minimal requirements were restricted to four questions that should be discussed with newly admitted residents. We did not expect NHs to hold the conversations with all residents. The following points should be clarified upon admission with the resident and/or family members:

- existence of an advanced directive. If available, the document is checked to ensure that it is up to date and represents current wishes
- wishes concerning resuscitation interventions and chest compressions
- wishes for possible hospitalisation in the event of an emergency situation, for life-prolonging measures[2] or for symptom relief
- wishes regarding antibiotic therapy as a life-prolonging measure or as symptom relief

The conversations' outcome or the intent to clarify these questions with the residents, family members, or legal representatives, is documented in the resident's file.

Additionally, for residents in an unstable condition an emergency care plan is available before weekends: orders and care plans are clarified (Notfallplan) with the responsible physician by the appointed responsible person(s) in the NH.

Peripheral requirements. The NHs select the person responsible for the implementation of these conversations and the initiation of an emergency plan when needed. Often, skilled and knowledgeable in-house employees are selected to take over this responsibility. NHs are free to initiate full ACP conversations. It is up to the NH to decide whether they want to extend the ACP conversations to all residents, irrespective of their length of stay in the NH.

[2]Life-prolonging measures are methods of treatment or therapies which, in the case of a life-shortening illness, are intended to keep residents alive for as long as possible or to increase their quality of life at the end of their lives. They slow down the incipient dying process, can also delay it for a long time, when residents have actually been ready to depart from life.

Evidence-based instruments

This core element includes the implementation of three evidence-based instruments: STOP&WATCH, ISBAR and reflection instruments.

These three evaluated evidence-based instruments have proven effective to assist health professionals in the development, promotion, or enhancement of health care quality in NHs:

1. STOP&WATCH: to support the information flow about changes in the resident health situation between nurse aides and LPNs or RNs.
2. ISBAR: to structure and enhance remote communication between the LPNs/RNs and physicians about resident changes in condition.
3. Reflection instrument after hospitalisation to acute care or psychiatry: to reflect on whether hospitalisations were avoidable or not and identify how they might be preventable and from happening again in the future under similar conditions.

The reflection instrument can be implemented at the beginning of the model implementation. The other two instruments (STOP&WATCH, ISBAR) can be implemented within the first 6 months of the model start. Additionally, we offered care pathways as a peripheral element, to guide decision making when residents show new symptoms.

1. STOP&WATCH (Figure 2)

Effective communication among staff is recognized as an essential factor for resident safety. If changes in a resident's health situation are detected early on and are effectively passed on to the responsible nurse, appropriate measures can be taken promptly and the quality of care improved.

STOP&WATCH is a simple yet comprehensive communication instrument for frontline staff – nursing aids, who are in regular close contact with the residents. The aim is to identify and then clearly communicate slight changes in the resident health status to the responsible RN on the ward, enabling them to follow up on the observed change. STOP&WATCH covers five main areas where changes in health status may occur:

- Cognitive condition
- Physical state
- Functional state
- Changes in behaviour
- Pain

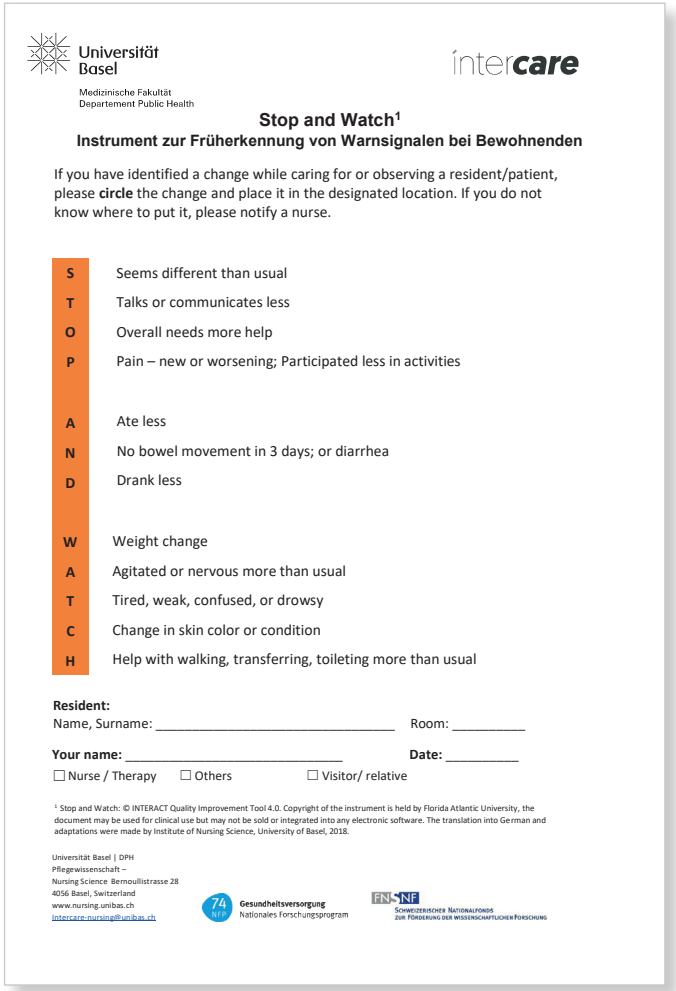
The instrument allows to detect differences in resident's condition or status and observe these without immediately conducting a full assessment.

Minimal requirements. We asked the NHs to adhere to the following points:

- All staff in the NH are informed about the implementation of STOP&WATCH
- The INTERCARE nurse is responsible for the implementation of STOP&WATCH on wards within the first 6 months of implementation of the INTERCARE model and supervises the usage of STOP&WATCH in daily practice on the wards
- All staff using STOP&WATCH must be trained
- STOP&WATCH is primarily used by nursing aids to inform the responsible nurse about changes in resident condition. If extended to other staff, it is clearly defined who will use the STOP&WATCH
- STOP&WATCH notepads or pocket versions are distributed to all employees trained to use the STOP&WATCH

- STOP&WATCH must be filled in and, if necessary, the appropriate letters should be marked as soon as a change in the residents' condition has been identified
- The situation for which the STOP&WATCH is used is recorded in the resident's documentation
- The RN responsible should perform the adequate assessment after being informed by STOP&WATCH about a change in health condition

Peripheral requirements. Although STOP&WATCH is aimed in particular at nursing aids, the instrument can also be extended to other collaborators such as the cleaning staff, therapists or family members. Each NH can decide how staff are informed and trained in the use of the instrument. Furthermore, the implementation, handling and storage of instruments once they have been completed is up to the NH. This also includes deciding what the best internal processes are, to promote the good use of STOP&WATCH, and how to embed it into daily practice as to not impede the usage of other instruments. This includes to whom the STOP&WATCH instrument are handed to once filled out and who takes responsibility to follow up on the changes observed. Finally, the instrument could also be used to structure the oral or written handover.



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Stop and Watch[1]
Instrument zur Früherkennung von Warnsignalen bei Bewohnenden

If you have identified a change while caring for or observing a resident/patient, please **circle** the change and place it in the designated location. If you do not know where to put it, please notify a nurse.

S	Seems different than usual
T	Talks or communicates less
O	Overall needs more help
P	Pain – new or worsening; Participated less in activities
A	Ate less
N	No bowel movement in 3 days; or diarrhea
D	Drank less
W	Weight change
A	Agitated or nervous more than usual
T	Tired, weak, confused, or drowsy
C	Change in skin color or condition
H	Help with walking, transferring, toileting more than usual

Resident:
Name, Surname: _____ Room: _____

Your name: _____ **Date:** _____
☐ Nurse / Therapy ☐ Others ☐ Visitor/ relative

[1] Stop and Watch: © INTERACT Quality Improvement Tool 4.0. Copyright of the instrument is held by Florida Atlantic University, the document may be used for clinical use but may not be sold or integrated into any electronic software. The translation into German and adaptations were made by Institute of Nursing Science, University of Basel, 2018.

Universität Basel | DPH
Pflegewissenschaft –
Nursing Science Bernoullistrasse 28
4056 Basel, Switzerland
www.nursing.unibas.ch
intercare-nursing@unibas.ch

74 NFP Gesundheitsversorgung Nationales Forschungsprogram

FN SNF Schweizerischer Nationalfonds zur Förderung der wissenschaftlichen Forschung

Figure 2. *STOP&WATCH instrument*

2. ISBAR

Missing or insufficient communication plays a decisive role in the occurrence of adverse events. Some fundamental barriers to communication across different disciplines and staff levels include hierarchy, gender, age, experience, ethnic background and differences in communication, e.g., inexperienced employees can lack confidence when communicating with a more experienced colleague or superior.

ISBAR consists of standardised short questions in five sections to ensure that staff are sharing concise and focused information (Identification, Situation, Background, Assessment, Recommendation). ISBAR is:

- easy to use
- easy to remember
- logically structured

Minimal requirements. In the INTERCARE model, the ISBAR instrument aims at optimizing communication between RNs, LPNs, INTERCARE nurses and physicians. It offers a simple and structured form of communication in situations in which a deterioration or change in a resident's health status must be reported to a physician over the phone. The ISBAR structure helps to pass on necessary information quickly, clearly and appropriately, so that the physician has an efficient basis upon which to base further proceedings and facilitate rapid decision-making. The minimal requirements are as follows:

- The INTERCARE nurse is responsible for the implementation of the ISBAR instrument on wards within the first 6 months of implementation of the model; for monitoring the usage of ISBAR in daily practice and for giving feedback
- ISBAR is primarily used by RN and LPNs in communicating with physicians and with the INTERCARE nurse in acute situations. If extended to the members of the care team, it is clearly defined who will use the ISBAR
- All staff using the ISBAR must be trained
- All ward staff are informed about implementation of the ISBAR
- Distribution of the ISBAR Pocket version to all RN, LPN and other employees trained to use the ISBAR

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ISBAR: Communication with the doctor / physician when reporting changes in health status.

I Identification	**Identification** • Name und function • Unit / Nursing home • Resident: Name, Surname, Date of birth
S Describe situation	**Situation** • Symptoms/Problem, duration? • Vital signs? Consciousness?
B Give background information's	**Background** • Primary diagnoses / other relevant diagnoses /current medication • Relevant medical / therapeutic treatments • Involved professionals
A Inform about assessment	**Assessment** • What is the problem / issue in your view? (physical, psychological, cognitive, functional)? • Suspected diagnosis? Delirium? • How urgent is the situation?
R Recommendation	**Recommendation** • What do you think need to happen now? • What do you expect from the receiver?

Figure 3. *ISBAR Instrument*

Peripheral requirement. The situations and format in which the ISBAR is used can be further extended beyond phone conversations; e.g., during ward visits with physicians, or between LPNs or RNs and the INTERCARE nurse when transmitting general resident information. ISBAR can be used when handing over non-oral information to the physician e.g., via secured emails or fax.

3. Reflection Instruments on hospitalisation to acute care and psychiatry

In order to reduce unnecessary hospitalisations, it is important to thoroughly analyse unplanned transfers to an acute or psychiatry facility. This helps to better understand how and why the transfer occurred, and to learn how similar transfers can be avoided in the future. This is called root cause analysis and it enables health care professionals to identify possible areas for improvement or to better tackle early signs and symptoms with residents to prevent hospitalisation in the first place. The INTERCARE model uses two instruments, the reflection instrument for acute care hospitalizations and another for psychiatry hospitalisation in order to:

- identify factors and patterns related to unplanned hospital admissions
- identify potential for improvement

Minimal requirement. The INTERCARE nurse is responsible for the implementation, filling in the instruments and guiding the reflection after an unplanned hospitalisation with members of the care team who were directly involved in the transfer and admission process. Both reflection instruments consist of five parts that guide the reflection:

- identification of risk factors upon admission
- description of acute changes in health status and other factors
- description of measures for dealing with the change of state
- description of the transfer to hospital
- identification of opportunities for improvement

Reflecting on unplanned transfers with the care teams supports them in the identification of factors which could have potentially avoided the transfers and where there could have been an improvement in the care process. The reflection instruments are part of the resident documentation as fillable PDF forms. The results from reflection instruments are discussed with the INTERCARE nurse and the leadership to plan measures for improvement; e.g., nursing staff training on specific topic related to most frequent health conditions upon hospitalization, or adaptation of working processes such as nursing hand over.

Peripheral requirement. There is no peripheral requirement to this instrument.

Peripheral element

Care pathways have steps that can be followed when a specific symptom such as fever or shortness of breath is detected. This helps care workers to decide which further clarifications should be made and when and how they should be addressed. Care pathways are peripheral elements and each NH can choose if, how and when to implement them. With INTERCARE, we provided seven care pathways for the following symptoms or diseases: shortness of breath, fever, gastro-intestinal symptoms, congestive heart failure, urinary tract infection, and infection of the upper respiratory track.

Data-driven quality improvement

This core element of the INTERCARE model includes collecting and analysing data on hospitalisations and the national quality indicators. The goal is to plan and implement interventions to improve the quality of care based on identified problem areas.

It is important to collect certain data to monitor and optimise quality so that NH residents receive the best possible quality of care. Using this data, measures can be discussed and implemented to improve quality of care. Data-driven quality improvement is understood as a structured, organization-wide approach to understand and improve underlying work processes. In order to improve quality, NHs need to define which areas of care should be monitored and based on the results, identify areas which could be improved. This process can also help NHs understand which factors contribute to the quality of care. Quality improvement is a continuous process and a team effort in which employees at all NH levels (e.g., care aides, care professionals, leadership, administrators, etc.) need to work together towards the same goal.

Minimal requirement. The overarching goal of the INTERCARE model is to improve the quality of care by reducing the number of unplanned hospitalisations and to improve the six national quality indicators (two measures for physical restraint use, two measures for pain, weight loss and polypharmacy). During the INTERCARE study, data on all unplanned and planned hospital admissions as well as on the six national quality indicators (QIs) were continuously collected. Additionally, INTERCARE nurses were asked to identify and evaluate the reasons for every hospitalisation. For this purpose, the reflection instruments for hospital and psychiatry admissions were used (see 3.2.5).

Data on the Swiss quality indicators are exported from RAIsoft in each of the NHs on a quarterly basis. The results of the hospitalisations and the Swiss quality indicators were visually displayed and made available to the NH. NHs received 6-monthly benchmarking reports, displaying 26 QIs measured in RAI-NH, allowing each NH to compare its own results with those of other NHs. NHs also received SPC charts (3-monthly) for each of the 6 quality indicators showing changes over time, and to help them identify areas for improvement. Furthermore, benchmarking reports with the current state concerning ACP across 4 timepoints and summary reports with an analysis of the reflection instruments filled out for hospitalisations are also sent to each NH.

Based on this, interventions can be planned, implemented and evaluated using the Plan-Do-Check-Act (PDCA) cycle. Data is repeatedly discussed with the leadership team as well as any further steps needed to improve quality improvement and complete a quality cycle.

Peripheral requirement. Each NH decides internally, depending on their organizational structure, who is responsible for the export of the data, who participates in the charts/benchmarking discussions (e.g., ward manager, RAI NH data reference person, INTERCARE nurse, director of nursing), who is responsible for using the PDCA cycle and so on. Hence, the INTERCARE nurse may be solely responsible for identifying reasons for quality issues on individual wards, or involved in the whole quality improvement process. Additionally, analysis of all RAI quality indicators based on anonymised data is made available. Each of the NHs need to consider their own priorities and challenges and work on those to improve quality of care.

Implementation strategies

Implementation strategies are methods or techniques which support implementation of the INTERCARE model in the NHs [25]. Based on our contextual analysis, we identified factors, i.e., barriers and facilitators, that impacted the implementation of the nurse-led care model. We chose various implementation strategies to address those identified factors in the preparation, and later on during both the implementation and sustainability phases [39]. To guide the identification of fitting implementation strategies, we first used CFIR to synthesize the factors and matched them with the implementations strategies described in the Expert Recommendations for Implementing Change compilation (ERIC) recommendations [39, 40]. The intensity of the employed implementation strategies varied in time and within the NHs, i.e., they are tailored to the individual NH's needs. In this chapter we shortly present the implementation strategies developed based on the findings from the contextual analysis with the case studies.

Promote adaptability

All of the NHs that served as case studies worked with nurse experts. However, the actual competencies of the nurse experts, their additional training and specialized clinical field varied among NHs and were defined in accordance with local needs.

Therefore, in addition to minimal requirements, peripheral requirements were defined. The minimal requirements of the INTERCARE model assure comparability among NHs. Yet, all NHs are free in adapting the peripheral requirements so that the INTERCARE model is tailored to their individual needs. This adaptability allows the model not only to be used in the German-speaking part of Switzerland but might also give it the flexibility to be tailored to other language regions of Switzerland or abroad.

Assess the readiness for change

The contextual analysis confirmed that NH readiness for change is one of the critical factors for successful implementation of the model. The leadership needs to have an innovator's mind-set, as well as the willingness and motivation to change current practice patterns. The organisation needs to create a new vision for the NH future.

In the INTERCARE study, members of the research group visited the NH and presented the INTERCARE model to explore the readiness for change before inclusion in the INTERCARE study. Based on the presentation, the NH could reflect whether they were prepared to act and implement the six core elements, including discussions about the costs incurred by the implementation. Further, since the implementation of the INTERCARE model is a "team effort", the leadership also needed to consider their employees' willingness to go along with the changes introduced by the INTERCARE model. A similar exploration of readiness to change is advisable for all NHs who wish to implement the INTERCARE model.

Obtain formal commitments

Contextual analysis clearly indicated that NH leadership support and commitment to implement the nurse-led model is crucial. Therefore, for the INTERCARE study we obtained and signed contracts between the central research site (the Institute of Nursing Science) and the participating NHs, once the NH leadership decided to participate. In the contract, the leadership stated that they would implement the INTERCARE care model. The contracts included a commitment to adhere to the study timeline to implement the INTERCARE model, as well as to collect and provide the required data and documents. Additionally, the contract included the level of reimbursement for the data collection by the NH, during the study. All NHs received a study description with all the details about objectives, methods, data collection and INTERCARE nurse training.

Identify barriers and facilitators

Through the contextual analysis, we understood how unique the individual NHs are, for example in terms of resources, leadership styles or visions. Thus, reflection of possible local barriers and facilitators that may impede or strengthen the implementation is crucial for its success.

To address these elements, we organized individual training sessions for NH leadership and additional collaborators such as the future INTERCARE nurse(s), ward supervisors and physicians. The individual preparatory meetings are essential to ensure buy-in from leadership and to tailor the peripheral requirements of the INTERCARE model to individual NH needs. At this point, each NH discussed the minimal requirements of the INTERCARE nurse's role and decided upon peripheral requirements to tailor the role to their own context. Furthermore, during the meetings the NH reflected upon their own possible barriers and facilitators for the model implementation based on the synthesis from the case studies. This stipulated thinking and gave an orientation. Lastly, in the contextual analysis we learned that recruitment of the INTERCARE nurse may be difficult. Thus, we discussed recruitment strategies, drafted a job description for the INTERCARE nurse, and advised the leadership to review internal staff to identify potential nurses who could take over the INTERCARE nurse role. If a NH had no internal candidates, a job announcement was drafted for external recruitment.

Create new clinical teams

During the contextual analysis it became clear that innovations such as new care models need facilitators for successful implementation. In our study, we let the NHs decide who those facilitators were, and in every NH, the implementation team had a different composition with leadership representatives, the INTERCARE nurse and other positions (e.g., quality manager, ward supervisors, RAI reference persons) to handle the implementation in the NH. The INTERCARE nurse is responsible for overseeing the implementation of the evidence-based instruments. Consequently, in some NHs, the INTERCARE nurse created working groups with champions, i.e., local facilitators on each ward to plan, monitor and evaluate the implementation, and facilitate the usage of the STOP&WATCH and ISBAR instrument. The champions, coached by the INTERCARE nurse, introduced the care teams to the instruments and coached them in their everyday use. Champion involvement ensured that the way the instruments are used is aligned with the care team's needs and practices, oriented towards support rather than representing an obstacle in daily practice. Involvement of the champions added to the sustainment in the application of the instrument. Any member of the care team can become a champion.

The INTERCARE nurse blended learning curriculum

Conduct ongoing training. During the contextual analysis, it became clear that the nurse experts working in NHs had different levels of training. Some had specialized knowledge in a specific clinical field, others had years of experience in geriatric nursing. Hence, the INTERCARE nurse can have a variety of knowledge and skills.

To level out key skills, the INTERCARE nurse receives continuous education (before the model start and throughout the implementation phase) based on a newly developed blended-learning curriculum. The blended-learning curriculum of approximately 300 hours aimed to prepare the INTERCARE nurse for their role in the interprofessional team including eight modules:

- Clinical leadership (e.g., methods of successful leadership, emotional intelligence and leadership, leadership styles according to Goleman, self-reflection, case studies)
- Communication (e.g., model of interpersonal and intrapersonal communication based on Schulz von Thun, communication techniques and styles, behaviour assessment tool based on the DISC theory of psychologist William Moulton Marston)
- Comprehensive geriatric assessment / advance care planning
- Geriatric syndromes (delirium, falls, vision and hearing losses, sarcopenia & frailty, malnutrition, pain, immobility, BPSD)
- Chronic conditions (COPD and asthma, diabetes, congestive heart failure)
- Acute symptoms (e.g., acute dyspnoea, abdominal pain, hypoglycaemia, suicidality)
- Medication management (e.g., polypharmacy, drug-drug interactions)
- Data-driven quality improvement (e.g., statistical process control chart, benchmarking, PDCA cycle)

Make training dynamic. The heterogeneity of the INTERCARE nurses called for a variation in delivering the education to maximize the learning outcomes considering that adults have different learning styles and working environments. The blended-learning curriculum allows different information delivery methods to serve different learning styles and working contexts, and to shape the training to be interactive. Learning methods included: E-learnings, readings, self-evaluations, reflections, face to face meetings, supervision and exchange among participants.

Develop and distribute educational materials. Facilitation of successful implementation of, and adherence to, evidence-based instruments requires: guidelines on how to implement evidence-based instruments, decision trees on how and when to use the reflection instrument, staff handouts as well as power point presentations to educate staff about the instruments.

The INTERCARE research group developed and distributed educational material (including guidelines, decision trees, handouts and power point presentations). All material was made available through online learning platforms and/or sent by email.

Continuous support of nursing homes

Provide local technical assistance. During the contextual analysis, we noticed that all identified NHs had been working with various data for years e.g., their data about quality indicators derived from electronic resident documentation. Therefore, they had the required skills to work with the electronic system. In INTERCARE, all participating NHs were required to extract data from RAIsoft, the software to access RAI-NH data on a three-monthly basis. To assist the NH with the data extraction and ensure good communication between NHs and the research team throughout the study, a study coordinator was available for all NHs. NHs were supported for data extraction when needed.

Provide ongoing consultation. We understood from the contextual analysis, that providing on-going support to the leadership and INTERCARE nurses during the implementation process is a pre-requisite for success. Therefore, we provided regular opportunities for the NHs to consult with the research team. We conducted meetings every two months with each of the NHs and provided bi-weekly phone calls to support the INTERCARE nurse, but also offered spontaneous support based on individual needs during the intervention phase. During the two-monthly meetings, the leadership (e.g., nursing director) and the INTERCARE nurse met with two members from the research team. During the two-hour meetings we discussed the implementation of each of the core elements, barriers, facilitators and also answered questions. During the bi-weekly phone calls with the INTERCARE nurses, the study coordinator discussed the individual challenges faced during the implementation process and gave feedback, supported them in their role development. The study coordinator helped them to critically reflect on both their own and others' practice, skills, behaviours and challenges to ensure effective knowledge transfer (Curriculum – practice).

Audit and provide feedback. Data-driven quality improvement was one of the common core elements among all the case studies. Collecting and summarizing clinical performance data over a specified time period to inform all persons involved to help monitor, evaluate, and modify care processes is important.

We delivered quarterly exports for the quality indicators and ACP to help NHs identify where better quality of care can be provided and which actions they may choose. The results were discussed during the two-monthly meetings in each NH in order to support the nursing homes in their continuous quality development. Reflection instrument results and possible patterns were fed back with summarizing reports and discussed during the bi-weekly phone calls with the INTERCARE nurse and, where necessary, in the leadership meetings. Further, we conducted questionnaire surveys involving staff and INTERCARE nurses. The goal was to assess changes over time regarding the work environment, staff outcomes and the scope of practice. The first survey occurred before the model implementation, and then 6 and 12 months after the intervention started. The results of the surveys were also fed back to the NHs on a six-monthly basis by means of structured reports.

Chapter 4 – INTERCARE: Development of the model

The development of the INTERCARE model with its six core elements and implementation strategies was based on four studies. We started with a literature review (study 1), a contextual analysis with case studies (study 2), and stakeholder input (study 3). The three studies helped us to develop the INTERCARE model based on existing evidence for the effective reduction of unplanned hospitalisations and to locally adapt it to the Swiss context. The flexibility of the model with its peripheral requirements allows its adaptation to the specific characteristics of other NHs in all language regions in the future. The last study looking at residents' and family members' experiences during an acute event (study 4) was conducted at a later stage and the findings were fed back to the NHs participating in the implementation. The findings were not immediately integrated into the development of the core elements, rather helped broaden our understanding of residents' and family members' needs in terms of acute situations. In this synthesis we present the results from all four studies.

Study 1: Literature review

We started by exploring international evidence-based nurse-led care models that effectively reduce avoidable hospitalizations. Five international nurse-led care models were identified: EVERCARE, INTERACT™, MOQI, and OPTIMISTIC in the US, and the nurse practitioner initiative in Canada [15-18, 31].

We found that all identified care models work with an APN[3] (nurse practitioner or clinical nurse specialist) with a Master's degree in Nursing Science. One model additionally required two to three years of APN clinical experience [17]. Overall, the APN role has an expanded scope of practice. The APNs are able to perform specified diagnostic and treatment-related activities within an interdisciplinary health care team. They also have the authority to independently order diagnostic tests, to prescribe the full range or a limited range of formulary drugs depending on country/region legislation and communicate a diagnosis. APNs spend a minimum of one third of their working time in clinical practice and all work on full-time contracts. In two models, APNs were given the same responsibilities and clinical tasks as GPs [15, 31].

The competencies and responsibilities of APNs vary across NHs and studies depending on resident needs, physician preferences, service agreements, and the presence of established programs (e.g., immunization clinics), and on-site specialists (e.g., wound care specialist). Yet, all perform clinical assessment, manage episodic and chronic illnesses, coach care teams, provide clinical leadership and facilitate interprofessional collaboration. This is achieved by working alongside care teams, physicians, therapeutic staff and driven by residents' needs. APNs do not undertake research activities. One model described APN participation in professional development activities including participation in conferences, workshops and courses to increase their level of expertise (e.g., psychogeriatrics, wound care, palliative care, and continence management), and are involved in professional associations ranging from general membership to active participation in administration and executive

[3]The International Council of Nurses defines an APN as *"a registered nurse who has acquired the expert knowledge base, complex decision-making skills and clinical competencies for expanded practice, the characteristics of which are shaped by the context and/or country in which s/he is credentialed to practice. A Master's degree is recommended for entry level"* (ICN, 2008).

committees. Additional activities include presentations to various community groups about the role of nurse practitioners in long-term care (e.g., to Nursing and Medical Advisory Boards).

In one model, APNs are involved in the development, implementation and evaluation of care protocols, best practice guidelines, and new care procedures. In three models the APNs are responsible for the implementation of the INTERACT program. The INTERACT program focuses on early identification, evaluation and management of residents' acute conditions to reduce hospitalisations. To reduce hospitalisation rates, INTERACT uses different instruments incorporated into everyday care. Some of the INTERACT instruments include: ISBAR (providing guidance and structure in communication), STOP&WATCH (early recognition of changes in condition), a reflection instrument (to identify factors and patterns related to hospital admissions and to identify potential for improvement), or advance care planning to assess resident's wishes and values [41]. Overall, all models successfully improve the quality of care by monitoring and managing chronic conditions, medication use and end of life care. They reduce hospitalisations and readmissions, improve care coordination, and enhance family satisfaction [17, 31, 42-45]. The results of the literature review informed the content of each of the six INTERCARE core elements.

Study 2: Case studies

In the case studies, we identified 14 Swiss NHs already working with nurse-led care models, but they had never been evaluated for their effectiveness. The aim of the case studies was to understand factors influencing the uptake of the model, explore the constituting elements of the models and relevant practice patterns, to both complement the six core elements and define implementation strategies. A short overview of the case studies is shown in Box 3. Due to time constraints, only the results from 7 NHs in the German-, and 2 NHs in the French-speaking part were considered when defining the content of the six INTERCARE core elements. All case studies are presented in the following section.

Existing Swiss nurse-led care models

The NHs vary in terms of geographical location, size, ownership, physician model and care services provided (see Table 1). NHs in our sample were larger in size (range 31-300, mean 141), than what is more often found in Switzerland with an average of 60 beds per NH. The synthesis of all cases reveals that one common component for all nurse-led care models are RNs working as nurse experts (i.e., beyond the scope of a registered nurse) – internationally referred to as RNXs. A NH employs between 1 to 6 nurse experts. The other common element is the use of data to drive quality improvement in the NH.

All nurse experts are RNs with various levels of training in geriatrics, dementia or palliative care, including certificates, a diploma or Master of Advanced Studies (CAS, DAS, MAS) [52-54], Bachelor or Master in Nursing Science. These nurse experts work to different degrees in clinical practice (e.g., perform nursing interventions including monitoring of residents' conditions), coaching (e.g., provide residents and staff with tailored education), and clinical leadership, while collaborating with other professions and facilitating interprofessional collaboration. Yet, each NH seems to adapt the role to its current needs, strategic goal, and the nurse expert's own field of expertise.

Goal: To describe current national nurse-led care models with regard to (1) factors influencing the uptake of the model, (2) elements of the models, (3) competencies of the local nurse expert, (4) outcomes of the local nurse expert, (5) successful implementation strategies
Design: Multiple-case exploratory study design [46]
Participants and sample size: 14 NHs: 8 in the German-speaking part, 4 in the French-speaking part, 2 in the Italian-speaking part of Switzerland
Inclusion criteria: *NHs:* Long-stay residents (>30 days of stay), NH working with a nurse-led care model
Nurses with expanded roles: NHs working with an APN or similar role e.g., RN with advanced role based on additional education who (a) works in the position in the eligible NH for a minimum of 6 months, (b) collaborates closely with physicians and (c) fulfil any of the following points: having in-depth knowledge of geriatric care, providing leadership in the caregiving process, guiding residents' needs assessment, coordinating care and care transitions within and between settings
NH Leadership: Person working in the eligible NH from the leadership team who was involved in the implementation of the model
Medical director or physician: Responsible for residents in the eligible institution and closely collaborating with the identified nurse expert
Recruitment: NHs were identified by the stakeholder group and the members of the INTERCARE research group (purposive sampling) or from recommendations by the NHs approached (snowball sampling). The identified NH received an e-mail informing them about the study and its purpose and an eligibility criteria questionnaire identifying the location, size, physician model, educational background and scope of practice of the expanded RN role.
Data collection: In all NH fulfilling the eligibility criteria, both qualitative and quantitative data from four sources have been collected: (1) internal documents review, (2) information from NH websites, (3) structured survey questionnaires with a few open questions (4) face-to-face and telephone semi-structured interviews.
Internal documents: documents (e.g., communication structures, interprofessional collaboration, nurse expert job description)
Website: Available information about organizational structures of the NH and care profile
Questionnaires (quantitative and qualitative data): *Leadership questionnaire*: demographics, local and regulatory context of the model implementation, significant barriers and facilitators impacting the implementation of the care model, perceived improvements in quality and data used to monitor and evaluate quality
Nurse expert questionnaire: demographics, competencies, significant barriers and facilitators impacting the implementation of the care model, interprofessional collaboration [47-51]
Interviews (qualitative data): Facilitators and barriers for the development and implementation of the nurse-led care model, experience of interprofessional collaboration, scope of practice and competencies of the nurse expert
Analysis: *Single case analysis:* Each NH was considered as a separate case and analysed deductively according to the structures (the NH setting, nurse expert and residents characteristics), processes (nurse expert competency), according to the Hamric framework [30] and barriers and facilitators according to CFIR framework [29].
Case study integration: After the description of each case, a cross-case synthesis was carried out. Cross-case conclusions about the nurse-led care models concerning (a) barriers and facilitators to model implementation and (b) scope of practice, competencies of nurse experts, are presented.

Box 3. *Case studies*

Reason for the development of the nurse-led care models

The main motivation for developing a nurse-led care model was to improve quality of life and care for residents. Yet, the trigger for the implementation of nurse-led care models was often a combination of at least two elements among the following: the residents' and family members' needs, available resources, workforce issue(s), and NH restructuring processes such as fusion of different NHs or expansion [55]. It needs to be stressed that leadership support and willingness to change was mentioned as a prerequisite for any change in the NH. Based on this information, we developed and used implementation strategies assessing the readiness for change (cf. Implementation strategies)

The NHs did not rush the development of the nurse-led models, but carefully considered the context including the local needs of the residents (e.g., call for person-centred care), available resources (e.g., time, budget, skill-grade-mix), and the mission statement of the NH. The content of a nurse expert's role is often shaped by the drivers for the development of the model. Moreover, the care models are continuously in development to cover new expectations and needs. The leadership's vision for a new care model plays a pivotal part in its development.

Practice patterns

Practice patterns vary among the NHs. While some elements are common for all nurse experts, others are unique as they attempt to meet the frequently encountered care situations.

Four of the nurse experts undertake an additional role alongside the nurse expert role: one is a ward manager (NH9), another acts as director of nursing (NH8), and in NH 14 one of the nurse experts is a ward manager and the other a director of nursing. Furthermore, while nurse experts work for one NH, one of the nurse experts (NH2) works across 3 NHs, owned by the same NH group with the goal of aligning training and projects across all 3 sites, while considering the structural differences and local contexts of these NHs.

In general, all nurse experts are involved in clinical and educational activities, clinical leadership, and develop collaborative relationships with nursing, medical and support staff. Activities in the areas of ethical decision-making or research are not common for all nurse experts and depend on the nurse expert's personal expertise and interest and the needs of their NHs. Ethical decision-making was more prevalent among nurse experts who specialized in palliative care.

A detailed summary of each nurse experts' activities is attached in Appendix 1 where each case is described separately. Models from the German speaking part of Switzerland are available in German, and models from the French- and Italian speaking part of Switzerland are available in French. The next subchapters synthesize all activities within the fifteen cases according to Hamric's model (cf. Box 1). It needs to be stressed that the study has been conducted in 2017. In the meantime, the nurse expert roles might have changed or no longer exist, since they constantly evolve. In Table 2, the main characteristics of the nurse experts are presented. Under "function" we put the translated name of the nurse expert's function.

(Language) region	NHs	Canton[1]	Location	Number of beds	Status	GP model[2]	Number of staff[3]
German-speaking part	P1	ZH	Suburban	116	Public	Mixed	220
	P2	ZH	Rural	208	Private	Closed	450
	P3	TG	Rural	154	Public	Mixed	160
	P4	ZH	Urban	300	Public	Closed	383
	P5	BE	Rural	130	Public	Open	190
	P6	BS	Urban	2894	Private-subsidized	Mixed	200[4]
	P7	SO	Suburban	87	Private-subsidized	Open	130
	P8	SO	Rural	93	Public	Open	150
French-speaking part	P9	NE	Urban	128	Private-subsidized	Open	162
	P10	GE	Urban	227	Private-subsidized	Mixed	68
	P11	FR	Suburban	103	Private-subsidized	Mixed	112
	P12	VD	Suburban	56	Private-subsidized	Mixed	102
Italian-speaking part	P13	TI	Rural	52	Private-subsidized	Mixed	60
	P14	TI	Rural	59	Private-subsidized	Open	100

[1]Canton: BE, Bern; ZH, Zürich; TG, Thurgau; BS, Basel Stadt; SO, Solothurn; NE, Neuchâtel; GE, Genève; FR, Fribourg; VD, Vaud; TI, Ticino.

[2]Closed – NH based physician; Open – several general practitioners, not on site; Mixed – responsible physician assigned to the NH but care provided by several general practitioners.

[3]Under number of staff the following groups were included: registered nurses, licensed practical nurses, nursing aids.

[4]Includes staff from two sites, only one was part of the case study.

Table 1. *Characteristics of the nursing homes participating in the case studies*

Language region	NH	Function	Nb. per NH	Ratio*	Education	%	Superior
German-speaking part	P1	Nurse expert	1	164:1	MAS	100%	DON
	P2	Clinical specialist	6	30:1	MAS	490%	Ward manager
		Co-Leader of	1	46:1	MAS	80%	DON
		clinical specialists	1	30:1	MAS	80%	DON
	P3	Subject specialist	1	0	CAS	10%	Vice DON
		Nurse expert	1	0	MAS	20%	Vice DON
		Nurse expert/ vice DON	1	150:1	MAS	100%	DON
	P4	APN	1	50:1	MScN	60%	Chief physician
	P5	Nurse expert	1	130:1	CAS	60%	DON
	P6	Nurse expert	1	58:1	MScN	40%	DON
		APN		50:1		20%	
		Nurse expert	1	140:1	BSN	100%	DON
	P7	Nurse expert	1	85:1	MScN	80%	DON
	P8	Nurse expert	2	0	MScN	35%	NH director
		Nurse expert/DON		93:1	CAS	80%	NH Director
French-speaking part	P9	Nurse expert/ ward manager	4	21:1	CAS	330%	DON
		Clinical nurse	1	128:1	CAS	70%	NH Director
	P10	Clinical nurse	1	126:1	CAS, DAS	100%	NH Director
	P11	Clinical nurse specialist	1	103:1	MScN	60%	DON NH Director
Italian-speaking part	P12	Clinical nurse specialist	1	0	MScN	100%	NH Director
	P13	Clinical nurse specialist	2	54:2	DAS	180%	DON NH Director
		Clinical nurse specialist/ nurse leader	1	54:1	DAS	100%	NH Director
	P14	Clinical specialist	2	59:2	DAS	200%	DON
		Clinical specialist	1	59:1	MAS	100%	NH Director

*number of residents divided by number of nurse experts. Some of the nurse experts are not directly responsible for the residents, indicated by 0.
Abbreviations: APN, Advanced Practice Nurse, BSN, Bachelor of Science in Nursing; CAS, Certificate of Advanced Studies; DAS, Diploma of Advanced Studies; DON, Director of nursing; MAS, Master of Advanced Studies; NH, nursing home; MScN, Master of Science in Nursing;

Table 2. *Main characteristics of the nurse expert*

1. Clinical practice

Clinical practice – key points:

- Clinical practice is a core activity of all nurse experts.
- Clinical practice influences competencies in other areas such as coaching or clinical leadership.
- Clinical practice adds to the credibility and acceptance of the nurse expert's role.

The direct and indirect clinical practice is a core activity of all nurse experts in the models described, regardless of their training and specialized clinical field. The extent to which the nurse experts are involved in direct and indirect clinical practice differs both between and within NHs. The variability is based on differing needs of residents or staff and the variety of responsibilities linked with the nurse experts' position in the NH. Some nurse experts mostly concentrate on indirect clinical practice e.g., by identifying problems through record review, and providing guidance and support by phone (NH 2-6, 10, 11, 12, 13, 14).

Furthermore, they are not responsible for one specific clinical area such as palliative or psychogeriatric care, but respond to all areas of clinical care. NHs that work with more than one nurse expert usually combine direct and indirect clinical practice and at least one of the nurse experts works within a specialized clinical field e.g., palliative care, dementia care, BPSD (Behavioral and psychological symptoms of dementia) or psychogeriatrics (NH 2, 3, 8, 9, 10, 13, 14). The specializations of the nurse experts are aligned with the NH profile, e.g., if a NH has a palliative/ end of life focus (NH3), one of nurse experts has additional training in palliative care. Two NHs work with APNs in advanced clinical practice i.e., at a higher level of capability in independent, autonomous, and expert practice compared to other nurse experts (NH 4, 6).

In their direct clinical practice, all nurse experts focus on prevention, assessment and management of episodic resident changes in condition, chronic conditions, and behaviour management. They support care teams when a resident's condition deteriorates or during an acute event such as a fall or when a resident does not accept care. If necessary, the nurse experts are called to assess a new resident to help identify what their needs might be or to triage the resident to a specific ward. They develop care goals in collaboration with the resident and family members, e.g., how they imagine their lives in the NH, what activities they would like to continue doing, and what can be put into place in the NH to help them successfully reach their goals. Apart from the APNs mentioned above, only three further nurse experts regularly perform respiratory, cardiac and gastrointestinal clinical assessments (NH 2, 3, 7).

Clinical expertise is the basis to establish credibility for their role. Additionally, regular involvement in residents' complex situations on the wards while applying expert knowledge and advising care teams generates a reputation of trustworthiness. Consistent with literature findings, the credibility of the role is established when care teams appreciate clinical judgment based on solid expertise [56].

2. Coaching

Coaching – key points:

- The focus of coaching depends on the NH context and the number of nurse experts in the NH.
- Coaching has a pivotal meaning in those NHs where the personnel often lack geriatric expertise and comprise mostly nursing aids and licensed practical nurses.

All nurse experts are involved in various educational activities for care staff. However not all nurse experts are involved in direct educational activities for residents and family members. All nurse experts identify knowledge gaps among staff while providing direct or indirect care on the ward and seize opportunities for coaching the care teams in recognizing early changes in condition.

In NHs with more than one nurse expert, responsibility for coaching can be shared or divided according to the unique expertise of nurse experts. In NH3, e.g., one nurse expert is responsible for coaching in palliative care and another in dementia care. In NH9 and NH8, one of the nurse experts educates the care teams in the field of gerontopsychiatry (e.g., how to better approach residents demonstrating aggressive or challenging behaviour) and in NH8, the nurse expert is foremost concerned with training the staff in multisensory stimulation, kinaesthetics and the nursing process. Furthermore, all nurse experts teach care teams to use specific guidelines (e.g., wound care, delirium guidelines, pain management) with continuing education and clinical support.

3. Clinical and professional leadership

Clinical and professional leadership – key points:

- NHs need clinical leaders to evaluate and improve quality of care and quality of life, person-centred care and residents' safety. The nurse experts are key in driving practice development.
- Care in NHs is under constant change. Nurse experts are able to identify areas needing change or innovation.

Clinical leadership competencies are part of the essential competencies all nurse experts have, which were gained either through training or through experience. In the constantly evolving health care system, the leadership competencies of nurse experts are essential in driving the innovation process. This competency requires state-of-the-art clinical evidence-based knowledge with emphasis on interpersonal skills, to be able to connect with others at varying levels of the NH and externally to drive the change. Leadership competencies of nurse experts are constantly evolving in response to the changing needs, opportunities and experiences identified in the NHs.

All nurse experts as part of their roles identify needs for innovation, development, implementation and evaluation of evidence-based projects, including the development of concepts (e.g., end-of-life care) or practice protocols or guidelines (e.g., hospital admissions, malnutrition). The evidence-based projects aim to change practice by responding to residents' needs while ensuring that they receive the best possible care. All nurse experts are responsible for such projects. All nurse experts also work to improve quality of care. As such, nurse experts mainly focus on checking residents' documentation, e.g., all aspects of care provided are included and appropriately reflect the resident assessment.

All nurse experts lead or take part in specialized groups dealing with a specific topic such as palliative care or hygiene, depending on their own speciality area. The aim of such specialized groups is to gather members from different teams with common interests to network, exchange information, develop professionally, and strengthen their expertise to facilitate knowledge transfer into practice. Depending on the topic, such groups are also formed combining different professions (E.g., with staff from different

educational backgrounds such as physiotherapists, occupational therapists or other professional groups).

Furthermore, some nurse experts are involved in the formal training of care teams (NH 1-3, 5-8, and 11, 14) tailored to the requirements of the individual NH (staff needs, NH profile and review and analyses of quality indicators). Regular training sessions develop knowledge and skills of the care teams. They have either a clinical focus, i.e., chronic disease management (e.g., diabetes, congestive heart failure), psychogeriatrics, geriatrics (e.g., dementia), geriatric syndromes (e.g., delirium, urinary incontinence), palliative and end-of-life care, and basic care (e.g., oral care) or they have a general focus (e.g., communication).

4. Interprofessional collaboration and partnership with residents and family members

Interprofessional collaboration – key points:

- All core competencies of the nurse experts are executed in collaboration with other members of the interprofessional health care team
- Interprofessional collaboration is needed to provide effective care to the chronically ill, older adults in the NHs

Collaboration with care teams

Collaborating with care teams in delivering direct resident care is a typical domain for all nurse experts in the NHs. Usually, the collaboration is initiated by members of the care teams, i.e., registered nurses, licensed practical nurses, or nursing aids. They either call the nurse experts or talk directly to them during ward visits, e.g., for acute or emergency situations. In other cases, the nurse expert identifies complex situations based on the residents' documentation (e.g., resident fell during the night, untreated pain) and goes directly on the ward to solve the problem. The role of nurse experts is to facilitate teamwork and to deliver person-centred, high-quality and efficient care for the residents. In an end-of-life situation, the nurse expert might apply their expertise to support care teams and manage the tasks in the health care team to fulfil the wishes of the residents and family members. They also collaborate with therapeutic staff in complex situations to a varying extent.

Collaboration with physicians

All nurse experts establish collaborative relationships with physicians based on trust, mutual respect and exchange of knowledge, although this does not always work out as planned. However, in all NHs, the nurses on the wards are the first point of contact for the physicians. The nurse experts are mainly called in when the situation is complex, when their assessment is needed or when communication with the physician is difficult. In NH 3 and 8, two nurse experts have little or no direct contact with the physicians due to small working percentages (20%, 35%, respectively).

The NHs with a home-based physician (NH 2, 4), responsible physician (NH 1, 9, 10, 11, 12, 13) or a primary care physician with an on-site office (NH 6, 8) work in a structured manner, for example, meeting the physician twice a day for an exchange, based on a "triage", i.e., prioritisation of medical services. In NH 4, the APN works closely with the chief physician who coaches and supports her in her daily practice, e.g., in clinical evaluation, drug management and discussing medical procedures as well as therapies and medication. In NHs with several primary care physicians (NH 3, 5, 7, 14), the collaboration is more challenging. There are few or no regular visits and communication takes place mostly via e-mail or over the phone.

Collaboration with specialised physicians

The NHs often work with psychiatrists specialized in geriatrics (NH 4, 6, 10, 12) or nurse experts initiate this if a collaboration isn't in place yet (NH 1, 5, 7). The growing number of residents with dementia as well as other mental disorders, at the end-of life requiring specialised care, treatments, or diagnosis requires closer collaboration between NHs, geriatric psychiatrists, palliative care and primary care physicians. Specialised physicians advise care teams in behavioural challenges/mental or end-of-life situations. For NHs without on-site physicians, 24/7 available palliative care services are very important to avoid emergency department visits: when the general practitioner is not reachable, such services allow for better solutions in end-of-life situations. Additionally, other forms of collaboration with different professionals not generally involved in NH care can be initiated, as NH5 did, with close collaboration with a dentist.

Collaboration with NH management

The collaboration with the NH management team is key for the nurse experts, be it at the level of ward managers, director of nursing or the executive board. This collaboration often started even before the models were in place, as nurse experts and management developed the nurse experts' task and duties together. If done otherwise, there is a risk that the objectives and goals of the nurse experts are not met or the role will not be implemented well. Once the model is in place, the collaboration is embedded in a structured way. In meetings with ward managers, nurse experts exchange information about residents' situations and staff needs to decide to what extent the support of the nurse expert is needed. The nurse experts meet regularly with directors of nursing to exchange information and ideas, which builds and reinforces a shared understanding and common purpose for the mission and goals of the NH. Goals could relate to care provision, development of specialist wards such as a dementia ward or structures for collaboration between nurse experts, care teams and physicians. Common purposes could include e.g. the development of a policy of no usage of physical restraints, quality improvement projects, or data-driven changes in pain management based on quality indicator data.

Collaboration with residents and families

Most nurse experts described that they interact directly with residents and families during a complex situation e.g., communicating about serious changes in a resident's status and treatment planning. However, the care teams remain the first point of contact for residents and families.

5. Research skills

Research skills – key points:

» The use of basic research competencies to handle clinical problems varies between nurse experts

The basic research skills are the ability to search for, find, collect, analyse, interpret and evaluate evidence-based information that is relevant to a clinical problem at hand, e.g., malnutrition or falls. Basic research skills are important to develop evidence-based projects; however, they are not a pre-requisite for all nurse experts. The degree to which nurse experts are comfortable and able to understand and use evidence-based findings from the literature varies considerably between nurse experts. Irrespective of that, they fulfil the purpose of their role in their NH and improve overall quality of care. On the other hand, for those nurse experts who use their research skills, this competency is an integral part of their role.

6. Ethical decision making

Ethical decision making – key points:

- The ethical decision-making competency requires expert knowledge and skills
- In most NHs, at least one nurse expert is experienced in advance care planning

Ethical decision-making is addressed by identifying ethical dilemmas, conflicts and problems at an early stage and to tackle them effectively. We also considered the ability to provide advance care planning, referring to appropriate care at the end of life, integrating all parties involved as necessary (i.e., residents, family members, attending physician and other groups). Nurse experts transfer their specialized knowledge to everyday practice and offer support to care teams in dealing with ethical issues and dilemmas. This competency is strongly associated with direct clinical practice, which helps them to identify ethical concerns. In most of the interviewed NHs, there is a strong institutional focus for advance care planning. The aim is to clarify wishes and expectations for treatment and care (e.g., decision against hospitalization) for residents living with dementia and/or other multiple chronic conditions, and to clearly communicate decisions concerning end-of-life care. At least one nurse expert in almost all NHs is well trained in initiating and conducting open discussions with residents, family members, physicians and care teams about the value of medical interventions, clarifying "do not hospitalize" or "do not resuscitate" orders and documenting end-of-life preferences in an accessible and transparent way. Furthermore, at least one nurse expert has the skills and knowledge to support family members during end-of-life care.

Nurse experts in almost all NHs review advance care planning status or wishes as defined by the individual institution, e.g., once a year in stable situations or in case of serious changes in condition. In some NHs, the nurse expert will adapt (NH 2, 3, 4, 6, 7, 9, 13, 14) the existing advance care planning documentation in collaboration with the physician or at least make suggestions for adaptations (NH 1, 5, 13) to the physician based on residents' and family members' wishes, in response to changing goals of care.

The nurse experts in the NHs in the German-speaking part (NH 1-4, 6, 7) and for one NH in Ticino (NH14) are strongly involved in initiating and leading round table discussions in complex situations and offer support to care teams about ethical issues and dilemmas.

Data-driven quality improvement

All 14 NHs participating in the case study work with resident assessment instruments (i.e., RAI-NH, PLAISIR, or BESA[4]) which enable them to use routine resident data to drive and monitor quality improvement activities. Quality indicators are collected with the resident assessment instruments and used to assess, report, and monitor the quality of care provided and its changes over time. Quality indicators derived from residents' assessment instruments typically provide resident outcome data (e.g., percentages of residents with severe or moderate pain). The NHs analyse the data internally or receive annual reports from cantons or from providers of the resident assessment instruments. The results serve either:

- As a basis for discussion in the leadership team and with a particular person(s) responsible for the quality improvement in the NH to take on strategic decisions about quality of care and to further develop action plans.
- To raise employees' awareness of the topics measured with quality indicators based on the results. The NHs emphasised that when presenting the results on quality indicators to staff, the following factors should be taken into consideration:
  - Results should be presented in a clear and understandable form, i.e., using simple language to describe the quality indicators so that people find greater value in the information.
  - Results should be released in a suitable and convenient manner, i.e., presented to the care teams in team meetings, distributed by e-mail, published on the intranet, posted on the wards.

Besides working with quality indicators from the resident assessment instruments, some NHs conduct employee, resident, and family member surveys to measure satisfaction with the care provided in the NH. Others work with annual cantonal quality reporting on broader measures including structure and process indicators or conduct audits that can include documentation review or quality audits on the wards.

Barriers and facilitators influencing the implementation of nurse-led care models

Based on the case studies, we summarised crucial factors (i.e., barriers and facilitators) influencing the implementation of the models. We systematically structured them according to CFIR in five domains: (1) intervention characteristics, (2) characteristics of the individuals involved, (3) inner setting, (4) implementation process, and (5) outer setting. The following description addresses the main factors influencing the implementation of the nurse-led care model within the four CFIR domains. A summary of all factors within the five CFIR domains is presented in appendix 2.

Within the domain of **intervention characteristics**, we identified various features of the care model that can facilitate the implementation. Firstly, the source of the intervention is important. If the reason for the model development and the role of the nurse expert is to respond to a local problem (e.g., increasing complexity of residents, hospital admissions, skill-mix) and the nurse expert is recruited from within the pool of NH RNs, the model has better chances for a successful implementation. Further, it is important to adapt the nurse expert's competencies to the individual needs of the NH rather than just copying/mirroring the same role as in other NHs. What worked for one NH doesn't necessarily meet the needs of another NH.

In the domain of the **characteristics of the individuals** involved, positive attitudes, knowledge and beliefs are important for successful and sustainable implementation of the nurse expert role. If the staff do not know the exact competencies of the nurse experts, they might not accept them, nor want to collaborate with them. However, if staff believe that the nurse expert is a resource person, and considers them as a support in daily practice, it will help with the implementation. The personal traits of the nurse experts such as professional experience and expertise in geriatrics, motivation, and advanced interpersonal and leadership competencies can facilitate the implementation. Overall, low commitment of NH staff e.g., high staff turnover – may negatively influence or even hinder the implementation.

[4]Swiss version of the Resident Assessment Instrument-Nursing Home (RAI-NH); Planification informatisée des soins infirmiers requis (PLASIR/PLEX); BewohnerInnen-Einstufungs- und Abrechnungssystem (BESA).

The **inner setting** refers to the internal context of the NH. Here, the organizational culture of the NH seems to be the most critical barrier or facilitator to the implementation of a nurse-led care model. Firstly, hierarchical structures are experienced as a barrier, e.g., if the physician sees him- or herself above the nurse expert. Further, a lack of shared vision for the future development of the nurse expert role can hinder the implementation. A culture of transparent communication between staff, where mutual respect between professions is important, e.g., with the integration of nursing aids or housekeeping, allows for a better implementation of innovations such as nurse-led care models. Moreover, sufficient available resources are needed, which are dedicated to the development and implementation of the nurse expert role, including the time invested to prepare the care teams for change. The dissemination of information and knowledge about the nurse expert role add to a better understanding among staff, and to a higher acceptance by removing parts of the "unknown". If there is no or not enough information about the nurse expert role, staff is likely less engaging. Another very important element are networks and communication. There is need for continuous exchange between the nurse expert and their superior to address the implementation, its challenges and to show support, as well as professional exchange of the nurse expert with other nurse experts. The professional exchange is needed for professional growth and provides opportunities to learn from each other about how to improve quality of care.

Lastly, the **implementation process** is crucial to successfully implement the nurse expert role. Firstly, prior to the implementation, the leadership and preferably the nurse expert should plan how and to whom the new care model, including the nurse expert role should be communicated to.Understanding of how the role will be integrated into existing working processes (i.e., at what times the nurse expert will visit the wards, how they will work with physicians and who will be the hierarchical superior and where the nurse expert would be positioned in the organizational chart) needs to be clarified. Secondly, in the planning stage, it is important to consider those who will be in constant contact with the nurse expert and will have to familiarize themselves with a new role. This would include ward managers, care teams and physicians, and those supporting the implementation, e.g., the director of nursing. In the execution phase it is important to monitor the nurse expert role in terms of workload, if they can implement the planned competencies and tasks, and adapt if necessary.

Study 3: Stakeholder involvement

We learned from the case studies and evidence from the literature that an important facilitator for implementing a new nursing role is a clear definition of the competencies needed [57]. Such definitions give a basis for the monitoring and evaluation of the role's effectiveness and contribution to the reduction of unplanned hospitalizations [57]. Thus, we collaborated with the input of key stakeholders to develop and define the relevant competencies with attention to the local context. The method for a structured rating and discussion with the stakeholders about competencies and expected outcomes of nurses in expanded roles in NHs is described in Box 4. We describe four key insights from the discussions with the stakeholders.

The RAND/UCLA method – a modified Delphi method – was used iteratively with stakeholders to define competencies and outcomes relevant for nurse experts [33, 58].
Based on the literature review (study 1) and case studies (study 2), competencies and outcomes of APNs from international examples, and from nurse experts in Swiss nurse-led care models were extracted and translated into a structured questionnaire survey.
A group of national stakeholders (persons who are directly or indirectly involved in any Swiss healthcare sector for older adults, e.g., as a care provider, payer (e.g., an insurance company delegate), professional group or policymakers) rated the relevance of each of the competencies and outcomes in a structured questionnaire survey in two rounds. Stakeholders rated their relevance for nurse experts in Swiss NHs, without considering current health law or financing models [33]. Additionally, stakeholders could suggest modifying or adding items. Detailed results can be found in the published article by Basinska, et al. [59]

Box 4. *The RAND/UCLA method*

Professional boundaries

The interest in expanding nursing roles to substitute primary health care physicians is growing. However, the stakeholders emphasised that this new role, resembling a nurse practitioner (NP) one, should not be the emphasis for the INTERCARE nurse role. Firstly, the training and specialized clinical field of INTERCARE nurses are not homogeneous. Secondly, taking over certain physicians' tasks (i.e., clinical assessment, diagnosis, prescribing medication) requires master-level training (e.g., 900 hours of physician supervision) and legal authority in order to bill accordingly. However, given the current circumstances, few INTERCARE nurses have a Master's level education. Thus, the INTERCARE nurse expert role should encompass aspects of the role internationally known as clinical nurse specialists (CNS) who concentrate on coaching care workers in complex situations with the goal of empowerment; promoting and improving quality of care through the support of evidence-based practice; and facilitating system change through clinical leadership (although the degree to which INTERCARE nurses will fill out this role will depend on their educational background). The discussion reflected differences between the German and French speaking part of Switzerland. In the French speaking canton Vaud, the law has been adapted and gives nurses with a Master's degree the right to prescribe after accomplishing the corresponding training [60]. In the German part, this is not yet in place.

Central competencies

Accordingly, stakeholders rated the following as core competencies of the INTERCARE nurse expert: 1) coach care teams; 2) support and empowerment care teams; 3) clinical activity comprising regular work on the wards in complex situations; 4) identify knowledge gaps in care teams and plan activities accordingly, 5) conduct analysis of unplanned hospitalizations with care teams.

Professional acceptance

The stakeholders discussed barriers for the implementation of the INTERCARE nurse role. They emphasized foremost that the acceptance of the new role might be challenged by the registered nurses themselves. Specifically, we need to be careful in defining the unique competencies so we do not de-skill the role of regular registered nurses. Further, clear scope of practice and identification of professional boundaries will make the implementation process easier, increase the acceptance and add to the sustainability of the role.

Diversity of the settings

In the same way that models cannot be transferred from one country to another, stakeholders pointed out that the new role cannot be directly translated, as in "copy pasted", from one NH to another, because "one size" doesn't fit all. Thus, each of the NHs need to further define the content of the role and constantly adapt it based on its structures, processes and resources. Such a role is designed in response to the local context, including resident health care needs, for the role to be sustainable.

Study 4: Residents' and family members' involvement

As additional part of our contextual analysis, we performed focus group interviews with residents and family members in three of the NHs which also participated in the case studies (see Box 5 for a description of the methodology). The aim was to explore how residents and family members experienced acute situations. Since the qualitative analysis of the focus group interviews was performed at the same time as the INTERCARE model implementation in eleven NHs, the results could not guide the development of the model. However, insights from the focus group interviews fed into conversations with the eleven NHs while we were still tailoring the model to each local context. The key insights from the focus group interviews are presented below. Detailed results can be found in the published article by Basinska, et al. [61].

Experiences of everyday care

All participants shared similar daily experiences of the NHs as a well-organised system, functioning with a set routine and with limited resources, for instance limited care staff. Participants perceived the limited resources primarily as the lack of staff, especially registered nurses with geriatric expertise and time to fulfil duties and responsibilities at their level. In addition, some residents and family members experienced limited access to geriatric expertise of physicians, who in fact are usually not available on-site. This is challenging as arranging personal contact with physicians to discuss medical treatment depends on the availability and presence of physicians.

Acute situations

While developing the study, we imagined that participants would tell us about acute situations related to changes in their health condition with the need for medical attention (i.e., medical and somatic problems like pain, hypoglycaemia, or pneumonia with deliberations about hospital transfer). However, the residents and family members mostly perceived situations as acute referring to basic needs (i.e., toileting or hunger) and maintaining a good quality of life for the residents. The quality of life is expressed as incorporating the personal preferences into everyday care (e.g., go for a walk, have a coffee in the cafeteria, eat their favourite food).

Wishes

Family members and residents would appreciate greater care support and guidance in their daily care and upon hospital admissions. A possible solution would be to involve residents and family members in advance care planning and creating a joint care plan. This would save the family members from difficult, ad-hoc medical decisions. Furthermore, to avoid distressing situation around unmet basic needs and insuring good quality of life, better communication between health care professionals, residents and family members is needed. A biography resumé might serve as a starting point for getting to know each party's expectations, resources and wishes concerning basic life and care needs and hopes concerning personal relationships. Finally, a reference person responsible for the resident would account for continuity in terms of communication and care. According to the interviewees, a nurse expert with certain standards of education and clinical competencies could support the nursing staff in everyday care.

Focus group interviews assessed residents' and family members' values and preferences regarding care in acute situations. Seven residents and 11 family members in three NHs (two in the German-speaking part and one in the Romandie) working with nurse experts participated. The interviews were audio recorded, transcribed verbatim in each native language (2 German, 1 French) and analysed using reflexive thematic analysis by Braun and Clarke [62].

Box 5. *Focus group interviews with residents and family members*

Chapter 5 – **Discussion**

This is the national report of a 4-year (2017-2020) Swiss national implementation science study funded by the SNSF called "Improving **INTER**professional **CARE** for better resident outcomes – **INTERCARE**". INTERCARE consisted of the development of a new nurse-led care model for the Swiss context using implementation science as the overarching methodology. The thorough analysis of the Swiss context helped to understand the needs of, and available resources in Swiss NHs and guided the development of the INTERCARE model.

Need for innovative solutions for nursing homes

As residents move into NHs later in life, often with advanced stages of chronic diseases with functional or cognitive decline, an increase in the complexity of care requiring comprehensive care including caring for family members, is needed. Increasingly, NHs strive to provide the necessary infrastructure to care for residents with complex medical situations in a non-acute setting [63, 64]. Overall, the grademix in Swiss NHs is changing with an increase of licensed practical nurses at the cost of RNs [2, 65]. In 2018, only 24% (private NHs) and 29% (public NHs) of the nursing staff were RNs. NHs have difficulties to recruit skilled nursing staff with geriatric expertise as NHs are not necessarily portrayed as attractive settings to work in. Also, RNs working in NHs often see themselves occupied with medical and technical tasks. Additionally, the number of primary care physicians is not meeting the current demand, although their number is increasing. In Switzerland, 77% of GPs treat residents in NHs [5], which means that NHs often work with several GPs who treat only a few residents. This has implications for the continuity of care, interprofessional collaboration and communication, as well as availability of GPs for local visits. The lack of embedded NH geriatric expertise might lead to a delay in recognizing, handling and treating complex resident situations in a comprehensive way. The established lack of geriatric expertise in NHs both nationally and internationally, calls for innovative solutions. There are different options, e.g., integrated care models including case managers from outside the NH, telehealth, mobile GP or mobile mixed teams, or nurse-led care models with APNs.

In England, e.g., the NHS (the National Health Service) launched a national program to develop new models of integrated care. Six of them have been developed for NHs with the goal to reduce the need for acute care and empower staff through training and education [66, 67]. One innovative aspect of this program is the collaboration between NHs working with a dedicated GP practice collaborating with mixed teams including community nurses, therapists, voluntary carers, and other professionals. The mixed teams provide a flexible, efficient and responsive service that reacts to the needs of residents and their family members. Another care model includes an external "rapid" support team to provide support to the NH within 60 minutes. Another solution, which is widely spread in England, emerging in Germany [68] but still relatively new in Switzerland, is the use of technology such as video consultations. This enables a timely response for NHs in need of support and shows promising results in the reduction of physical GP visits by 50% [69]. Additionally, during seasonal viral epidemics and the recent COVID-19 pandemic, distant assessments and phone support are proving to be an important solution for NHs to limit viral spread but to also maintain access to support and limit acute care transfers when possible. Another example of modern communication are hotlines with experts, already implemented in Switzerland in the primary care sector (e.g., Parahelp[5]); potentially to be adopted by the NHs to provide remote access to geriatric expertise for staff in case of uncertainty. Furthermore, innovative solutions in Switzerland include mobile GP teams [70] and specialised palliative care teams [71]. To date, mobile GP teams are available in eleven Swiss cantons to counteract the overload of emergency department admissions and the decreasing number of GPs. Such teams consist of experienced doctors from various disciplines carrying out treatments in the NHs [70]. The specialised palliative care teams include a GP and a nurse as central professionals, a pastoral service (if needed), social and psychology services, as well as other therapeutic staff. These professionals are solicited as necessary to fulfil the needs of residents and their families. The NH staff can directly involve the specialised palliative care teams for residents in complex situations, offering in-person consultation and a 24/7 contact person.

[5]Parahelp provides outpatient nursing advice for outpatient with congenital or acquired traumatic or disease-related paraplegia, as well as for people with spina bifida and ALS (amyotrophic lateral sclerosis) throughout Switzerland.

The implementation of interprofessional teams with APNs is another innovative solution, well established in the United States, the United Kingdom, Australia, Sweden, and the Netherlands, and emerging in Switzerland [21]. An example is GP practices including APNs in their team; in Switzerland there are about 12 GP practices with APNs who also visit NHs [72]. Or, the currently less common solution is a nurse-led model with APNs hired by the NHs, as portrayed in two of our case studies.

The INTERCARE model

The INTERCARE model, offers a potential solution to the various abovementioned issues but is a contextually-adapted solution based on the available resources in Swiss NHs to move Switzerland's health system forward. Nurse-led care models driven by APNs would be a great asset for Swiss NHs. However, this is currently not a viable option, given the number of APNs interested in working in long-term care. Moreover, Switzerland has limited experience with APNs, as the first APN program started in 2000 [73]. In 2015, only 328 APNs had graduated, and most of them work in the acute care setting [73]. Due to this, INTERCARE had to be tailored to fit the available resources; building on RNs rather than APNs, working with motivated NHs and especially nurses who were interested in developing their expertise and clinical leadership roles, without necessarily embarking on a Master's program.

Similar to the models working with APNs, the core of the INTERCARE model is the **interprofessional care team** with the INTERCARE nurse (i.e., an RN in an expanded role). Unlike models in other countries, the INTERCARE nurse is hired by the NH. This helps to keep the geriatric expertise within the NH unlike having experts consulting on a case by case basis, without knowing the NH and providing coaching to the care staff. flying in and out of the NH without impacting practice and helping all care staff to increase their own knowledge. As has been shown in the case studies, the best way is to recruit candidates for this position in-house, providing a career ladder for RNs and helping them to expand their scope of practice. While the idea of having someone with geriatric expertise in a clinical leadership position within the NH is key to INTERCARE, we learned from the case studies that the content of this expertise can vary and be adapted to the mission and strategies of each NH. However, unlike nurse experts in some case studies, we stress the importance of the INTERCARE nurse being close to the teams they are working with, visiting units regularly, and being involved in direct resident contact as a role model, e.g., in performing an assessment or leading a conversation. As described by the nurse experts, these daily contacts help to see where coaching or formal training is needed to support care teams in prevention and treatment.

The **INTERCARE nurse** focuses on the empowerment and support of the staff and on improving interprofessional collaboration with GPs. With **comprehensive geriatric**

assessment being one of the core elements, we emphasize that residents in NHs are older people needing interprofessional care. Interprofessional collaboration being a core characteristic of CGA; all health care professionals depend on each other to reach the resident's care goals. To be able to work interprofessionally, the INTERCARE nurse needs to learn the concepts and terminology of geriatric care. On the one hand, understanding the geriatric concepts helps the INTERCARE nurse to best describe the problems and inform GPs about residents' and family wishes. On the other hand, understanding and using geriatric terminology facilitates effective communication with GPs. Since most NHs in Switzerland work with several GPs and few have in-house physicians, geriatric knowledge and expertise as well as long-term care experience are key to build sustainable relationships with different physicians. As we learnt from the case studies, physicians want to have somebody they can rely on and trust, as their medical decision making relies on an in-depth description of a resident's situation. Ideally, as we have seen in several case studies, there is an in-house physician who can train the nurse expert. However, this is not the case in many NHs. Accordingly, the degree to which CGA or clinical assessment is applied and the importance it is given for the INTERCARE nurse's role can vary. Since INTERCARE nurses have very different backgrounds, we support them only as far as they are trained for. Trust within interprofessional collaboration relies on self-awareness of each professionals' limits regarding their own scope of practice and their ability to communicate their scope of practice accordingly.

All NHs in the case studies used some form of **ACP**, stressing the importance of talking with residents and families about their needs and wishes and focusing on person-centred care and treatment plan, with other professionals. ACP has gained increasing importance over the last years and is supported by the Federal Office of Public Health [74], since it allows to better assess residents' values and treatment preferences. However, although evidence indicates that ACP improves communication, family and staff satisfaction, and reduces staff distress [37], the integration of ACP into routine care remains challenging for NHs [75, 76]. This is – amongst others – due to lacking resources in time and staff. Accordingly, the requirements we formulated in INTERCARE are minimal and do not reflect the consultation process that would normally be involved in an ACP. However, as we established during the case studies, even such minimal conversations about resuscitation status and wishes concerning hospitalisations are often not held and would be a first step. We are confident that positive experiences will move NHs to further explore the benefits of ACP consultations. The health professionals working in the NHs have established trustworthy relationships with their resident. Therefore, NH professionals are in the best position to guide ACP conversations if trained accordingly.

The core element of **evidence-based instruments** promotes several instruments (STOP&WATCH, ISBAR, reflection instrument) to support the recognition of changes in a resident's condition, the communication and reflection of these changes with care teams and physicians, to help reduce acute care transfers. This is a core element present in the literature as an important component in nurse-led models and yet none of the case studies we visited worked with these instruments in a structured way, although some of them were familiar with ISBAR. A key difference of the INTERCARE model compared with the case studies is that we developed the model in view of reducing unplanned hospitalizations, while the case studies focused on improving overall quality of care. In order to evaluate the new model, a measurable clinical outcome had to be chosen. Unplanned hospitalizations do not only affect the quality of life of residents but can also cause harm due to the higher risk for iatrogenic complications, and have been repeatedly shown to be reduced by nurse-led care models. INTERACT was the most successful model used in the US that worked with the three instruments which we then translated, locally adapted and used in INTERCARE.

Data-driven quality improvement was embedded well in the NHs participating in the case studies. The desire and motivation of the NHs to implement a care model with a nurse expert underpins the commitment of these NHs to continue strengthening quality improvement by looking at innovative solutions, such as new care models. However, collecting data does not suffice; they need to be analysed, understood and discussed to be able to improve quality of care. These results are needed to decide where to position efforts of a nurse expert, not only to endorse the additional position and expenses generated by the model, but also to visualise positive results. This is also helpful for critical executive boards to understand the impact of such a role by

looking at numbers and figures. For INTERCARE, we concentrated on measuring key outcomes for the INTERCARE study (hospitalizations, quality indicators, ACP, staff surveys), but of course other sources of data, as seen in the case studies, such as surveys of residents and families, were collected to measure a broader array of themes.

New roles for registered nurses

The clinical leadership position of the INTERCARE nurse offers a career ladder for nurses in NHs to further develop their professional skills. As such, the INTERCARE model has the potential to increase the attractiveness of residential long-term care for RNs by giving them an opportunity to expand their role and scope of practice, keeping to a clinical track and not having to change to a management position.

We hope that both the role of the INTERCARE nurse (or other RNs in expanded roles) and of APNs will gain more importance for NHs. We suggest moving forward with both roles, consolidating the roles of highly skilled RNs such as the INTERCARE nurses and continuously investing in attracting APNs to NHs. We would not restrict the NHs to either having APNs or RNXs, but rather pin point that a variety of combinations are possible. The OPTIMISTIC model in the US describe collaboration between NPs and RNXs, each with their specific competencies. NPs have an overseeing role as the right hand of GPs [77]. INTERCARE nurses are in an excellent position to support and empower the care teams. While APNs in an NP role can improve the medical service to NH residents and address the increasing lack of GPs, Clinical Nurse Specialists bring broader skills in practice development and quality improvement as well as clinical expertise. We are certain that all roles have a future in NHs to provide best care for residents and their families. Each NH needs to assess its own possibilities and needs in order to plan a combination that best fits their context.

Implementation science

The development of the INTERCARE model was guided by the implementation science principles [23]. This allowed for the development of relevant, innovative solutions that can be successfully implemented in real-world settings. Key methods in the development phase are a contextual analysis, a theory-driven approach, and the involvement of stakeholders [24].

Even with the existing evidence-based literature about new care models, how to increasing quality of care in NHs and how to reduce unplanned hospitalisation, it is difficult to implement an existing model in another context without a proper contextual analysis. Failure to assess the context in which implementation should take place is detrimental. Not knowing the pre-existing conditions and resources, the barriers and facilitators, and resident's preferences, prevents from these being addressed accordingly. On the other hand, successful implementation also highly depends on the local expectations, as well as the needs and resources of NHs that want to implement the model. To be able to guide the implementation, firstly, we defined core elements of the model to successfully reach its aim of strengthening geriatric expertise and to improve quality of care. In a second step, these core elements needed a certain flexibility so that NHs implementing the model could adapt them to their local context. We defined minimal requirements that were compulsory for all NHs, and peripheral requirements that could be adapted to local needs and preferences. We used the knowledge gained from the focus group interviews with residents and family members to further shape the role of the INTERCARE nurse. Lastly, we are going to assess implementation outcomes, i.e. the acceptability, feasibility, adoption, fidelity and cost of the core elements of the model. It will deliver information about implementation process which can be used in the scale up of the INTERCARE model.

The contextual analysis as well as the stakeholders served as guidance in defining implementation strategies and thus facilitating the implementation of the INTERCARE model in the NHs [39]. In the same way as the intervention was multilayered, the implementation strategies also needed to tackle different levels of the implementation. Accordingly, they included instructions for action at the level of NH leadership (to prepare them for the implementation and to discuss the handling of quality data), as well as strategies at the level of the INTERCARE nurse (e.g., educational program). Proposed implementation strategies may serve as a discussion for further NHs wishing to implement the INTERCARE model.

Chapter 6 – **Recommendations**

Implementing INTERCARE

The INTERCARE model can serve as a blueprint for NHs across Switzerland interested in increasing access to geriatric expertise. NHs can tailor the core elements of INTERCARE to their local context considering their own needs and resources. NHs can use this report as a basis to evaluate their resources and needs, and to discuss how to implement the core elements while considering influencing factors and implementation strategies that can support the implementation.

As the implementation of the INTERCARE model introduces organizational changes (e.g., the new role introduces a shift in responsibilities), readiness for such a change is crucial and NH leadership needs to envisage which changes will arise when introducing a new care model [78-80]. Changes needs to be envisioned by all parties for them to work. According to our findings from the case studies, nurse expert positions might be strongly linked to the vision of one member of the leadership team and as soon as this person leaves, the position becomes unstable. Accordingly, forming a common understanding of the needs behind any new changes and the primary goal of a new role is important for its sustainability. While all core elements are important, the model is highly characterised by the INTERCARE nurse. Hence, the effort put into defining and delimitating this role will be fundamental for the model to work. There needs to be a strategic communication process to emphasize the goal of the INTERCARE nurse, to support the care teams and the RNs, and to not de-skill or threaten RN roles. Moreover, building such a role requires time and INTERCARE nurses need to be given a period to reflect on their practice to be able to grow into their new role and responsibilities, especially if they do not share any tasks with other INTERCARE nurses. Introducing such a role will not lead to immediate effects on quality of care or on unplanned hospitalisations, but continuous exchange with the leadership team is important to implement the role properly and work collaboratively so that short-term outcomes are visible (e.g., staff satisfaction) and long-term ones are reachable.

There are many possibilities for RNs in expanded roles to enhance their geriatric knowledge and skills through different educational programs and training. Usually training programs focus on single clinical themes such as wound care or pain management, or on specific concepts such as kinaesthetic or multisensory stimulation. On the other hand, educational programs (e.g., CAS) cover broader themes such as dementia care, palliative care, or geriatric care. To better assure the sustainability and scalability of the role beyond the INTERCARE study, we developed a Certificate of Advanced Studies program based on the INTERCARE nurse curriculum and will launch it as a postgraduate Certificate of Advanced Studies (CAS) program at the University of Basel[6]. The CAS "INTERCARE – Klinische Fachverantwortung in der Geriatrie" will focus specifically on clinical knowledge for RNXs in nursing homes, not only developing clinical skills, but also coaching them to take over a clinical leadership role. Additionally, one of the CAS modules is designed for the NH leaders of the enrolled RNs. This is to support them in the introduction of the new role within their NH.

Nurse-led care models and policy

The financial question underpinned many discussions we had with interested parties and stakeholders. In each of the case studies in the different cantons, the nurse experts were financed by the NHs' budget. However, the NHs described in the case studies were rather large ones which gave them financial flexibility, since they were able to combine small percentages from different units to build a combined, overarching position. Hence, we do acknowledge a challenge for medium-sized or small NHs, depending on the canton and funding mechanisms, in being able to implement such a care model. There is the possibility of several NHs working together in hiring one RNX. Given the costs related to avoidable hospitalisations from NHs, policy makers should strengthen the development of nurse expert roles by facilitating RNs in NHs to receive in-depth training in geriatrics and gerontology so that they can take up clinical leadership roles. Policy makers can support the attractiveness of working in NHs, by supporting the creation of nurse expert positions e.g., by counting nurse expert

[6]More information about future offers of the program: https://nursing.unibas.ch/de/weiterbildung/cas-intercare/

positions as an extra position for a certain number of beds or by supporting the education of nurse experts beyond their RN education with financial incentives for NHs. Nursing home associations might foster the exchange among nurse experts and be responsible for the administrative work to build networks, helping nurse experts to concentrate on initiatives and interventions needed to address issues and foster geriatric expertise in their NH. A powerful example is the ongoing recent COVID-19 pandemic which strongly underlines how NHs are alone in tackling new challenges. Nurse experts might be one group of professionals that can help to concentrate resources within a region to address current and new problems.

A second national report will be published in 2022 after we carefully evaluate the implementation of the INTERCARE model in 11 German-speaking NHs. The intervention phase took place between June 2018 and February 2020 and both statistical and qualitative analyses are currently taking place to be able to provide more information concerning what we learned about the implementation process and the effectiveness of this nurse-led care model.

Acronyms and abbreviations

ACP	*Advance Care Planning*
APNs	*Advanced Practice Nurses*
BPSD	*Behavioural and psychological symptoms of dementia*
CAS	*Certificate of Advanced Studies*
CFIR	*Consolidated Framework for Implementation Research*
CGA	*Comprehensive geriatric assessment*
CNS	*Clinical nurse specialist*
COPD	*Chronic obstructive pulmonary disease*
COVID	*Coronavirus*
DAS	*Diploma of Advanced Studies*
DISC	*Dominance (D), Inducement (I), Submission (S), and Compliance*
DON	*Director of nursing*
EBP	*Evidence-based practice*
EPIS	*Exploration, Preparation, Implementation, Sustainment*
ERIC	*Expert Recommendations for Implementing Change compilation*
F	*French speaking part of Switzerland*
FTE	*Full-time equivalent*
G	*German speaking part of Switzerland*
GP	*General practitioner*
I	*Italian speaking part of Switzerland*
ICN	*International Council of Nurses*
INTERCARE	*improving INTERprofessional CARE for better resident outcomes*
INTERACT	*Interventions to Reduce Acute Care Transfers*
ISBAR	*Identification, Situation, Background, Assessment, Recommendation*
LPN	*Licensed practical nurses*
MAS	*Master of Advanced Studies*
MOQI	*Missouri Quality Initiative*
NH	*Nursing home*
NP	*Nurse practitioner*
OPTIMISTIC	*Optimizing Patient Transfers, Impacting Medical Quality and Improving Symptoms: Transforming Institutional Care*
PDCA	*Plan-Do-Check-Act*
RAND	*Research ANd Development*
RN	*Registered nurse*
RNXs	*Registered nurses in expanded roles*
SNSF	*Swiss National Science Foundation*
SPC	*Statistical Process Controlling*
UCLA	*University of California at Los Angeles*
US	*United States of America*

Tables and figures

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