
# Feasibility of the INSPIRE care model: a community-based integrated care model for home-dwelling older adults

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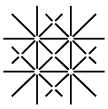

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# FEASIBILITY OF THE INSPIRE CARE MODEL:

## A community-based integrated care model for home-dwelling older

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I have obtained the required credits according to the doctoral agreement, as well as a written and signed statement to the following effect:

*"I declare that I have written the dissertation entitled 'Feasibility of the INSPIRE care model: a community-based integrated care model for home-dwelling older adults' only with the help indicated therein. Under the cooperation agreement for the implementation of a "Cotutelle de these", this thesis is also submitted to KU Leuven for a joint degree."*

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# Contents

# List of Abbreviations

**INSPIRE:** ImplemeNtation of a community-baSed care Program for home dwelling senIoR citizEns Project

**BL:** Canton Basel-Landschaft

**TRANS-SENIOR:** Transitional Care Innovation in Senior Citizens Project

**ADL:** Activities of daily living

**IADL:** Instrumental activities of daily living

**ICOPE:** Integrated Care for Older People

**IAC:** Information and Advice Center

**OASI:** old age and survivor's insurance

**EQ-5D-5L:** EuroQoL 5-dimensions 5-levels questionnaire

**IQR:** interquartile ranges

**AIC:** Akaike score

**BIC:** Bayesian Information Criterion

**OR:** odds ratio

**MAR:** Missing at Random

**MCAR:** Missing Completely at Random

**MICE:** Multiple Imputation by Chained Equations

**ICC:** intraclass correlation

**MRC:** Medical Research Council

**FTE:** full-time equivalent

**CICI:** Context and Implementation of Complex Interventions framework

**ERIC:** Expert Recommendations for Implementing Change

**FRAME-IS:** framework for documenting modifications to implementation strategies in healthcare

# Summary

The global increase in life expectancy has led to an ageing population; particularly in Europe and Switzerland (1–4). The number of older adults, especially those aged 75 and older, is expected to rise significantly from 44 million in 2022 to 74 million by 2050 (4). However, the increase in life expectancy has not necessarily translated to an increase in healthy years due to the high prevalence of multimorbidity, ranging from 40% to 75% (5–7). Multimorbidity poses a substantial burden on healthcare systems and is linked to adverse health outcomes, including frailty (8,9).

Frailty is considered a state of vulnerability in older adults, characterized by an increased susceptibility to adverse health outcomes, functional decline, and a reduced ability to recover from stressors (10,11). There are various approaches to defining frailty, but they all agree on its multidimensional, non-linear, and dynamic nature (8,9,11). Frailty is associated with negative health outcomes, including falls, disability, hospitalization, and mortality (10,11). It also has a negative impact on the life of caregivers (10,11). Frail individuals often require care from multiple providers such as general physicians, nurses, physiotherapists, etc. However, the way in which their care is organized tends to be fragmented (12). Care fragmentation can lead to care gaps, conflicting recommendations, and unmet health and social care needs (13), which can result in unmet needs and increased healthcare costs (12,14,14–16).

Unmet needs among home-dwelling older adults can result from the unavailability or inadequacy of essential support and services (17–20). These needs encompass healthcare services (e.g. health promotion, prevention, treatment, etc.) and home support services (e.g. assistance with activities of daily living, transportation, financial management, etc.); and are associated with various adverse consequences, including lower quality of life and increased healthcare utilization (18,21–23). While the prevalence of unmet needs for healthcare services in older adults stands at 25% (24), the prevalence of unmet needs for home support ranges from 11% (22) to 55% (19) depending on the definition or assessment methodology used. Failure to meet the needs for home support services can lead to adverse outcomes, including lower quality of life, increased healthcare utilization, hospitalizations, institutionalization, and mortality (18,21–23). This underscores the importance for developing innovative solutions that facilitate a comprehensive identification of the complex health and social care needs of home-dwelling older adults, while providing the necessary multidisciplinary support to meet those needs.

Integrated care has been proposed as a solution to meet the complex needs of frail older adults and mitigate care fragmentation (25,26). Integrated care models aim to coordinate and provide multidisciplinary care to meet the needs of older adults while allowing them to stay at home (13,27). Despite recommendations to advance integrated care models in order to meet the needs of frail older adults (28) (29,30), its effectiveness remains unclear. Integrated care models are considered complex intervention with various components and challenges (13,27,31). Achieving integration requires overcoming barriers at different levels (13,27,31), and the contextual factors play a crucial role in its success (31–33). Thus, given the complex nature of integrated care models, it is recommended to first assess their feasibility in the specific context before proceeding to evaluate their effectiveness (34–36). By assessing its feasibility, potential refinements to the care model can be identified, uncertainties related to the evaluation design can be clarified, and additional barriers to its implementation can be recognized (34,37). To date, only one study has published the results of the feasibility assessment of an integrated care model for home-dwelling older adults (38). While this study reported positive enrollment and adherence, it didn't evaluate the intervention's implementation or reach. Given the challenges of engaging home-dwelling older adults for community-based programs (39), assessing reach is crucial in feasibility assessments of such interventions.

Canton Basel-Landschaft (BL) in Switzerland presents an ideal scenario to advance integrated care due to its ageing population and the introduction of a legal framework for addressing the needs of home-dwelling older adults (40,41). These determinants set a strong foundation to advance integrated care in the canton. In response to this, the Canton BL and the University of Basel partnered to create the INSPIRE (ImplemeNtation of a community-baSed care Program for home dwelling senIoR citizEns) Project. INSPIRE is multiphase project aimed to develop, implement, and evaluate a community-based integrated care model for frail home-dwelling older adults. It was designed in alignment with the recommendations of the UK Medical Research Council (MRC) Framework for the development and evaluation of complex intervention (34); and incorporates implementation science methods, as a way to unravel and facilitate its implementation and ensure their sustainability beyond the research phase. The INSPIRE project's three phases include: 1) development of the care model; 2) feasibility assessment; and 3) effectiveness evaluation.

Phase 1 concluded with the development of the INSPIRE care model, a community-based integrated care model with four core components: frailty screening, multidimensional assessment, development of a care plan and coordination, and follow-up. While this dissertation draws on secondary data used for the development of the care model, its primary focus lies on the feasibility evaluation of the INSPIRE care model. Consequently, the main objectives of this PhD focus on three key

aspects. First, by using an ecological approach, we aimed to determine the prevalence of and identify the factors associated with perceived unmet needs for home support in home-dwelling older adults, in order to get a better understanding of the vulnerable home-dwelling older population. Second, we recognized the inherent challenges in reaching home-dwelling older adults, and therefore we wanted to contribute evidence on how to reach this population by using implementation strategies selected by following an implementation mapping approach. Last, due to the complexity of integrated care models, we wanted to determine the feasibility of the INSPIRE community-based integrated care model for frail home-dwelling older adults using implementation science methods. This care model was implemented and tested in an Information and Advice Center (IAC) of a care region of Canton Basel-Landschaft.

Chapter 1 provides an in-depth examination of population demographics concerning ageing. It introduces essential concepts like multimorbidity, frailty, and unmet needs before delving into integrated care, implementation science, and providing a concise overview of the INSPIRE Project in Canton Basel-Landschaft. Chapter 2 describes the aims of this dissertation.

Chapter 3 focuses on analysing the prevalence of unmet needs for home support in home-dwelling older adults and the factors at the macro-, meso-, and micro- levels associated with them (42). Using an ecological approach and data from the INSPIRE Population Survey (43) we found a prevalence of unmet needs for home support of 4.3% (42), which was lower than previous studies (19,20). This was likely due to differing definitions and the methods used to assess them. Key factors associated with the perception of unmet needs for home support included: receiving other government support (macro), using transportation services (meso), and experiencing depression or abandonment (micro), increasing odds of unmet needs. Conversely, having private health insurance (macro), higher education, good self-perceived health, and informal care (micro) reduced odds of unmet needs. These findings coincided with previous studies that have demonstrated that socio-economic disparities at different levels can shape the perception of unmet needs for home support among home-dwelling older adults (19,22,44–47).

Chapter 4 elucidates our approach for identifying implementation strategies to reach home-dwelling older adults in order to allow them to receive the services of the new IAC of a care region in Canton BL. Guided by the implementation mapping approach (48), we identified seven implementation strategies (49) that were organized in bundles and delivered by the IAC manager to community care providers, home-dwelling older adults, and their caregivers. Despite using this approach, the reach of the target population was estimated at 5.4%, somewhat lower comparing to other studies in Canada and the US (50,51). Moreover, our analysis revealed that most IAC visitors were either self-referred or

referred by their caregivers, with minimal referrals from community care providers. Factors such as low fidelity in delivering the implementation strategies selected and low coverage partially explained the low reach observed. However, we considered that other factors such as the time needed for the IAC to establish itself in the community (32,52), and the absence of formal collaborative structures could have also impacted the observed results (32).

Chapter 5 describes the results of the feasibility evaluation of the INSPIRE care model implemented in the IAC of a care region of Canton Basel-Landschaft. This study was conducted using a convergent parallel mixed-methods design. We collected quantitative and qualitative data in order to assess the acceptability, fidelity, feasibility, and reach of the INSPIRE care model core components from the perspective of older adults, informal caregivers, IAC staff and community care providers. Our analysis revealed that while frailty screening and multidimensional assessment were two core components delivered with high fidelity levels (100% and 75%, respectively) and widely accepted by older adults, informal caregivers and IAC staff, the implementation of the other two core components encountered significant challenges. We observed a poor fidelity for care planning and coordination (42%), accompanied by acceptability issues among community care providers. Similarly, our results revealed that follow-up (10%) had the lowest fidelity score, associated with some feasibility issues (e.g. lack of time of the IAC staff). Our findings aligned with other studies that had underscored the inherent challenges in collaborating with other care providers, potentially acting as a barrier to the successful implementation of integrated care (31,32,53,54).

Chapter 6 provides a comprehensive synthesis of the findings reported in Chapters 3 through 5; offering a thoughtful interpretation within the framework of existing literature. It also addresses the methodological strengths and potential limitations of this PhD project. This chapter also includes reflections on the implications of this research for fellow researchers, policy developers, and practitioners.

In summary, the increasing aging population and the challenges of multimorbidity and frailty demand innovative solutions. The INSPIRE Project in Canton Basel-Landschaft aims to address these challenges with the implementation of a community-based integrated care model. The insights from this research offer valuable guidance for researchers, practitioners, and policymakers. Our findings revealed the impact of socio-economic disparities on unmet needs, even in high-income countries, demonstrating that more efforts are needed to facilitate the access of vulnerable older adults to the support needed. They also emphasize the necessity of community-wide collaboration in order to effectively reach home-dwelling older adults. Additionally, our research highlights the challenges in

implementing integrated care within the community, and the importance of investing time and efforts to improve the collaboration between healthcare and social care professionals. We believe that our findings have valuable implications for improving care for frail older adults and advancing the implementation of integrated care models in community-settings.

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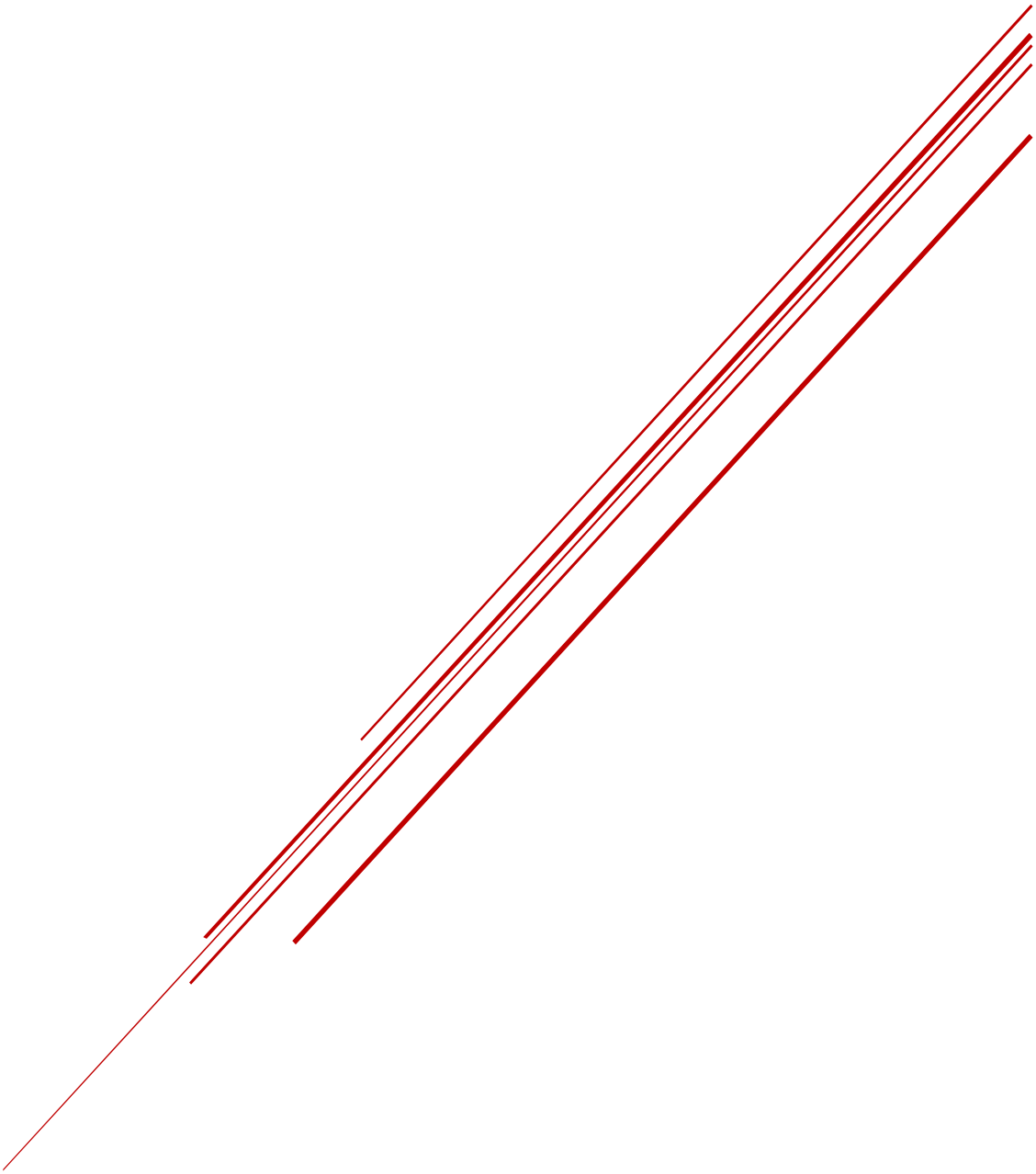
Maria José Mendieta Jara

Basel, 2023

# CHAPTER 1:

## INTRODUCTION



## 1.1. New demographic and epidemiologic trends

The increase in worldwide life expectancy is considered a great accomplishment for today's society. Global life expectancy has increased from 66.8 years in 2000 to 73.4 years in 2019 (1). Europe is one of the regions with the highest life expectancy (2), which has contributed to the ageing of its population (3). In 2022, there were 44 million older adults aged 75 years and older living in the European Union, and this number is expected to increase to 74 million by 2050 (4). Likewise, Switzerland is also witnessing a notable demographic shift, with the population aged 75 years and older projected to rise from 0.8 million in 2022 to 1.5 million in 2050 (4).

These newly won years are not always spent in good health. The number of disability-free years in older adults has not increased at the same rate as life expectancy, with an increase of only 1.2 of healthy life years in the last two decades (2000-2019) (1,5). This disparity can be partly attributed to the presence of multimorbidity, the presence of two or more chronic conditions (e.g. diabetes, hypertension, or heart disease) in an individual (6,7).

Multimorbidity constitutes an emerging burden for the healthcare system worldwide. Studies from Belgium, Canada, and the UK have revealed a varying prevalence of multimorbidity among individuals aged 75 and older, ranging from 40% to 75% (8–10), and this prevalence increases with advancing age (11,12). Although Switzerland currently lacks official data on multimorbidity prevalence among adults aged 75 and older, a report from the Swiss Health Observatory suggests that for those aged 80 and above, the prevalence of multimorbidity is approximately 41.3%.(13). Notably, several studies have demonstrated the negative impact of multimorbidity on disability, mortality rates, healthcare utilization, and overall healthcare expenditures (12,14,15). Beyond this impact, multimorbidity also constitutes a major risk factor for the development of frailty, as the presence of chronic conditions in an older person can lead to an increased accumulation of health deficits and vulnerability to external stressors (6,7,16). A systematic review and meta-analysis conducted by Vetrano and colleagues identified a frailty prevalence of 16% among older adults with multimorbidity (6).

## 1.2. Frailty & care fragmentation

Although frailty is an evolving concept (7,17), it is considered a state of vulnerability in older adults, characterized by an increased susceptibility to adverse health outcomes, functional decline, and a reduced ability to recover from stressors (16,18). It is gaining recognition as a growing global health burden due to the rapid ageing of the population worldwide (16). In Europe, approximately 16% of home-dwelling persons 75 years and older are frail (19) and this prevalence is expected to increase considerably in the coming years (16).

There is no current agreement on the operational definition of frailty, with the two predominant approaches being the Frailty Phenotype (FP) and the Frailty Index (FI) (7). The FP considers frailty as a clinical syndrome characterized by the presence of three or more of the following signs: weakness (low grip strength), slowness (slow walking speed), shrinking (unintentional weight loss), exhaustion (self-reported), and low physical activity (20). The FI uses a mathematical model that defines frailty as an accumulation of deficits (7). According to this approach, frailty is operationalized as the ratio between the cumulative deficits an older adult exhibits and the overall deficits taken into consideration (7,21). While the FP approach is more accepted by clinicians and general practitioners for its intuitive and easily interpretable nature, the FI is more sensitive and a better predictor of frailty-related negative outcomes (7). Nevertheless, both approaches coincide that frailty is a dynamic, non-linear, and multidimensional condition that predisposes older adults to an increased risk of adverse health outcomes in the presence of minor stressors due to the loss of physiological reserves (6,7,16).

Some of the negative health outcomes associated to the presence of frailty in older adults include falls, disability, lower quality of life, hospitalization, institutionalization, and mortality (16,18). Additionally, some studies have reported the negative impact of frailty on the life of caregivers (22,23). For example, in the US, it has been reported that 28% of informal caregivers for older adults face physical difficulties, while 45% experience emotional distress, including 13% with anxiety and 15% with depression, and these conditions can be further exacerbated for caregivers of patients with dementia (24).

Frail older adults can present complex health and social care needs, often requiring care from different providers, such as general physicians, nurses, physiotherapists, pharmacists, social care workers, etc. (25). However, the manner in which their care is organized tends to be fragmented (26). Fragmented care refers to lack of inter-provider communication and coordination, which can lead to care gaps, conflicting recommendations, and unmet health and social care needs (27). Consequently, care fragmentation places almost a third of home-dwelling older adults at risk of early institutionalization due to inadequate support (28), which contributes to elevated healthcare costs (29). Therefore, establishing a well-coordinated and continuous care system becomes crucial for successfully addressing the complex needs of frail older adults.

### 1.3. Unmet needs in home-dwelling older adults

The presence of unmet needs in older adults is closely linked with care fragmentation (27), as it represents a gap in providing essential support and services. Unmet needs among home-dwelling older

adults can be the result of two situations: when services are completely unavailable, or when the services received are insufficient to meet their health or social care needs (30–33). Services needed can include healthcare services (i.e. health promotion, prevention, treatment, or rehabilitation services, or home support services (i.e. assistance with activities of daily living [ADLs], instrumental activities of daily living (IADLs), transportation, financial management, and basic household maintenance) (30,34). Approximately a quarter of older adults in the EU experience unmet needs for healthcare services (35). The prevalence of unmet needs for home support ranges from 11% (36) to 55% (32) depending on the definition or assessment methodology used.

While financial reasons and long waiting lists have been recognized as significant contributors to the presence of unmet needs for healthcare services in home-dwelling older adults (35), the underlying factors contributing to unmet needs for home support are not yet fully understood. The majority of studies have primarily focused on identifying individual-level factors associated with unmet needs for home support, with few studies investigating the influence of macro- and meso-level factors that contribute to the development of such needs (31,37,38). Failure to address the needs for home support services can have adverse consequences, such as lower quality of life for older adults, increased healthcare utilization, hospitalizations, institutionalizations, and mortality (31,34,36,39). Furthermore, unmet needs for home support have been linked to an increased rate of onset of frailty among home-dwelling older adults (34). This underscores the importance for developing innovative solutions that facilitate a comprehensive identification of the complex health and social care needs of home-dwelling older adults, while providing the necessary multidisciplinary support to meet those needs. Integrated care emerges as a promising intervention to bridge these gaps and holistically address the unmet needs of this population, especially those who are frail.

## 1.4. Integrated Care for frail older adults

### 1.4.1. Integrated care: a complex intervention

Integration of care has been proposed as an approach to meet the needs of frail older adults and mitigate fragmented care (40,41). Numerous studies have indicated its potential for positively influencing patient and service outcomes, as well as lowering healthcare costs (42–46). Organizations like the World Health Organization (WHO) (47) and the Swiss Federal Office of Public Health (48,49) have recommended the advancement of policies to implement integrated care. Yet there is no consensus on the definition of integrated care, with several definitions found in literature (27,49,50). For example, the WHO defines integrated care as "*health services that are managed and delivered in a*

*way that ensures people receive a continuum of health promotion, disease prevention, diagnosis, treatment, disease management, rehabilitation and palliative care services, at the different levels and sites of care within the health system, and according to their needs, throughout their whole life*" (51). On the other hand, integrated care may be seen through the patients perspective as the possibility to "*plan their care with people who work together to understand them and their carer(s), allow them control, and bring together services to achieve the outcomes important to them"* (52). Despite the differences in perspective, all these concepts of integrated care demonstrate two main characteristics: *first*, it entails the integration of fragmented care systems to form a whole; and second, this integration must end up in delivering care or assistance to people in need (52). Thus, for frail home-dwelling older adults, integrated care could be defined as efforts to deliver coordinated and multidisciplinary care by two or more care providers, communicating and cooperating within or across different sectors, centered on the needs of the older adult (27,42).

Integrated care is considered a complex intervention due to the number of behaviors, groups, settings, and levels targeted, the number of components involved, and skills required to deliver it (27,42,53). Many taxonomies and frameworks have been developed to conceptualize it (27,50,52,54,55). For example, integrated care can be conceptualized according to the *form* it takes, including horizontal integration (between care providers), vertical integration (across one care service); sectoral integration (one sector), and whole-system integration, among others. (52). Alternatively, it can be categorized based on the *type* of integration (i.e. organizational, functional, cultural, technological) or the *level* at which the integration occurs (i.e. macro, meso and micro level). Furthermore, integrated care can be described in terms of its *process* (i.e. how it's organized and delivered), *breadth* (i.e. targeted diseases or population groups) and the *degree* (i.e. presence of informal or formal structures to deliver integrated care) of integration (50,52).

Several frameworks exist describing the *main components* of integrated care models for specific conditions or populations (55,56). For example, the WHO Integrated Care for Older People (ICOPE) approach recommends interventions that include comprehensive assessments, integrated care plans, shared decision-making and goal setting, self-management support, multidisciplinary teams, data sharing systems, community integration and supportive leadership, governance and financing mechanisms (57,58). Wagner's Chronic Care Model identifies six essential elements for comprehensive care programs targeting chronically ill patients: the health care system, community resources, self-management support, delivery system design, decision support, and clinical information systems (56). The diversity of how integrated care models are described has led to difficulties when trying to design, replicate, and evaluate them, as it is still not clear which components are capable of creating a

substantial impact (27,42). In recent years a novel framework has been created to address this issue—the SELFIE Framework for Integrated Care for Multimorbidity. This framework emerged with the aim of establishing a standardized taxonomy for the development, implementation, description, and evaluation of integrated care (27). This framework emphasizes a holistic comprehension of the individual within their environment while describing aspects of service delivery, leadership and governance, workforce, financing, technologies, medical products, and information and research across micro, meso, and macro levels (27). Nevertheless, this framework remains underused, with numerous studies primarily detailing components within the service delivery, leadership, governance, and workforce domains while ignoring the other three domains. (42).

But besides the complexity derived from the conceptualization of integrated care, achieving integration is a complex task in itself. There are many *barriers* at different levels which need to be overcome in order to integrate health and social care systems (27,42,53). These barriers include organizational cultural inertia to change, funding silos, non-supportive leaderships, non-acceptance of new professional roles and responsibilities within multidisciplinary teams, a lack of existing working relationships, and low credibility among community partners (53,59,60). These issues demonstrate the importance of having a strong understanding of the geographical, epidemiological, socio-cultural, socio-economic, ethical, legal, and political context where integrated care interventions will be implemented (61), in order to create strategies to overcome these barriers beforehand.

In the following sections, we will delve deeper in describing the challenges with assessing the impact of integrated care models for frail home-dwelling older adults. *First*, we will provide a summary of the evidence of the impact of integrated care models for frail home-dwelling older adults and the challenges related to its evaluation. *Second*, we will describe the context where the INSPIRE care model was tested. Finally, we will describe how implementation science methods are key for the evaluation of complex interventions, such as integrated care models.

### 1.4.2.Integrated care impact: challenges and opportunities

Despite international and national recommendations for implementing integrated care models to support frail older adults, evidence of their effectiveness remains inconclusive. For example, our research team conducted a systematic review and meta-analysis evaluating nurse-led integrated care models for home-dwelling older adults. While individual studies showed improved quality of life (62), fewer hospital admissions (63), reduced emergency department visits (64), and decreased mortality (65), these benefits were not consistently supported by our meta-analysis due to substantial outcome heterogeneity and variations in their assessment (42). A recent systematic review conducted by Briggs

and colleagues (2022) assessed the impact of multidimensional assessment and coordinated care for home-dwelling older adults, and reported a decrease in unplanned hospital admission (median follow-up of 14 months) (RR 0.83, 95% CI 0.70 to 0.99) but the impact on other outcomes was less clear (i.e. mortality [RR 0.88, 95% CI 0.76 to 1.02]; nursing home admissions [median follow-up of 12 months] [RR 0.93, 95% CI 0.76 to 1.14]) (43). Similarly, a recent Cochrane review of case management for integrated care of frail community-dwelling older people found little or no difference on mortality (RR 0.98; CI 0.84 to 1.15), nursing home admissions (RR 0.73, 95% CI 0.53 to 1.01) and hospitalizations (RR 0.91, 95% CI 0.79 to 1.05) compared to standard care (44). In view of cost-effectiveness, a systematic review by Looman et al. (2018) showed a limited evidence for the cost-effectiveness of integrated care interventions for frail older people due to limited cost savings and modest effects of the interventions and the poor-to-moderate methodological quality (66).

Failure to determine the effectiveness of integrated care models for frail home-dwelling older adults can be explained by several factors: First, the heterogeneity in the definition of integrated care in terms of organization, delivery, setting, and care providers involved (44) makes it difficult to compare and replicate different interventions. Second, a huge variability in the outcomes selected to evaluate the impact of integrated care models for home-dwelling older adults (42). Third, previous studies have primarily focused on more distal outcomes such as functional status or emergency department visits (68), despite integrated care models are predicted to have the greatest impact on factors such as improvements in older adults' care experiences and overall well-being (67,68). Finally, previous evaluations of integrated care have focused on measuring intervention effectiveness only, despite the vast evidence of how contextual factors influence integrated care models' impact (42,59,69). Thus, the evaluation of integrated care models requires not solely measuring effectiveness, but also incorporating process evaluations to discern whether unfavorable results stem from design limitations or implementation challenges (70).

Given the complex nature of integrated care models, it is recommended to first assess their feasibility in the specific context before proceeding to evaluate their effectiveness (54,71,72). By assessing its feasibility, potential refinements to the care model can be identified, uncertainties related to the evaluation design (e.g. reach, data collection, etc.) can be clarified and additional barriers to the implementation can be acknowledged (e.g. lack of adherence to the intervention, low acceptability, etc.) (54,73). While feasibility studies often focus on recruitment and protocol adherence, assessing implementation outcomes, like adoption, acceptability, and feasibility, is crucial (74). Such indicators offer tangible evidence of intervention efficacy in practice, helping identify necessary adaptations for successful implementation. However, to date only one study has published the results of the feasibility

assessment of an integrated care model specifically designed for home-dwelling older populations experiencing declines in their intrinsic capacity (75). While this study reported positive findings regarding the feasibility of the intervention in terms of number of participants enrolled and their adherence to follow-up evaluations, it did not assess the implementation of the intervention itself and its reach (75). Given the challenges of engaging home-dwelling older adults for community-based programs (76), evaluating the reach (i.e. the proportion of individuals receiving the intervention compared to those needing it) of this population becomes a crucial outcome in feasibility assessments of integrated care interventions.

### 1.4.3.Canton Basel-Landschaft: an ideal scenario to advance integrated care in Switzerland

While the Swiss health system is well-ranked in terms of quality of care, access, efficiency, and health indicators, it is also characterized for a tendency towards fragmentation (49). A decentralized healthcare system with distributed responsibilities among federal, cantonal, and municipal levels; a mandatory health insurance scheme managed by over 50 insurers; a varied mix of private and public providers, including individual practices, specialized institutions (e.g. homecare, long-term care), and large hospitals; intricate financing mechanisms involving diverse private and public sources, alongside out-of-pocket contributions; the lack of interoperable ICT systems; and until 2020, the absence of a federal framework to encourage care coordination across different levels, collectively have contributed to this phenomenon (49,77). Hence, the implementation of integrated care in the Swiss context presents different challenges and opportunities to be addressed.

In particular, Canton Basel-Landschaft (BL), comprising a population of approximately 298,000 individuals (78), holds the distinction of being the second-oldest canton in Switzerland, surpassed only by Ticino in terms of aged population (79). Official estimates anticipate that individuals aged 65 and older will constitute 29% of the overall population of BL by 2050 (80). In response to this demographic trend, BL introduced in 2018 a legal framework to address the needs of home-dwelling older adults and ensure high-quality of care provision (81). This law, known as the Elderly Care and Long-Term Care Act (APG) mandated the reorganization of the Canton's 89 municipalities into larger care regions, alongside the development of Information and Advice Centers (IAC) in each of these newly defined care regions (81). These IACs serve the purpose of assessing care needs and providing advice on ageing-related topics to older people and their family members, particularly in cases where transitioning to nursing homes is anticipated. This legal framework set a strong foundation to advance integrated care in the canton. In response to this, the University of Basel partnered with the canton BL to implement the

INSPIRE (ImplemeNtation of a community-baSed care Program for home dwelling senIoR citizEns) Project. The overall goal of the INSPIRE project is to advance person-centred integrated care to frail home-dwelling older adults in BL to meet their care needs, so they can stay at home as long as is possible. The INSPIRE project is also part of the TRANS-SENIOR project, which is an EU-funded initiative focused on preventing unnecessary care transitions and enhancing the quality of care during essential transitions.

### 1.4.4. The INSPIRE care project in Canton Basel-Landschaft

INSPIRE is a multiphase implementation science project aligned to the recommendations of the Medical Research Council Framework for the development and evaluation of complex interventions (54,82). This framework emphasizes the importance of developing and evaluating complex interventions systematically and rigorously to ensure their effectiveness and practicality. It differentiates four phases into complex intervention research: 1) development or identification of an evidence-based intervention; 2) assessing its feasibility; 3) evaluating its impact and 4) implementing it (54). Additionally, the MRC Framework considers that each phase has common core elements (e.g. context, stakeholders involvement, key uncertainties identification, intervention and program theory refinement, etc.), which need to be considered from the start and revisited at various stages of the implementation of a complex intervention (54). The INSPIRE Project was designed with three phases in order to develop, implement, and evaluate a community-based integrated care model for frail home-dwelling older adults.

The first phase consisted in *the development of the INSPIRE care model.* In this phase, a community-based integrated care model, its program theory, and a preliminary list of implementation strategies to overcome potential barriers to its implementation were developed. This care model aims to integrate health and social care service delivery for frail home-dwelling adults aged 75 years and older, who need coordination between two or more services, by promoting connectivity and collaboration within and between sectors at the micro level. The model includes four core elements (*1. Frailty screening; 2. Multidimensional assessment; 3 Development of individualized care plan and care coordination;* and *4. Follow-up*) and peripheral elements that can be adapted to facilitate its delivery (e.g., place to deliver the intervention; personnel delivering the intervention; frequency and duration, etc.). During this phase a review of evidence about core components of nurse-led integrated care models for home-dwelling older adults (42) and a contextual analysis was conducted (83). The contextual analysis contributed to understanding factors that may intervene with the implementation

of the integrated care model (83). Contextual data was obtained from surveys sent to key stakeholders, reviewing local, national and international reports, and the INSPIRE population survey (83,84). Data from this population survey, which aimed to understand the current and future needs of 75+ home-dwelling older adults living in the Canton BL (85), was included as part of this dissertation and served as the basis for chapter 3.

The second phase entails the *feasibility evaluation of the INSPIRE care model in an IAC of one care region of Canton BL.* During this phase uncertainties related to the implementation of the care model as well as the reach of the target population will be addressed. This dissertation is embedded in this phase and the data obtained in these analyses constituted the basis for chapters 4 and 5.

The third phase will focus on the *effectiveness evaluation* of the intervention using a hybrid design, in order to determine what impact the care model will have on the perception of person-centred care and gathering information about why the intervention succeeded or failed. The last phase has yet to be completed.

### 1.4.5.Implementation science: The key to successfully implement the INSPIRE Care Model

Given the complex nature of integrated care, it is key to have a more granular understanding of the mechanisms behind the impact of an integrated care model, such as the INSPIRE care model (42,44,69). This can be achieved by making use of implementation science methods. Implementation science is "the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practice into routine practice and as a result, improve the quality and effectiveness of health services" (86). These methods include: stakeholder involvement, contextual analysis, use of implementation science frameworks, selection of implementation strategies, evaluation of implementation outcomes, trans-disciplinary teams and hybrid implementation-effectiveness designs (82). By employing these methods, we can answer questions such as what, why, and how integrated care models work in real-world settings(87). Additionally, the utilization of implementation science methods, including implementation strategies, offers valuable tools to overcome multiple barriers and enhance the reach, adoption, and fidelity of an integrated care model (88).

The importance of using implementation science methods to unravel and facilitate the implementation of complex interventions, such as integrated care models, is now widely recognized. Institutions like the UK Medical Research Council or the National Institutes of Health (NHI) recommend

their use (54,89), as it has been proven that they make a substantial impact in accelerating the adoption of health interventions, while also ensuring sustainability beyond the research phase (89). Despite this, only a limited number of studies of integrated care models for home-dwelling older adults have incorporated implementation science methods during their development or evaluation(42), and none have tested its feasibility using these methods.

Therefore, this dissertation addresses this gap by incorporating implementation science methods in order to gain valuable insights into the effective implementation of integrated care in real-world settings. The findings obtained from this research will not only inform the progression to the next phase but also offer valuable guidance to other researchers aiming to implement integrated care in diverse contexts.

## 1.5. Research gaps and rationale for this dissertation

In order to contribute to a successful implementation of integrated care models for frail home-dwelling older adults in real world settings, this dissertation will address the following research questions:

- *What is the prevalence of unmet needs for home support among home-dwelling older adults and what factors are associated with these unmet needs?*

The presence of unmet needs in home-dwelling older adults can have a negative impact at patient and service levels (e.g. increased healthcare utilization, hospitalizations, and institutionalizations) and can contribute to the development of frailty. However, until now little is known about the presence of unmet needs for home support and which factors can contribute to its development. To address this gap, we will utilize data from the INSPIRE Population Survey to determine the prevalence of unmet needs and examine the macro, meso, and micro-level factors associated with this issue.

- *What implementation strategies can be utilized to successfully reach home-dwelling older adults?*

Community-based programs have encountered challenges in effectively reaching older adults residing in the community (76,90). Given that the potential public health benefits of these programs can only be observed if the intervention reaches the target population, we considered this a main starting point for our feasibility evaluation. Currently, there is a lack of evidence-based guidance on how to reach home-dwelling older adults. Therefore, this dissertation aims to address this gap by using

implementation science frameworks to identify effective strategies for reaching this population. The expected contribution of this study is to provide evidence on the use of an implementation science approach in selecting strategies that effectively reach vulnerable populations, specifically home-dwelling older adults.

- *Is it feasible to implement the INSPIRE care model in an IAC of a care region of Canton BL?*

Given the complexity of integrated care models, it is crucial to assess their viability in real-world settings and identify potential implementation barriers and challenges. However, there is limited research on the feasibility of integrated care models for home-dwelling older adults prior to evaluating their effectiveness (75). Therefore, the final part of this dissertation focuses on conducting a feasibility evaluation of the INSPIRE care model from multiple perspectives by looking at implementation outcomes such as acceptability, feasibility and fidelity from different perspectives. By conducting this evaluation, we aim to demonstrate the importance of feasibility assessments in identifying methodological and implementation challenges specific to integrated care models. This process allows for necessary adaptations aligned with the needs and context of the target population and setting before proceeding to evaluate their effectiveness. The insights gained from this evaluation can help researchers to make informed decisions about whether to proceed with large scale implementation and effectiveness evaluation of an intervention.

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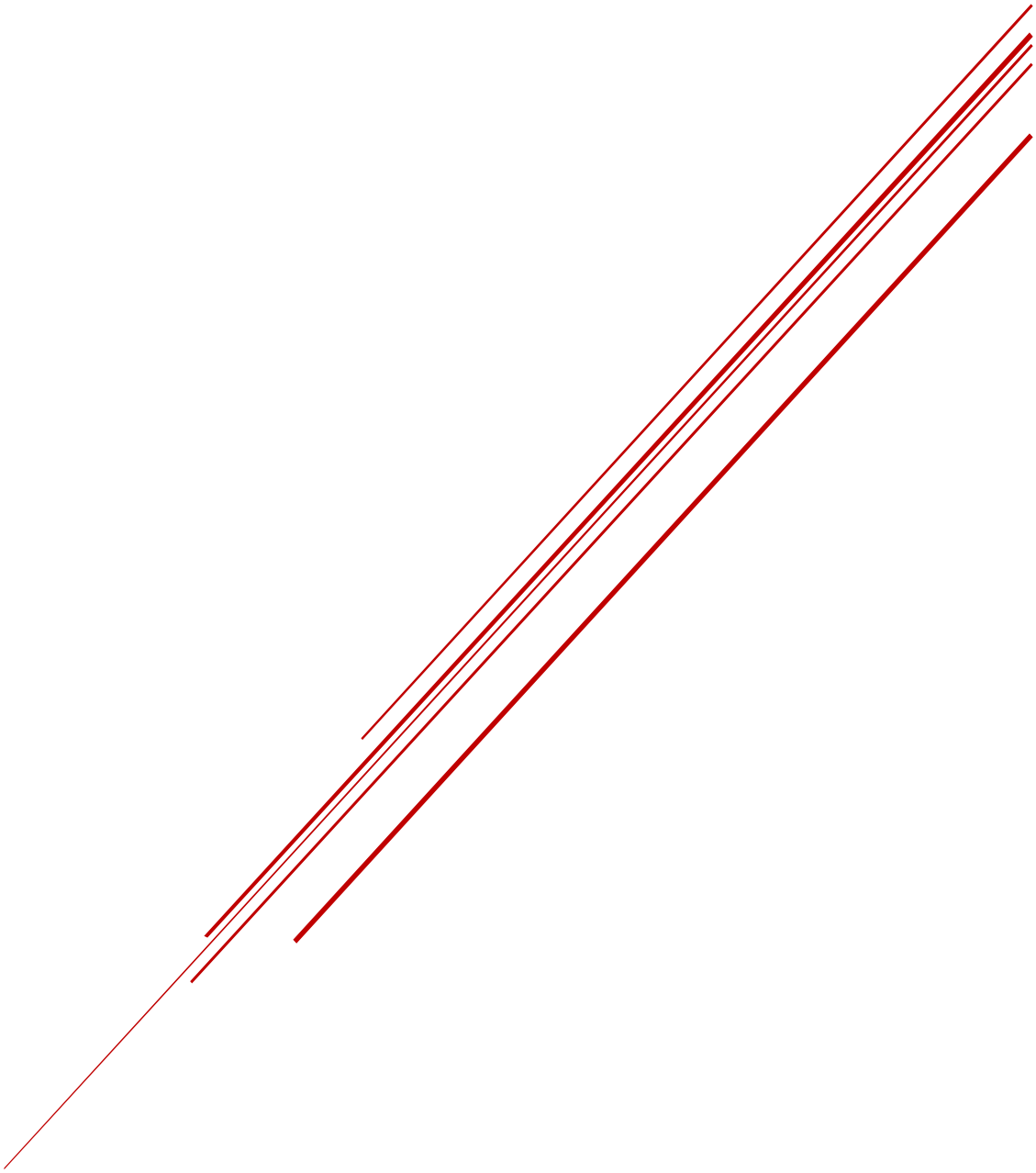
# CHAPTER 2:

## DISSERTATION AIMS



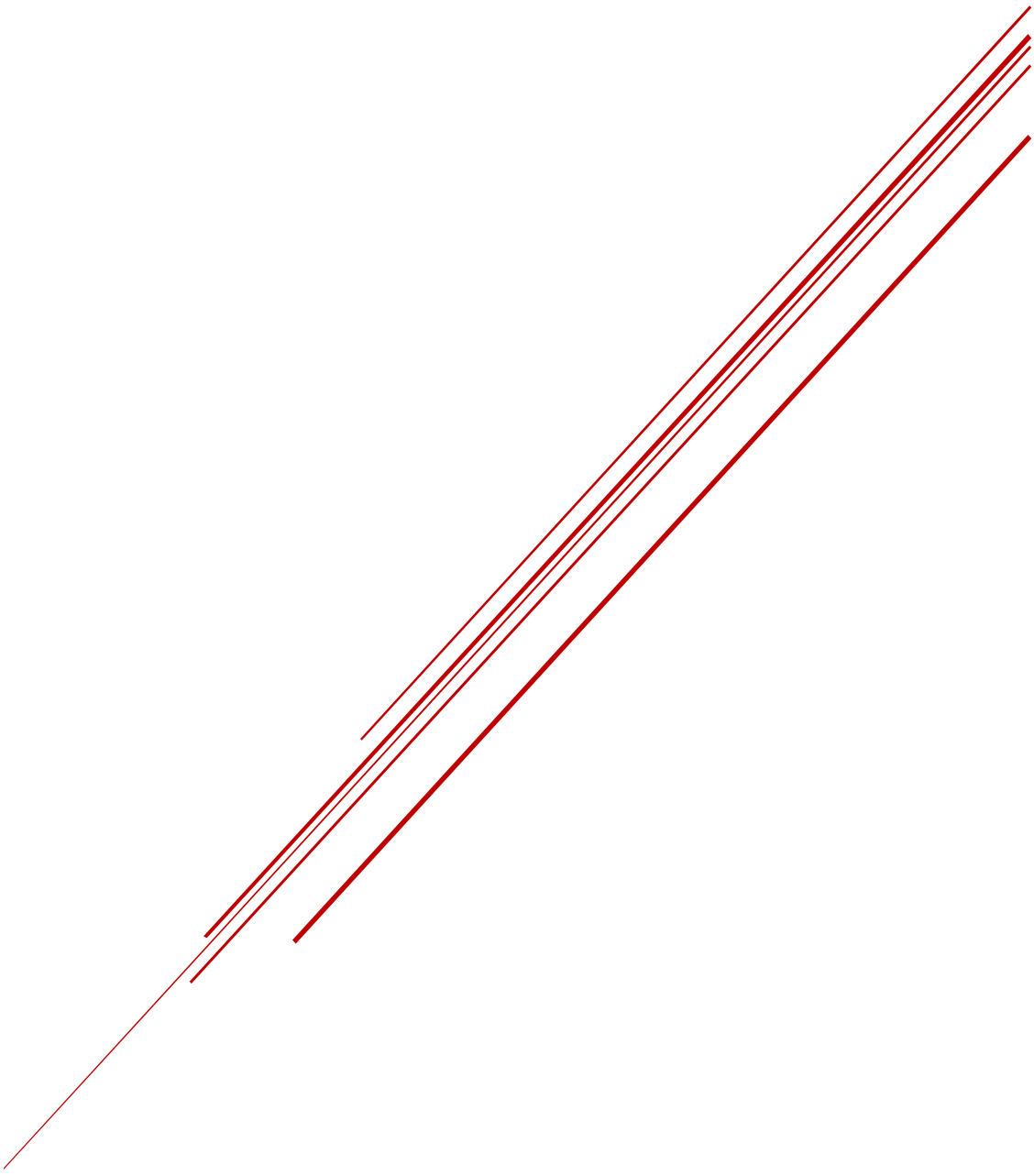
## 2.1 Dissertation aims

This PhD project includes the following aims:

1. To determine the prevalence of and identify the factors associated with perceived unmet needs for home support in home-dwelling older adults
2. To systematically identify implementation strategies to reach home-dwelling older adults who can benefit from integrated care
3. To evaluate the feasibility of the INSPIRE community-based integrated care model in an Information and Advice Center of a care region of Canton Basel-Landschaft

# CHAPTER 3:

## A multi-level perspective on perceived unmet needs for home support in home-dwelling older adults in the Swiss context: a secondary data analysis of a population study



# CHAPTER 3:

## A multi-level perspective on perceived unmet needs for home support in home-dwelling older adults in the Swiss context: a secondary data analysis of a population study

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## 3.1 Abstract

**Background:** Unmet needs for home support occur when any support services perceived by older people as needed are not being received. Not meeting these needs can negatively impact older adults' quality of life, and increase health care utilization, hospitalizations, institutionalizations, or death. To date there is no consensus in how to define and assess these unmet needs. In parallel, previous research of factors associated with unmet needs for home support has mostly focused on factors at the micro level. Thus, this paper aims to identify the prevalence of unmet needs for home support among a home-dwelling older population and the factors at the macro, meso and micro levels contributing to them.

**Methods:** Using an ecological approach we identified multi-level factors associated with the presence of unmet needs for home support among the home-dwelling older population (aged 75+) in Switzerland. This is a secondary cross-sectional analysis of the INSPIRE Population Survey of home-dwelling older adults (n=8,508) living in Basel-Landschaft in Switzerland, conducted as part of the TRANS-SENIOR Project. Prevalence of perceived unmet needs for home support was self-reported, using a dichotomized question. Multiple logistic regression analyses were performed to investigate the associations of factors at each level with unmet needs for home support.

**Results:** 4.3% of participants reported unmet needs for home support, with a median age of 81 years. 45.1% had private health insurance and 6.3% needed additional government support. Being a recipient of other type of government support (OR=1.65; 95% CI=1.17 - 2.29) (macro-); the use of transportation services (OR=1.74; 95% CI= 1.15 - 2.57) (meso-); and feeling depressed (OR=1.40; 95% CI=1.06 - 1.85) or abandoned (OR=2.60; 95% CI=1.96 - 3.43) (micro-) increased odds of having perceived unmet needs for home support. Having a private health insurance (macro-) (OR=0.63; 95% CI= 0.49 - 0.80), speaking Swiss-German (OR=0.44; 95% CI=0.24 - 0.88) or German (OR=0.47; 95% CI=0.24 - 0.98), having a high level of education [primary (OR=0.48; 95% CI=0.24 - 1.02); secondary (OR=0.49; 95% CI= 0.25 - 1.03); tertiary (OR=0.38; 95% CI= 0.19 - 0.82); other (OR=0.31 (0.12 - 0.75)], having a high score of self-perceived health status [score ≥76 (OR=0.42; 95% CI=0.20 - 0.96)] and having informal care (OR=0.57; 95% CI=0.45 - 0.73), among others (micro-) were associated with decreased odds of having perceived unmet needs for home support.

**Conclusions:** Our study findings highlight the role of socio-economical inequality in the perception of unmet needs for home support in home-dwelling older adults. In order to address unmet needs in home-dwelling older adults, healthcare leaders and policy makers should focus on strategies to reduce socio-economic inequalities at the different levels in this population.

**Keywords:** home-dwelling older adults, unmet needs, home support, ecological model, socio-economical inequality

## 3.2 Background:

Unmet needs in home-dwelling older adults occur when services are not received or are insufficient to meet health care or social care needs [1–4]. Services needed can include health care support such as promotion, prevention, treatment, or rehabilitation services as well as home support such as support services to perform activities of daily living (ADL), instrumental activities of daily living (IADL), transportation, finances, or basic maintenance [1, 5]. Failure to meet the needs of health care or home support services can result in a lower quality of life of the older adult, increased health care utilization (e.g., physician visits) and an increased risk of hospitalizations, institutionalizations or death [2, 5–7].

The assessment of unmet needs for home support can be conducted in different ways, either a professional identifies them using standardized questionnaires, or it is self-reported by the older person, or a proxy respondent [1, 3]. But most of the time, this assessment focuses only on a specific type of support needed [3, 6]. For instance, in a study in the UK on unmet needs for home support, 55% of adults aged 65 and over reported unmet needs to perform ADL, and 24% to perform IADLs [3]. In the US, 11% of older adults of 65 years and more reported unmet needs for transportation [6]. Despite the attempt to define and measure unmet needs for home support, there is no consensus on the concept and how to assess it in older adults [4]. The most used definition involves asking the older person about their difficulties to perform ADLs or IADLs. When those difficulties are present, and no- support is provided, this is defined as an unmet need. However, this definition does not incorporate the older person's own perspective of whether their needs are met, instead assuming that once help is provided the need is met [4, 8]. Another disadvantage is that it is a task-oriented definition (e.g. support to get dressed), leaving out important areas such as social interaction and companionship [9]. An alternative approach involves asking the person directly whether they perceive that their needs are met or not. A consideration in this definition is that some older adults will suggest that their needs are unmet even when they are receiving help, and this could reflect that the services received are not enough or not fully suitable [4]. Therefore, in the current paper we refer to unmet needs for home support as any support for everyday activities that older people perceive as necessary but are not being received.

In order to better understand the factors that influence the older population's health and capacity to cope with everyday activities, it is crucial to consider the complex environmental context in which the home-dwelling older person is embedded. Hence, employing an ecological model can provide insight into how the older person's perceived problems and needs (micro level) interact with the overlapping layers of environmental contexts (the macro and meso levels), surrounding the older adult [10]. To date, most studies on unmet needs for home support have focused on factors related directly to the

individual (micro level). Being older, female, living alone, having a lower socioeconomical status, residing in a rural area, having a poor self-rated life satisfaction and self-rated health have been associated with having unmet needs for home support [2, 11, 12]. There have been few efforts to explore how services in the community (meso level) and the system at large, e.g. national policies (macro level) are associated with meeting needs for support at home in older adults. Blake and colleagues reported that lack of transportation, geographical distances, higher costs of services, and unawareness of the services available or how to gain access to them, contribute to unmet needs in this population [9]. Similarly, the lack of budget, legislative support, or strict requirements to access support services have been denoted as factors of the system that contribute to unmet needs [6]. To the best of our knowledge, none of the previous studies have attempted to investigate the impact of macro, meso, and micro factors on unmet needs for home support using this ecological perspective.

To allow all people to retire with a considerable financial autonomy to cover their basic needs and remain active in the community, Switzerland instituted an old-age insurance system in 1947 [13]. Additionally, the country introduced a reform in the health system in 1994 delegating, for example, the provision of long-term care (nursing homes and home care services) to Cantons [14]. While evidence on the prevalence of unmet needs for support among older adults in Switzerland is lacking, data of the Federal Statistical Office demonstrated that 40.9% of older adults report some limitations in their daily activities [15]. This is in contrast with the 2.7% of older men and 4.5% of older women that reported the use of home support services [15]. Despite the insurance system for old age, and the high decentralization for the provision of services, the fact that only a small proportion of Swiss older adults are using home support services justifies the need to gain a better understanding of factors at both macro and meso levels, associated with unmet needs for home support. This information could help develop targeted interventions to improve support needs coverage. Therefore, the aim of this paper is to identify the prevalence of unmet needs for home support and the factors at the macro, meso and micro levels which contribute to them among a home-dwelling older population.

### 3.2.1 Theoretical background & study framework

As there is currently not a well-defined framework to assess unmet needs for home support in home-dwelling older adults, we developed a framework integrating the main concepts of two theoretical models: the Andersen Behavioral Model of health services use and the Integrated Care for Older People (ICOPE) implementation framework [16, 17]. The Andersen behavioral model has been widely used to describe factors associated with older adults' unmet needs for health care [6, 11, 12, 16, 18]. It highlights the impact of predisposing factors of an individual on their enabling factors to use existing

services, without considering factors at other levels (i.e. macro and meso levels) [16]. On the other hand, the ICOPE framework, developed by the WHO, is grounded in the ecological model and constitutes a guide to address the needs of older adults with multimorbidity at three different levels (macro, meso and micro) [17]. Yet, it lacks the operationalization of the concepts described by Anderson. Consequently, using the ecological perspective of the ICOPE framework and guided by the concepts defined by Andersen, our study framework describes the interaction of factors at each level (macro, meso and micro level), and their impact on the development of the older adult's needs. The macro level includes factors related to health and social care system, the economical context and the provision of formal care support; the meso level includes factors related to the available care services in the community and the micro level includes the enabling and predisposing factors of the older person (Figure 1).

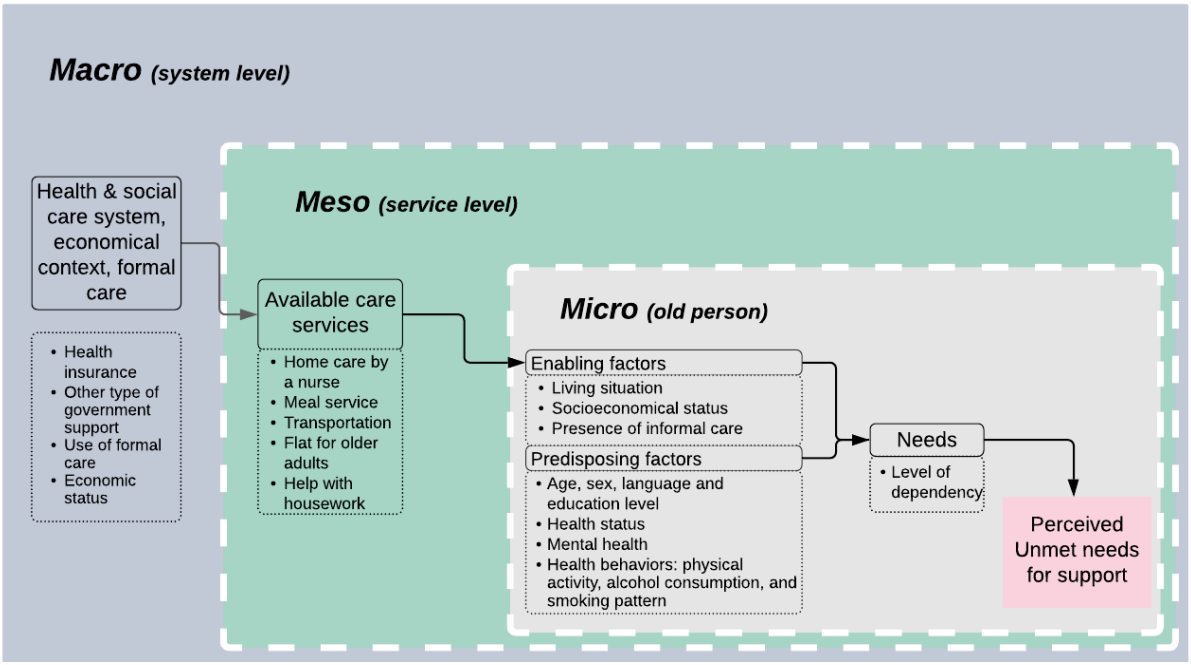


Fig 1. Study Framework

## 3.3 Methods

### 3.3.1 Design and sample

This is an exploratory secondary analysis using data from the INSPIRE (ImplemeNtation of a community-baSed care Program for home dwelling senIoR citizEns) Population Survey of older adults of the Canton of Basel-Landschaft (BL) (Bevölkerungsbefragung Basel-Landschaft in German). INSPIRE is a multi-phase implementation science project designed to develop, implement, and evaluate an integrated care model for home-dwelling older adults in the Canton BL in Switzerland [19]. The INSPIRE Population Survey was conducted between March and August 2019 as part of the contextual analysis of the

INSPIRE project, to determine the current state, wishes, and needs of older adults with regard to their health, social support, and life situation.

### 3.3.2 Sample:

Following a population-based approach, the INSPIRE paper questionnaire, in German language, was mailed to all home-dwelling older adults who were 75 or older (29,045 people), living in urban and rural areas of the Canton BL in 2019. 8,846 questionnaires were received back (total response rate of 30.7%) [19, 20]. In the current study, our sample included home-dwelling older adults aged 75 years old and over, living in the Canton BL. Hence, the total sample included in the analysis was 8,543 older adults (see additional file 2).

### 3.3.3 Setting:

The old-age insurance system of Switzerland relies on three pillars: first pillar, state provision (funded through old-age pension Insurance - OASI); second pillar, occupational pension insurance (only for salaried workers); and third pillar, private provision. When this system is not enough to cover basic living costs, additional benefits are granted (i.e. supplementary benefits or helplessness compensation) [21]. The organization of long-term care (institutional care and home care services) is a responsibility of Cantons, but it is frequently delegated to municipalities (or communes). Institutional care is provided by nursing homes, while home care services are provided by public or private social care organizations [14].

### 3.3.4 Variables and Measurements:

The methodology for the development of the questionnaire for the INSPIRE Population Survey has been published elsewhere [19, 20]. The selection of variables used in the current paper are below. Further details are summarized in **additional file 1.**

Outcome variable

Unmet needs were identified when a person responded that the support they received in everyday life did not meet their needs. This question did not include a differentiation of the type of needs (social or health). A single question with a dichotomized answer (yes/no) was used for this purpose, where a positive answer corresponded to the presence of unmet needs.

*Predictor variables at the macro level*

Health insurance type was assessed by asking the older person the type of health insurance that they have. The variable health insurance was dichotomized as compulsory to include older adults who only had the universal health insurance, and private insurance to include older adults who had semi-private or private health insurance.

Other type of government support was determined by creating a single variable that combined the affirmative answers to either of these two questions: do you receive supplementary benefits? (yes, no or I don't know), and/or do you receive helplessness compensation? (yes, no or I don't know).

Use of formal care was measured by asking the older adult from which kind of care organizations they receive regular support in everyday life. The question of the survey used in this study, that inquired about the organizations that bring support to the older adult in regular basis included the following options of organizations: Spitex (non-profit), Alzheimer's Association, Parkinson's association, Diabetes Association, Red Cross Baselland, Pro Senectute. We selected positive answers on the use of the two home care services (Spitex and Pro Senectute) only, as we were interested in organizations that provide home care services while the other organizations are focused in providing support according to the medical condition.

Economic status was determined using the data of the Swiss Federal Tax Administration of 2017. It corresponds to the gross income minus social security contributions (i.e. payments for unemployment insurance and other elements of obligatory social security, also payments to pension funds) and is corrected for household size and composition [22]. The variable was categorized as low income, middle income and high income for the Canton BL, using the tertiles based on the distribution of the sample. The postal code was used to identify the income category for each individual included in the study.

### Predictor variables at the meso level

Use of different support services like meal service, transport services (special transportation for disable people), flat for older adults, nursing care at home, and help with housework was measured by asking older adults about the kind of help that they used or needed in the previous year (2018). This question included a dichotomized answer (yes/no) for each service inquired.

### Predictor variables at micro level

<u>Enabling factors</u>

The living situation was assessed by asking the older person about the number of family members living with them in the same household. This question was developed by the research team. For the analysis, two categories were created: living alone or living with significant others. Living with significant others included all the older adults who referred to live with the spouse, siblings, adult children, other adults or a professional caregiver.

Socioeconomical status was determined by calculating the individual income of the older adult by dividing the income of the household by the number of people in the household, following the recommendations of the Swiss Centre of Expertise in the Social Sciences (FORS Guide) to measure income in surveys [23]: an equivalence scale is used for the number of people in the household (1.53 for two persons, 1.86 for three persons, and 0.28 for each additional person living in the household) [23]. Categories of the household monthly income were adjusted using the midpoint of the income band (e.g., 4,500 for income category 3,000 – 6,000) [23]. 2,495 Swiss francs (USD: 2647) was used as a threshold to consider a person at-risk-of-poverty, which represents a disposable income equivalent to less than 60 percent of the median in Switzerland [24].

The presence of informal care was obtained by asking to the older person their current source of support, with the following options: family members of the same age (e.g. spouse, partner), younger family members (e.g. children, grandchildren), friends and neighbors, or I don't need. For the analysis, this question was dichotomized (yes/no), where a positive answer grouped the support received by family members of the same or younger age, friends and neighbors.

Predisposing factors

The socio-demographic characteristics included age, sex and language. Education level was reported according to the Swiss Educational System, but for the analysis of this study was recategorized using the International Standard Classification of Education [25]. According to it, the following categories were created: Less than primary education: No school leaving certificate; Primary education: elementary school; Secondary education: completed training, gymnasium; Tertiary education: university, University of Applied Sciences / Technical University.

Health behaviors were captured through physical activity; alcohol consumption; and smoking status. For physical activity, participants were asked about the frequency of moderate and vigorous physical activity and muscle-strengthening activities practiced in a typical week. The level of physical activity was defined according to the recommendations of the WHO (optimal level: 150 minutes of moderate-intensity aerobic physical activity per week; or at least 75 minutes of vigorous-intensity aerobic physical activity per week; or a combination of both; and the practice of exercises to strength the muscles and improve balance more than 3 times per week) [26]. This variable was dichotomized (optimal level/no

optimal level) considering as an optimal level an older adult who referred to practice physical activity according to the WHO recommendations. The level of alcohol consumption was captured by inquiring about the amount consumed per day. We considered as chronic high-risk consumption the consumption of 2 standard glasses/day for women or 4 standard glasses for men [27]. For smoking status, older adults were asked about their current smoking status. Three categories were created for the analysis: current consumers, past consumers, or never consumed-. Current consumer included all older adults who smoke daily and not everyday, past consumers included all older adults who smoked in the past but not at the moment and never consumed included all the older adults who referred that they have never smoked.

Health-related measures such as mental health was measured by using the psychological and social domains of the Groningen Frailty Indicator [28]. The psychological domain includes feeling miserable or depressed or feeling a general emptiness, while the social domain includes missing the company of other people and feeling abandoned. These questions included a yes/no answer, that was used for the analysis. Self-perceived health was extracted from the visual analogue scale (EQ VAS) of the EuroQol 5 Dimensions 5 levels (EQ-5D5L) instrument, where scores range from 0 (the worst health you can imagine) to 100 (the best health you can imagine) [29]. Four cut-offs were created (0-25, 26-50, 51-75 and 76-100) following the distribution of the data and according to the guide of the EuroQol, on how to report the EQ VAS score [29]. To identify the level of dependency of the older person we extracted information from the Lawton and Brody scale. This scale determines the level of dependency to perform eight instrumental activities of daily living (mode of transportation, housekeeping, shopping, food preparation, ability to handle finances, responsibility for own medications, ability to use the phone, and laundry) necessary to live independently in the community [30]. The summary score ranges from 0 (low function, dependent) to 8 (high function, independent). Inter-rater reliability was established at 0.85 and criterion validity has been defined using correlations of this scale with four other scales of functional status, identifying significant correlations among them [30].

### 3.3.5 Statistical analysis

Descriptive statistics for socio-demographic and health related variables are presented as frequencies, percentages, medians and interquartile ranges [IQR], as appropriate. No means or standard deviations were calculated due to the non-normal distribution of the data. Correlations have been tested using Cramer's V coefficients to calculate the strength of association between the predictor variables. Bivariate logistic regression analyses were done to explore the individual association of each factor with the outcome variable. Additionally, multiple logistic regression analyses were performed in order to

investigate the association of factors at the system (model 1), service (model 2) and individual levels (model 3) with the presence of perceived unmet care needs for home support. Model 4 explored the association of the predictors that were significant in the bivariate and multivariate analysis performed at each level with the outcome variable. For the multiple logistic regression, we used a backward approach, starting with a saturated model (all variables from each level included in the analysis) and gradually eliminating variables until we found a reduced model that best explained the data. The Akaike score (AIC) and the Bayesian Information Criterion (BIC) were used to determine the best model, considering that a lower AIC or BIC score displays a stronger model. The level of significance p-value was set at 0.05. The estimated coefficients of the regression models were transformed to odds ratio (OR). A multilevel analysis was not necessary as we calculated that only 0.30% of the individual variation in the perception of unmet needs for support was due to differences between municipalities (in intraclass correlation -ICC- values less than 5 are indicative of poor correlation).

The percentage of missing values of the outcome variable (perceived unmet needs) was 17%. Additionally, we found an important percentage of missing values in two variables: individual income (21%) and level of dependency (18%). Therefore, under the traditional listwise deletion method we would have had only 79% of the 8,503 older adults in the sample available for analysis. Data was primarily missing due to item nonresponse, and after the analysis of missing patterns, we considered our data to be missing at random (MAR). We identified that older adults with missing values on the outcome variable were those who didn't have private health insurance or didn't receive services such as formal care, care at home by a nurse, transportation services or meal services. For the variable individual income, we identified missing values based on age, sex, and education level, while for level of dependency it was age and sex. As our data met the recommendations of Jakobsen and colleagues (2017) for when to use multiple imputation (i.e. missing data is above 5% but below 40%, data was missing not only on the dependant variable, the MCAR assumption could not be plausible, and we consider our data MAR)[31] we applied multiple imputation by chained equations (MICE) to impute missing values. We used the default settings in the mice function to generate 5 imputed datasets.[32]. We used postal code, age, sex, nationality, language, level of education, self-perceived health, type of insurance, and not giving information about income as predictors for the imputation model. We conducted sensitivity analyses to check differences in distribution between the imputed and observed data and ensure that the results were not impacted by the imputation [33]. We are reporting here the data after the imputation. Data analysis was done using R version 4,0.2 [34].

## 3.4 Results

### 3.4.1 Participants characteristics

From the sample of 8,543 individuals, a total of 8,508 older people were included in the study, after excluding 35 cases with answers *I don't know* for the health insurance and other types of support variables (see additional file 2).

The age of the respondents ranged from 75 to 107 years, with a median age of 81 years; 48.2% were male, and 80.4% had Swiss nationality. More than two-thirds of the individuals had secondary or tertiary education, while the individual income was above the threshold for the majority of them (96.4%). Less than half of the respondents had a private health insurance (45.1%) and only 6.3% needed additional government support. From the respondents, approximately 12% had some level of dependency (a score ≤6 in the Lawton Instrumental Activities of Daily Living (IADL) Scale), but only 4.3% mentioned to have unmet needs for support. Support at home for everyday activities, care at home by a nurse and public transportation were the most common professional services used by the older adults; and 50.2% referred to receive informal support from partners, family or friends. Table 1 shows the characteristics of all participants (see table 1).

Table 1. Description of the included older participants (N=8,508)

| Characteristics | n (%) | Median [IQR] |
|---|---|---|
| Economic status by municipality | | |
| Low income | 1941 (22.8%) | |
| Medium income | 4023 (47.3%) | |
| High income | 2544 (29.9%) | |
| Health insurance | | |
| Compulsory | 4671 (54.9%) | |
| Private [a] | 3837 (45.1%) | |
| Other type of government support [b] | 532 (6.3%) | |
| | | |
| Use of formal care | 773 (9.1%) | |
| | | |
| Use of professional home care support | | |
| Nursing care at home | 577 (6.8%) | |
| Help with housework | 1299 (15.3%) | |
| Meal service | 217 (2.6%) | |

| | | |
|---|---|---|
| Transport service | 433 (5.1%) | |
| Flat for older adults | 80 (0.9%) | |
| Age | | 81 [78 - 85] |
| 75-80 | 4065 (47.8%) | |
| 81-85 | 2590 (30.4%) | |
| >85 | 1853 (21.8%) | |
| Sex | | |
| Female | 4408 (51.8%) | |
| Nationality | | |
| Switzerland | 6845 (80.5%) | |
| Germany | 820 (9.6%) | |
| France | 96 (1.1%) | |
| Other | 747 (8.8%) | |
| German speaking abilities | | |
| Swiss German as mother tongue | 6636 (78.0%) | |
| German as mother tongue | 1053 (12.4%) | |
| Good German | 718 (8.4%) | |
| Bad German | 101 (1.2%) | |
| Education [c] | | |
| Less than primary education | 81 (1.0%) | |
| Primary education | 1253 (14.7%) | |
| Secondary education | 4707 (55.3%) | |
| Tertiary education | 2076 (24.4%) | |
| Other | 391 (4.6%) | |
| Unmet needs for home support | 355 (4.2%) | |
| | | |
| Level of physical activity [d] | | |
| Less than optimal | 2946 (34.6%) | |
| Optimal | 5562 (65.4%) | |
| Chronic alcohol consumption | | |
| High-risk | 3301 (38.8%) | |
| Low-risk | 5207 (61.2%) | |

| | | | |
|---|---|---|---|
| Smoking status | | | |
| | Never smoked | 4746 (55.8%) | |
| | Current consumer | 591 (6.9%) | |
| | Past consumer | 3171 (37.3%) | |
| Mental Health [e] | | | |
| *Psychological domain (GFI)* | Feeling depressed | 1298 (15.3%) | |
| | Feeling anxious | 1284(15.1%) | |
| *Social domain (GFI)* | Feeling empty | 2007 (23.6%) | |
| | Feeling abandoned | 890 (10.5%) | |
| | Missing company of others | 3007 (35.3%) | |
| Self-perceived health status scores (EQ-5D VAS) [f] | | | 80 [70 - 85] |
| | 0-25 | 65 (0.8%) | |
| | 26-50 | 956 (11.2%) | |
| | 51-75 | 2831 (33.3%) | |
| | 76-100 | 4656 (54.7%) | |
| Individual income | | | |
| | Below threshold [g] | 303 (3.6%) | |
| Living situation | | | |
| | Living alone | 3059 (36.0%) | |
| Informal care by family or friends | | 4271 (50.2%) | |
| | | | |
| Level of dependency (IADL scale) [h] | | | 8.0 [7.0-8.0] |
| | 0-2 | 78 (0.9%) | |
| | 3-4 | 161 (1.9%) | |
| | 5-6 | 831 (9.8%) | |
| | 7-8 | 7438 (87.4%) | |

[a] Supplementary support and helplessness compensation; [b] Semi-private, private and flex health insurance; [c] International Standard Classification of Education; [d] Optimal physical activity= WHO recommendations; [e] GFI= Groningen Frailty Indicator; [f] EQ-5D VAS= visual analogue scale of the EQ-5D questionnaire; [g] Individual income below threshold= 2,495 Swiss francs (USD: 2647); [h] IADL=Lawton Instrumental Activities of Daily Living

### 3.4.2 Factors affecting perceived unmet needs for support at home

The bivariate logistic regression showed that having a private health insurance, being male, being proficient in German, having a level of education above primary, keeping a level of physical activity according to the recommendations of the WHO, having a self-perceived health status score above 25, having an income above the threshold, living with a significant other or having an IADL score of ≥ 7 were significantly associated with a lower risk of having perceived unmet needs for home support. On the other hand, receiving other type of support from the government, using nursing care at home and transportation services, or feeling abandoned or depressed were significantly associated with a higher risk for having perceived unmet needs for support at home (see additional file 3).

Model 1 (AIC= 2898.2), which included only the variables at the macro level, showed that having private health insurance was significantly associated with a lower risk for having perceived unmet needs for support at home, while receiving other type of government support significantly increased the risk. Model 2 (AIC= 2940.9), which included only the variables at the meso level, showed that the use of using care at home services and transportation services was significantly associated with having perceived unmet needs for support at home. In model 3 (AIC=2807.2), where we included the variables at the micro level, it showed that speaking Swiss German or German as a mother tongue, having at least a secondary level of education, keeping an optimal level of physical activity, having chronic-high risk alcohol consumption, having a score of self-perceived health status above 51, having an income above the threshold and having informal care lowered the risk of having perceived unmet needs for support at home. On the other hand, feeling depressed and feeling abandoned were significantly associated with having perceived unmet needs for support at home (see additional file 3).

Table 2 presents the odds ratio of the Model 4 (AIC=2773.3), which included all the significant variables of the bivariate and models 1, 2 and 3. This model showed that having private health insurance, speaking Swiss-German or German as a mother tongue, having a level of education above primary, keeping an optimal level of physical activity according to the recommendations of the WHO, having a chronic-high risk alcohol consumption, having a score of self-perceived health status above 76 and having informal care was associated with a lower risk of having perceived unmet needs for support at home. On the contrary, receiving other type of government support, using transportation services, feeling depressed and feeling abandoned were significantly associated with having perceived unmet needs for support at home (see table 2).

Table 2. Multiple logistic regression of perceived unmet needs for support at home by level (macro, meso, and micro) model 4 (N=8,508)

| | Model 4<br>OR (95% CI)<br>AIC= 2773.3<br>BIC= 2928.3 |
|---|---|
| Macro level | |
| Economic status by municipality (ref. low income) | |
| Middle-income | |
| High-income | |
| Private Health insurance (ref. Compulsory insurance) | 0.63 (0.49 - 0.80) * |
| Other type of government support (ref. no support) | 1.65 (1.17 - 2.29) * |
| Use of formal care (ref. no) | |
| Meso level | |
| Services used (ref. no) | |
| Nursing care at home | |
| Meal service | |
| Transport service | 1.74 (1.15 - 2.57) * |
| Flat for older adults | |
| Help with housework | |
| Micro level | |
| Male (ref. female) | 0.85 (0.65 - 1.11) |
| Age (ref. 75-80) | |
| 81-85 | 1.04 (0.81 - 1.34) |
| >86 | 0.80 (0.58 - 1.08) |
| German speaking proficiency (ref. bad German) | |
| Swiss German as mother tongue | 0.44 (0.24 - 0.88) * |
| German as mother tongue | 0.47 (0.24 - 0.98) * |
| Good German | 0.64 (0.32 - 1.34) |
| Education (ref. less than primary) | |
| Primary education | 0.48 (0.24 - 1.02) * |
| Secondary education | 0.49 (0.25 - 1.03) * |
| Tertiary education | 0.38 (0.19 - 0.82) * |
| Other | 0.31 (0.12 - 0.75) * |
| Physical activity (ref. no optimal) | |

| | | Model 4<br>OR (95% CI)<br>AIC= 2773.3<br>BIC= 2928.3 |
|---|---|---|
| | Optimal | 0.77 (0.61 - 0.96) * |
| | Chronic alcohol consumption (ref. low risk) | |
| | High-risk | 0.76 (0.58 - 0.99) * |
| | Smoking status (ref. never smoked) | |
| | Current consumer | |
| | Past consumer | |
| | Mental Health (ref. no) | |
| *Psychological domain* | Feeling depressed | 1.40 (1.06 - 1.85) * |
| | Feeling abandoned | 2.60 (1.96 - 3.43) * |
| | Self-perceived health status (ref. 0-25) | |
| | 26-50 | 0.60 (0.29 - 1.38) |
| | 51-75 | 0.50 (0.24 - 1.12) |
| | 76-100 | 0.42 (0.20 - 0.96) * |
| | Individual income (ref. below threshold) | |
| | Above threshold | |
| | Living situation (ref. living alone) | |
| | Living with a significant other | |
| | Informal care (ref. no informal care) | 0.57 (0.45 - 0.73) * |
| | Level of dependency (ref. ≤ 2) | |
| | 3-4 | |
| | 5-6 | |
| | 7-8 | |

*$P < 0.05$

## 3.5 Discussion

Using data of the INSPIRE Population Survey, we conducted a secondary analysis to assess the multi-level factors associated with unmet needs for home support among 8,508 home-dwelling older adults. We found that only 4.2% of older adults in the canton Basel-Landschaft perceived having unmet needs for home support, which is low compared to the prevalence reported in other high-income countries. For example, Canada reported a prevalence of perceived unmet needs for home support among older

adults of 75 to 79 years of approximately 58%; however they considered the presence of unmet needs for home support when the person or anyone in their household felt that home support was needed but was not received [4]. The UK, on the other hand, which determines the presence of unmet needs of home support based on the reported difficulty to perform one or more ADL or IADL, has reported a presence of unmet needs in older adults that ranges from 12.5% in the presence of difficulty to perform more than three ADL to 55% when only one ADL is considered [3]. The differences in the prevalence of unmet needs for home support in these high-income countries could be explained by the absence of a standardized definition of unmet needs for home support that can lead to an imprecise assessment and an overestimation of the real problem, as none of these measurements incorporates the perspective of the older adult about their needs [3, 6]. This highlights the importance of combining objective measurements and older adults' perspectives in longitudinal studies to obtain a more precise determination of the prevalence, considering that the onset of needs for home support in home-dwelling older adults can vary over time.

The multiple regression analysis, following an ecological approach, demonstrated that macro and meso level factors are correlated with unmet needs for home support and confirmed existing evidence about the role of micro level factors on the perception of unmet needs for home support.

We could identify that at the macro level, older adults who hold a private health insurance were less likely to have perceived unmet needs for home support than those with only a compulsory health insurance. Similar findings have been reported in a study among adults from 18 to 65+ years in the US, where higher levels of unmet needs for home support were likely to be present in uninsured individuals [35]. Traditionally, private health insurances can help to cover services not, or not entirely, covered by compulsory health insurances [36], and access to them is highly determined by the income level [36–38]. In our study only 45% of older adults had a private health insurance, which could somehow reflect the presence of economic inequality. Previous studies have shown the impact of economic inequality in the access to care, where people with lower incomes are significantly less likely to look for health and care services needed compared to those with higher incomes [39, 40]. In Switzerland, approximately 24% of older adults only receive the income provided by the first pillar of the old-age pension system (including other types of government support), being at risk of poverty, with less money to consume and pay, for example, for a private health insurance [15]. This could also explain why even when the older adults received other types of government support, they were more likely to have a higher perception of unmet needs for home support. It is noteworthy that we found these associations between individual unmet needs for home support and factors at the macro level in a high-income country like Switzerland. We therefore hypothesize that these determinants will have a stronger impact

on individual unmet needs for home support in older adults residing in low- and middle-income countries.

Our analysis revealed that at the meso level, only the use of transportation services (e.g. taxi, or door-to-door service for people with physical disabilities) was significantly associated to a higher perception of unmet needs for home support. The capacity to move from one place to another is crucial in old age, as it allows an older adult to meet basic needs, access healthcare services and maintain social interactions [41, 42]. A higher use of transportation services is often reported among older adults due to environmental characteristics, mobility limitations or the lack of a driver in their support network [42, 43]. Basel-Landschaft is traditionally considered an urban/rural canton, with greater geographical distances to access services and limited public transportation, making the use of transportation services more likely. The positive association that we found between unmet needs for home support and the use of transportation services could be related to the costs to access transport service. In Switzerland, the use of transportation services is subject to a direct payment, as it is not covered by the compulsory health insurance [44]. There could be circumstances when an older adult would prefer to pay for transportation services instead of other services, with the risk of developing unmet needs for home support. However, as we didn't have additional information regarding the frequency of the use of the service, these results need to be interpreted with caution.

At the micro level, we found that speaking Swiss German or German, having an education level above primary, having a chronic alcohol consumption, practicing an optimal level of physical activity, having a self-perceived health status above 76, and relying on an informal caregiver decreased the risk of perceiving unmet needs for home support in home-dwelling older adults. In the other hand, mental health factors such as feeling depressed or abandoned, increased the risk of perceiving unmet needs for home support. Our findings about language proficiency and education level are in line with previous studies that have shown how social disparities can place vulnerable people in a more disadvantageous situation [45]. For example, studies in Canada, UK, Norway and the U.S. have shown that language and education can become a barrier to navigate in the care system, either because older adults are not aware of the services, or due to the difficulty to communicate with others [3, 6, 11, 46]. Another explanation for these findings may be associated to the fact that a good level of education allows a person to contribute a higher amount to the pension system and keep private retirement savings [47, 48], so their incomes in old age are enough to cover their needs for support [15].

Although in our study the association between the living situation and the presence of unmet needs for home support was not significant, other studies have determined that it can be a strong predictor of unmet needs [3, 4]. Living alone can also lead to the development of depression, feelings of

abandonment, and the perception of unmet needs, as older adults do not have the amount of social interaction that they would like to have [9]. This coincides with the results of our multivariate analysis where older adults who were feeling depressed and/or abandoned were at a higher risk of having perceived unmet needs for home support, while those who rely on an informal caregiver showed a lower perception of unmet needs for support. Two hypotheses could explain this association between informal care and unmet needs for home support. First, older adults who are recipients of informal care are less likely to fully acknowledge or admit their needs for care and support, and take pride of being independent and able to take care of themselves [9]. Second, older adults living with the caregiver show a lower perception of unmet needs, as they can receive the support for little things that make their life more enjoyable, such as reminding them of medication, helping with eye drops, going with them to medical appointments, etc., whenever such support is needed. [9]. However, in our study we did not have further information about the informal caregivers, thus this deserves more attention in future studies.

In accordance to previous studies, our analysis demonstrated that a good self-rated health status and health behaviours such as an optimal level of physical activity were associated with a lower perception of unmet needs for support at home [2, 11, 12]. Although the use of questionnaires to measure physical activity in older adults is a widespread practice in large studies, to date there is no questionnaire with sufficient content validity, and reliability [49]. Thus, we could assume that some older adults could have over- or underestimated their physical activity levels. We also found a negative association between a problematic alcohol consumption and the perception of unmet needs for support at home. A possible explanation could come from the tendency to drink more observed in those older adults with a good perception of their own health, while those with a poor self-rated health status avoid the consumption of alcohol [50, 51]. Another explanation could be related to the fact that alcohol consumption is seen as a mean for enhancing social engagement with friends and relatives [52].

## 3.6 Methodological considerations

The strength of this study was the use of a population-based dataset to identify the prevalence and factors associated with perceived unmet needs for home support in older adults of a developed country using an ecological approach. As such, having a large sample size of 8,508 individuals allowed us to increase the accuracy of the estimates of the regression analysis. Yet, findings need to be seen in light of certain limitations. First, the major limitation of this study is the use of secondary data for the analysis. Second, the response rate of the original survey could be considered as low and hence a source of bias. However, this response rate was much higher than those previously reported using postal mail

as a delivery method in population surveys without any direct incentive for participation [53]. Additionally, we recognize that due to anonymous data collection used in this survey, we had no means of knowing whether the non-respondents were frail or cognitively impaired, which may affect the response rate, thus subjecting this study to additional selection bias. Third, the data used to determine the prevalence of perceived unmet needs for home support might not be enough to estimate the real magnitude of unmet needs among the Swiss older population. First, as the original data come from a cross-sectional study, we might be reporting the patterns of unmet needs for home support under a specific time and circumstances. The onset of needs is an unsteady process, as they can appear as a sudden incident, be the result of a chronic condition, age-related physiological changes or due to the loss of a spouse or source of support [9]; thus, a cross-sectional approach might not be adequate for determining the prevalence of unmet needs for home support. Also, we used a single self-reported dichotomous variable to compute the presence of perceived unmet needs for home support: the support provided matches their everyday life needs. We did not have additional information about the type of needs (e.g., health vs social), how often these needs were not met or their reasons why these needs were not met. Thus, we could be underestimating the presence of perceived unmet needs. Therefore, future studies should focus on using a definition of unmet needs that combines an objective measurement with the perspective of the older adult to understand the dynamics behind the perception of unmet needs for support among older adults in longitudinal studies. This new approach could provide us with a deep understanding of the reasons for unmet needs. Another consequence of the use of secondary data was the limited information available to determine the factors of the macro and meso level that were associated with the perception of unmet needs, using an ecological approach. Although we incorporated the average income per municipality as a way to enhance the macro level, and the use of different formal care services at the meso level this could have been not enough to represent the socio-economical situation and the dynamics behind the provision of formal care services in BL. Therefore, future studies could incorporate more socio-economical factors at the macro level and precise information about the provision of formal care at the meso level as our study demonstrated that factors at both levels are associated with the perception of unmet needs. Finally, given the federal system in Switzerland, where services are also organized at canton and municipality level, the generalizability of the results might be limited.

## 3.7 Conclusion

This study set out to determine the prevalence and the multi-level factors associated with the presence of perceived unmet needs for home support. Our findings determined a low prevalence of perceived

unmet needs in home-dwelling older adults of a high-income country like Switzerland, despite the methodological considerations for its measurement mentioned above. Additionally, the findings in this study highlight the role of socio-economical inequalities at different levels in the perception of unmet needs for home support among home-dwelling older adults, validating the use of ecological approaches for the analysis.

Overall, these findings provide valuable information for policy makers. Our findings show that socio-economical inequalities seem to play an important role in the perception of unmet needs for home support; hence a number of specific policies and practices should be addressed to reduce inequalities. For example, fiscal and monetary policies, or strategies to reduce out of pocket-payments should be considered. Providing higher incomes to home-dwelling older adults could allow them to pay for additional health and social care services not currently covered, and therefore reduce their perception of unmet needs.

Our findings also highlight the importance of obtaining the perspective of the older adult in the assessment of their needs for home support, and developing targeted interventions to improve the access to different care services and financial benefits in the community. This information supports the implementation of community-based integrated care models, like the INSPIRE care model, which is being implemented in the Canton BL.

## 3.8 Ethics approval and consent to participate

Prior to conducting the INSPIRE Population survey, the ethical approval was requested to the Ethics Commission Northwestern and Central Switzerland (Ethikkommission Nordwest- und Zentralschweiz – EKNZ). The EKNZ declared that the study was not subject to cantonal and federal legislation, as it was not considered a research study as defined by the Human Research Act Art. 2. Therefore, the EKNZ did not issue a formal ethical approval but concluded that the study did meet the general ethical principles for research involving human beings (cf. Art. 51 para. 2 Human Research Act). The methods used in this study were carried out in accordance with relevant guidelines and regulations and an informed consent was obtained from all participants in the study.

As this is a secondary analysis of the INSPIRE Population survey, the approval of the ethics committee for the present study was not required.

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## 3.10 Supplementary information

### 3.10.1 Additional file 1

**Table 1.** Levels, categories and variables used for the analysis.

| Domain | Variable | Scale and reference (if applicable) | Items | Answer options | Psychometrics (if available) |
|---|---|---|---|---|---|
| **Outcome variable** | | | | | |
| Unmet needs | Support received | | Support received in everyday life | Yes, I am getting the support I need<br>• No, I need more support | |
| **Macro level** | | | | | |

| Domain | Variable | Scale and reference (if applicable) | Items | Answer options | Psychometrics (if available) |
|---|---|---|---|---|---|
| Health insurance | Health insurance | | Type of health insurance that the older adult has | • Compulsory<br>• Private<br>• No insurance | |
| Other type of government support | Other type of government support | | Recipient of supplementary benefits and/or helplessness compensation | • Yes / No /Don't know | |
| Use of formal care | Provision of formal care | | Use of formal care services (i.e. Spitex and Pro Senectute) | • Yes / No | |
| Economic status by municipality | Municipality's average equivalent taxable income | Swiss Federal Tax Administration, 2017 [22] | Gross income minus social security contributions (i.e. payments for unemployment insurance and other elements of obligatory social security, also payments to pension funds) and is corrected for household size and composition | • Low income<br>• Middle income<br>• High income | |
| Meso level | | | | | |

| Domain | Variable | Scale and reference (if applicable) | Items | Answer options | Psychometrics (if available) |
|---|---|---|---|---|---|
| Use of support services | Support services | | Support received in the previous year by different providers | • I didn't need any help in 2018<br>• Nursing care at home (Public Organization or Private Organization)<br>• Help with the housework (Public Organization or Private Organization)<br>• Meal service<br>• Transport and assistance | |
| **Micro level** | | | | | |
| *Predisposing factors* | | | | | |
| Socio-demographics | Age | | Year of birth | | |
| | Sex | | Sex | • Male<br>• Female | |
| | Education level | | Highest level of education | • No school-leaving qualification<br>• Elementary school<br>• Completed education<br>• High school<br>• Technical college / technical university<br>• University<br>• Don't know<br>• Other | |
| | Nationality | | Country of birth | • Switzerland<br>• France<br>• Germany<br>• Others | |
| Health behaviors | Level of physical activity | | Moderate and vigorous practice of physical activity and muscle-strengthening activities practice in a typical week | Moderate/vigorous physical activity<br>• Less than 30 minutes<br>• 30-74minutes<br>• 75 minutes or more<br><br>Muscle-strengthening | |

| Domain | Variable | Scale and reference (if applicable) | Items | Answer options | Psychometrics (if available) |
|---|---|---|---|---|---|
| | | | | • At least once a week<br>• Less than once a week<br>• Never | |
| | Chronic alcohol consumption | Chronic high-risk consumption is the consumption of 2 standard glasses/day for women or 4 standard glasses per day for men [27]. | Amount of alcoholic consumption per day | • 0 beverages<br>• 1-2 drinks<br>• 3-4 drinks<br>• 5 or more drinks | |
| | Smoking status | | Current or past consumption | • Yes, daily<br>• Yes, not everyday<br>• No, but I was a smoker<br>• No, never | |
| Mental health | Phycological domain | Groningen Frailty Indicator [23] | • Feeling miserable or depressed<br>• Feeling a general emptiness | • Yes / No | Pearson r = 0.556 [49] |
| | Social domain | | • Missing the company of other people<br>• Feeling abandoned | • Yes / No | Pearson r = 0.534 [49] |
| Health status perception | Self-perceived health status | EQ 5D 5L Scores range from 0 (the worst health you can imagine) to 100 (the best health you can imagine) [24]. | Current health perception | • Scale from 0 to 100 | test–retest reliability s = 0.78 [38] |

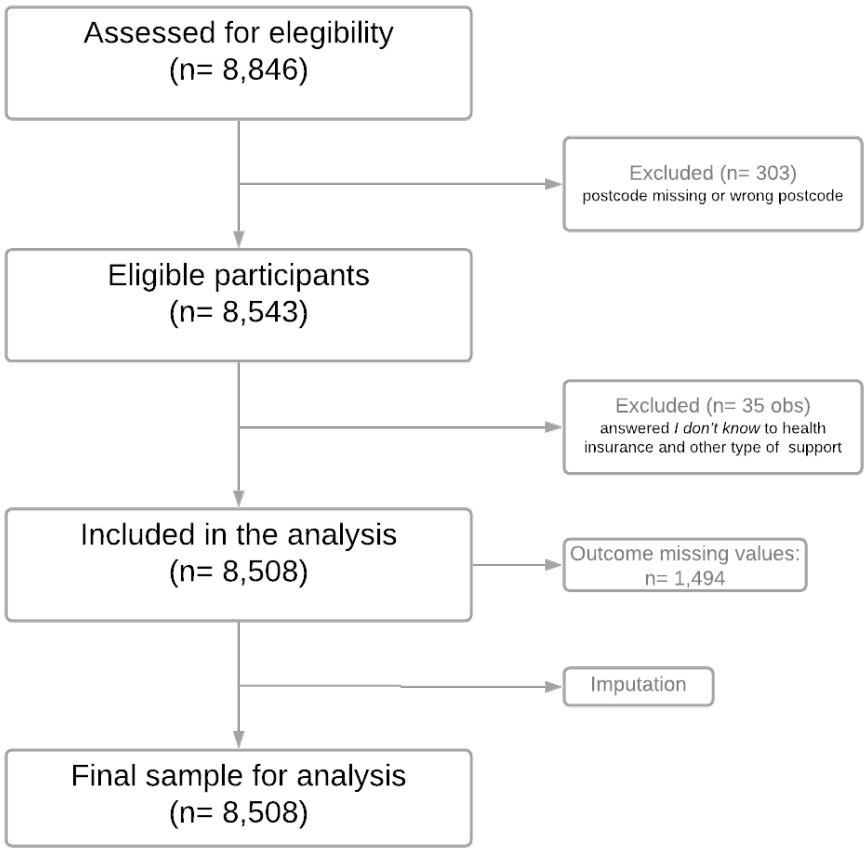
| Domain | Variable | Scale and reference (if applicable) | Items | Answer options | Psychometrics (if available) |
|---|---|---|---|---|---|
| Needs | Level of dependency | Lawton-Brody scale [27]. The summary score ranges from 0 (low function, dependent) to 8 (high function, independent) | Mode of transportation | • I ride a bicycle / e-bike I drive my own car<br>• I use public transport<br>• I order and use a taxi on my own, but no public transport<br>• I use public transport in company<br>• I make limited journeys in a taxi or car in company<br>• I can't move outside the house anymore | Inter-rater reliability = 0.85, |
| | | | Housekeeping | • I don't have any problems with my daily activities.<br>• I have slight problems with my daily activities<br>• I have moderate problems with my daily activities.<br>• I have big problems to do my everyday activities<br>• I am not in a position to pursue my everyday activities | |
| | | | Shopping | • I can do all my shopping independently<br>• I can only do small purchases independently<br>• I need help shopping<br>• I'm not able to do any shopping | |

| Domain | Variable | Scale and reference (if applicable) | Items | Answer options | Psychometrics (if available) |
|---|---|---|---|---|---|
| | | | Food preparation | • I plan and cook meals independently<br>• I need help preparing meals<br>• I warm up the meals prepared by other people<br>• The meals must be prepared ready to eat | |
| | | | Ability to use the phone | • I use the phone independently<br>• I'm just dialing some known numbers<br>• I pick up the phone, but I don't dial on my own<br>• I don't use the phone at all | |
| | | | Do the laundry | • I can wash the laundry myself<br>• I can do small laundry, e.g. socks wash<br>• My laundry must be done completely by others | |
| | | | Ability to handle medications | • I am taking my medication on my own in exact dosage and at the correct time<br>• I take prepared medications correctly (e.g. in doses)<br>• I cannot manage the correct intake of medication on my own. | |

| Domain | Variable | Scale and reference (if applicable) | Items | Answer options | Psychometrics (if available) |
|---|---|---|---|---|---|
| | | | Ability to handle finances | • I manage financial transactions independently (budget, cheques, deposit, bank transfer)<br>• I can make the daily, smaller expenses, but I need help with transfers and bank transactions<br>• I'm no longer able to handle money | |
| *Enabling factors* | | | | | |
| Socioeconomical status | Individual income | 2.495 Swiss francs was used as a threshold to consider a person at-risk-of-poverty. It represents a disposable income equivalent to less than 60% of the median in Switzerland [24] | Monthly income of the older person | • Below threshold<br>• Above threshold | |
| Living situation | Living arrangements | | Number of people living in the same household with the older person | • Number of people living in the same house | |
| Informal caregiver | Source of care | | Source of regular support in everyday life | • Family members of the same age (e.g. spouse, partner)<br>• Younger family members (e.g. children, grandchildren)<br>• Friends and neighbors<br>• I don't need | |

### 3.10.2 Additional fie 2

**Flowchart of sample selection**



## 3.10.3 Additional file 3

**Table 2.** Bivariate logistic regression and multiple logistic regression (models 1 -3) of perceived unmet needs for home support by level (macro, meso, micro) (N=8,508)

| | Bivariate analysis OR (95% CI) | Model 1 OR (95% CI) AIC= 2898.2 BIC= 2940.5 | Model 2 OR (95% CI) AIC= 2940.9 BIC= 2983.2 | Model 3 OR (95% CI) AIC= 2807.2 BIC= 2990.5 |
|---|---|---|---|---|
| Macro level | | | | |
| Income by municipality (ref. low income) | | | | |
| Middle-income | 1.11 (0.85 - 1.46) | 1.22 (0.93 - 1.60) | | |
| High-income | 0.87 (0.64 - 1.19) | 1.07 (0.78 - 1.46) | | |
| Private Health insurance (ref. Compulsory insurance) | 0.52 (0.41 – 0.65) * | 0.55 (0.43 - 0.70) * | | |
| Other type of government support (ref. no support) | 2.81 (2.05 – 3.79) * | 2.44 (1.76 - 3.32) * | | |
| Use of formal care (ref. no) | 1.36 (0.97-1.87) | 1.12 (0.79 – 1.56) | | |
| Meso level | | | | |
| Services used (ref. no) | | | | |
| Nursing care at home | 1.69 (1.18 – 2.37) * | | 1.49 (0.99 – 2.21) * | |
| Meal service | 0.88 (0.39 – 1.67) | | 0.59 (0.26 – 1.18) | |
| Transport service | 2.20 (1.52 – 3.12) * | | 2.06 (1.37 – 3.01) * | |
| Flat for older adults | 0.59 (0.10 – 1.87) | | 0.57 (0.09 – 1.83) | |
| Help with housework | 1.21 (0.91 – 1.58) | | 0.99 (0.71 – 1.34) | |
| Micro level | | | | |
| Male (ref. female) | 0.75 (0.60 – 0.93) * | | | 0.83 (0.62 – 1.10) |
| Age (ref. 75-80) | | | | |
| 81-85 | 1.19 (0.94 – 1.51) | | | 1.05 (0.81 - 1.34) |
| >86 | 0.93 (0.69– 1.23) | | | 0.78 (0.56 - 1.07) |
| German speaking proficiency (ref. bad German) | | | | |
| Swiss German as mother tongue | 0.21 (0.12 - 0.37) * | | | 0.44 (0.23 - 0.88) * |

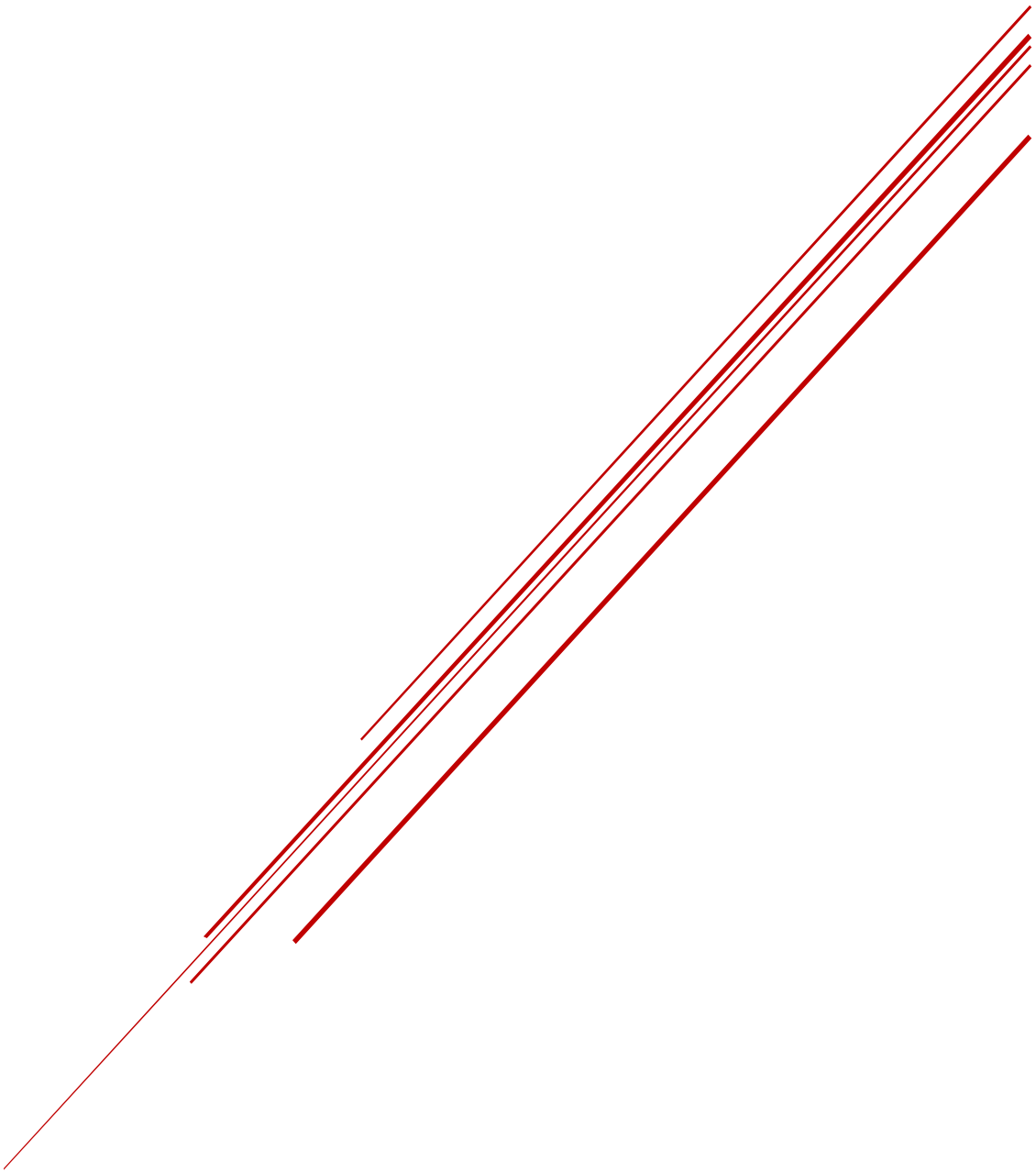
| | | Bivariate analysis OR (95% CI) | Model 1 OR (95% CI) AIC= 2898.2 BIC= 2940.5 | Model 2 OR (95% CI) AIC= 2940.9 BIC= 2983.2 | Model 3 OR (95% CI) AIC= 2807.2 BIC= 2990.5 |
|---|---|---|---|---|---|
| German as mother tongue | | 0.26 (0.14 - 0.49) * | | | 0.48 (0.24 – 0.99) * |
| Good German | | 0.31 (0.17 - 0.60) * | | | 0.62 (0.31 – 1.30) |
| Education (ref. less than primary) | | | | | |
| Primary education | | 0.27 (0.15 - 0.52) * | | | 0.51 (0.25 - 1.08) |
| Secondary education | | 0.21 (0.12 - 0.40) * | | | 0.47 (0.24 - 0.99) * |
| Tertiary education | | 0.14 (0.08 - 0.28) * | | | 0.33 (0.16 - 0.71) * |
| Other | | 0.15 (0.07 - 0.34) * | | | 0.30 (0.12 - 0.73) * |
| Physical activity (ref. no optimal) | | | | | |
| Optimal | | 0.63 (0.50 - 0.77) * | | | 0.75 (0.60 - 0.94) * |
| Alcohol consumption (ref. no problematic) | | | | | |
| Problematic | | 0.81 (0.64 – 1.01) | | | 0.72 (0.55 - 0.93) * |
| Smoking status (ref. never smoked) | | | | | |
| Consumer | | 0.91 (0.57 - 1.38) | | | 0.91 (0.57 - 1.41) |
| Past consumer | | 0.95 (0.76 - 1.19) | | | 1.01 (0.79 - 1.29) |
| Mental Health (ref. no) | | | | | |
| *Psychological domain* | Feeling depressed | 2.49 (1.96 - 3.14) * | | | 1.45 (1.09 - 1.91) * |
| | Feeling abandoned | 3.88 (3.04 - 4.92) * | | | 2.72 (2.05 - 3.58) * |
| Self-perceived health status (ref. 0-25) | | | | | |
| 26-50 | | 0.40 (0.20 – 0.87) * | | | 0.57 (0.27 – 1.32) |
| 51-75 | | 0.26 (0.13 – 0.54) * | | | 0.45 (0.21 – 1.04) * |
| 76-100 | | 0.19 (0.10 – 0.40) * | | | 0.38 (0.18 - 0.88) * |
| Individual income (ref. below threshold) | | | | | |
| Above threshold | | 0.47 (0.31 – 0.73) * | | | 0.62 (0.40 - 1.00) * |
| Living situation (ref. living alone) | | | | | |

| | Bivariate analysis OR (95% CI) | Model 1 OR (95% CI) AIC= 2898.2 BIC= 2940.5 | Model 2 OR (95% CI) AIC= 2940.9 BIC= 2983.2 | Model 3 OR (95% CI) AIC= 2807.2 BIC= 2990.5 |
|---|---|---|---|---|
| Living together | 0.78 (0.63 - 0.97) * | | | 0.92 (0.72 - 1.18) |
| Informal care (ref. no informal care) | 0.87 (0.70 - 1.07) | | | 0.59 (0.46 - 0.76) * |
| Level of dependency (ref. ≤ 2) | | | | |
| 3-4 | 0.97 (0.36 – 2.87) | | | 1.60 (0.55 – 5.14) |
| 5-6 | 0.69 (0.30 - 1.84) | | | 1.45 (0.58 – 4.26) |
| 7-8 | 0.49 (0.23 – 1.27) * | | | 1.15 (0.47 – 3.35) |

*$P < 0.05$

# CHAPTER 4:

## Mapping implementation strategies to reach community-dwelling older adults in Northwest Switzerland



# CHAPTER 4:

## MAPPING IMPLEMENTATION STRATEGIES TO REACH COMMUNITY-DWELLING OLDER ADULTS IN NORTHWEST SWITZERLAND

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## 4.1 Abstract

**Background:** In Northwestern Switzerland, recent legislation tackles the needs of community-dwelling older adults by creating Information and Advice Centers (IACs). Previous studies reported difficulties in reaching community-dwelling older adults for community-based programs. We aimed to: 1) systematically identify implementation strategies to promote the IAC among community care providers, older adults and informal caregivers; 2) monitor the delivery of these strategies by the IAC management; and 3) describe the impact of those strategies on reach of community-dwelling older adults. This study was conducted as part of the TRANS-SENIOR project.

**Methods:** As part of the INSPIRE feasibility assessment, we conducted a pre-experimental post-test study between March and September 2022. The sample included 65+ older adults visiting/calling or being referred to the IAC for the first time. Implementation strategies were selected using implementation mapping and organized in bundles for each group of community care providers and older adults/caregivers. Our evaluation included: estimation of fidelity to the delivery of implementation strategies and bundles by the IAC management and their coverage; referral source of older adults to the IAC; and impact of the strategies on reach of the IAC on the 65+ population living in the care region. Adaptations to the strategies were documented using the FRAME-IS. Descriptive statistics were calculated and reported.

**Results:** Seven implementation strategies were selected and organized in bundles for each community care provider and older adults and their caregivers. The lowest fidelity score was found in implementation strategies selected for nursing homes whereas the highest score corresponded to strategies targeting older adults and caregivers. “Informational visits” was the strategy with the lowest coverage (2.5% for nursing homes and 10.5% for hospitals and specialized clinics). The main referral sources were self-referrals and referrals by caregivers, followed by nursing homes. The IAC reach among the 65+ population was 5.4%.

**Conclusion:** We demonstrated the use of implementation mapping to select implementation strategies to reach community-dwelling older adults. The reach was low suggesting that higher fidelity to the delivery of the strategies, and reflection on the causal pathway of the implementation strategies might be needed.

**Key words:** implementation strategies, implementation mapping, reach, fidelity, older adults

## 4.2 Background

Reaching and supporting community-dwelling older adults as they age in their homes is often challenging. Due to the presence of multiple chronic conditions, older adults often present with complex health and social care needs, requiring multidisciplinary care and in some cases long-term support (1). To meet these complex needs, the World Health Organization advocates the reorientation of services towards prioritizing primary care and community-based programs (2,3). Some governments have started to shift the provision of care from hospitals to community settings (4). However, visits of older adults to community services are not yet optimal. Examples of low reach of community-dwelling older adults mostly come from preventive programs: less than 50% of older adults above 65 years use such services (5) and wait until they are very ill to demand care services (2). This highlights the need to invest efforts to maximize the reach of community-dwelling older adults.

Factors at different levels might play a role in the reach of older adults for community-based programs. For example, barriers to accessing community programs due to distance or costs (5–7), as well as physicians' attitudes and older adults' knowledge and beliefs towards these programs are important factors to consider (5). In fact, existing studies about the challenges of vaccination programs for community-dwelling older adults have identified that lack of awareness of such programs and negative beliefs about adult vaccination among healthcare providers can contribute to their low reach in the community (8–10). Similarly, in diabetes prevention program (DPP) implementation, problems in reaching older adults in the community have also been described (11,12). However, DPP implementation researchers found that after increasing the awareness of the program among healthcare providers, a positive impact in the referral and reach of older adults was observed (11,12). This highlights the influence that community healthcare providers can have in facilitating the access of older adults to targeted programs, while also denoting opportunities for improving reach through their involvement.

To date, we are not aware of recommendations on which strategies are more effective to reach community-dwelling older adults. Likewise, there is no guidance on how to select strategies to involve community care providers to reach community-dwelling older adults based on theory (13). Implementation strategies have been described as methods used to overcome barriers and enhance facilitators when implementing an intervention that can contribute to improve the adoption and reach of evidence-based interventions (14,15). A case study by Puffer and Ayuku (2022) reported the use of implementation strategies to reach hard-to-reach populations for a community-embedded program for mental health (16). However, one of the challenges described was the selection of appropriate

implementation strategies to match the barriers that arose with the implementation of the evidence-based intervention and the evaluation of its effectiveness (16). Therefore, to obtain the public health benefits of community-based programs for older adults living in the community, efforts are needed to systematically select implementation strategies to reach them, by also involving community care providers.

In northwestern Switzerland, Canton Basel-Landschaft (BL) passed a new care legislation to address the needs of community-dwelling older adults and ensure high quality of care provision (17). According to this law, the municipalities of the Canton were to be regrouped in care regions, and establish an Information and Advice Center (IAC). These centers would provide information about ageing to community-dwelling older adults and their caregivers, as well as identify the older adults' care needs (17). This legal framework set a strong foundation for establishing a partnership between the University of Basel and the Canton BL to collaborate in the co-development, implementation and evaluation of an integrated care model for community-dwelling older adults to be implemented in the IAC (18). We conducted a contextual analysis of the Canton prior to the development of the care model to identify barriers and facilitators for the implementation of the care model (18). Our findings suggested the need to select and implement strategies to promote the new center among community care providers and the general public in order to reach community-dwelling older adults. Therefore, our aims are to: 1) systematically identify implementation strategies to promote the IAC among community care providers, older adults and informal caregivers; 2) monitor the delivery of these strategies by the IAC management; and 3) describe the impact of those strategies on the reach of community-dwelling older adults.

## 4.3 Methods

This study is embedded in the INSPIRE (ImplemeNtation of a community-baSed care Program for home dwelling senIoR citizEns) study (https://inspire-bl.unibas.ch/). INSPIRE is an implementation science project designed following the recommendations of the Medical Research Council Framework for the development and evaluation of complex interventions (19). This multiphase study aims to develop (phase 1), as well as to assess the feasibility (phase 2) and effectiveness (phase 3) of a community-based integrated care model (the INSPIRE integrated care model) for community-dwelling older adults in one IAC (18,20–23). The current study is a sub-study of the feasibility assessment of the INSPIRE integrated care model to be implemented in the newly established IAC in one care region of canton BL (phase 2).

This study follows the STARI reporting standards for Reporting Implementation Studies (24).

### 4.3.1 Study design

This is a pre-experimental post-test study conducted between March and September 2022, during the preparation and implementation phases of the INSPIRE project (figure 1) guided by the Exploration, Preparation, Implementation and Sustainment Framework (25). The study was conducted at the IAC of one of the ten newly established care regions of Canton BL. The protocol of the INSPIRE feasibility study has been reported (22).

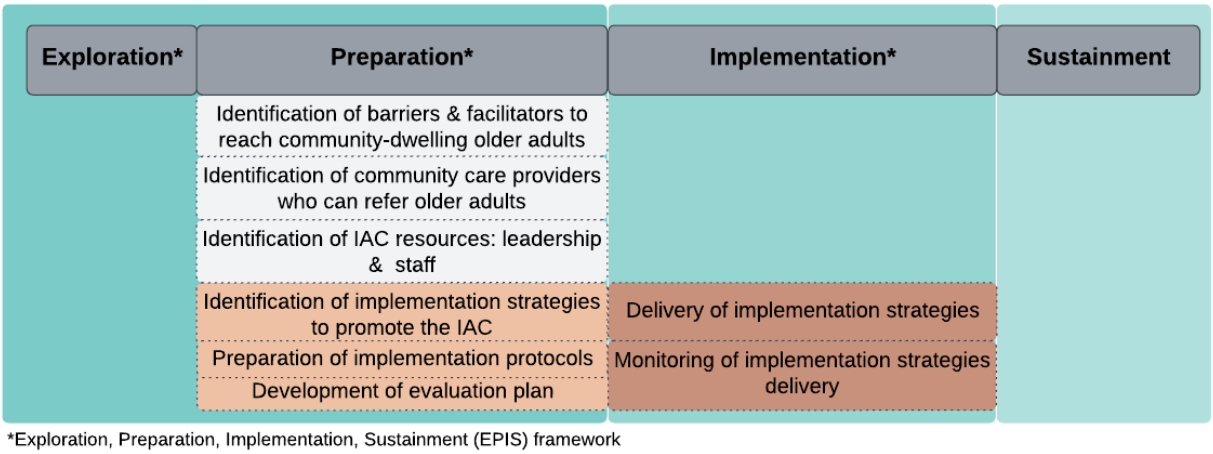


**Figure 1.** INSPIRE implementation process phases

### 4.3.2 Sample & setting

The care region of Canton BL where this study took place comprises a total population of 37,247 inhabitants, of whom 8,840 are older adults 65+ (26). The IAC of this care region opened its doors on January 2022, financed by the contributions of the six municipalities that are part of this care region. It employs a manager (0.8 FTE), an administrative assistant (0.9 FTE), a geriatric nurse expert with 20 years of geriatric expertise who is currently a member of the research team (0.4 FTE) and a social worker (0.8 FTE). The main goals of the IAC are to provide general information about age-related topics, social and financial advice, conduct needs assessment and provide nursing home referrals when necessary, at no cost for the older person or their caregivers.

All adults 65 years or more, visiting/calling or being referred for the first time to the IAC of this care region between January to September 2022 were included in the current study.

### 4.3.3 Selection process of implementation strategies to reach community-dwelling older adults

For the identification and selection of implementation strategies to promote the IAC, we used implementation mapping recommended by Fernandez and colleagues (27). Table 1 summarizes the five steps of implementation mapping while the next section describes its application in the current study.

Table 1. Implementation mapping steps according to Fernandez and colleagues

| Steps | Definition by Fernandez and colleagues (26) |
|---|---|
| 1. Conduction of an implementation needs assessment | Identification of barriers and facilitators for implementation, as well as of relevant members of the public at different levels who are crucial for the adoption, implementation and sustainment of an intervention. |
| 2. Identification of implementation outcomes, performance objectives, personal determinants, and development of matrices of change objectives | Implementation outcomes or indicators for the effectiveness of implementation strategies<br><br>Performance objectives refers to tasks/behaviors required for each member of the public in order to adopt, implement or sustain an intervention<br><br>Personal determinants are modifiable factors internal to members of the public that might influence the adoption and implementation of an intervention<br><br>Development of matrices of change objectives to register the discrete changes required in each determinant in order to achieve the performance objective |
| 3. Selection of theory-based methods and implementation strategies to operationalize these methods | Theory-based methods are techniques to influence the determinants identified in step 2. Multiple methods can address one determinant and a method can influence various determinants. To operationalize these methods, implementation strategies need to be selected |
| 4. Production of implementation protocols and materials | Production of protocols for each implementation strategy. These protocols may include the purpose of the material, audience, targeted determinants and change objectives, theoretical methods or draft content |
| 5. Evaluation of implementation outcomes | Development of a plan to evaluate whether the implementation strategies have led to intended implementation outcomes and the specific implementation actions needed to implement the intervention (performance objectives). |

**Step 1- Conduction of an implementation needs assessment:** In the current study, the barriers and facilitators to reach community-dwelling older adults were identified as part of the contextual analysis conducted by the research team in the preparatory phase of this project (18) (see figure 1). Using Stange and Glasgow's approach to identify, analyze and report on contextual factors (28) and Pfadenhauer's CICI framework to identify which contextual domains to consider for the analysis (29), we gathered contextual data from different sources. These sources included: cantonal and local

meetings with members of the public, a cross-sectional survey, the INSPIRE Population Survey (20) and local, national and international reports (18). As the context is a dynamic structure that evolves over time (29), additional information about the setting was collected during the implementation phase through informal conversations with the IAC staff. This activity led to the identification of new barriers. Table 2 summarizes the identified barriers and facilitators at meso and micro level that could impact the reach of the target population by the IAC.

Table 2. Barriers and facilitators for the implementation of an IAC in a care region of Canton BL

| | |
|---|---|
| **Barriers** | |
| *Preparation phase* | |
| Political and legal context | Meso-level:<br>• The care law does not specify how community care providers will collaborate with the IAC, thus there is no obligation for them to refer older adults to the IAC |
| Socio-cultural context | Meso-level:<br>• Conflicting interests of all actors involved in care, leading to different attitudes and perceptions towards the IAC services<br>• Presence of multiple community care providers for older adults with different outcome expectations regarding the IAC<br>• Insufficient/contradictory information on services available in the care region, making older adults, caregivers and community care providers less likely to be aware of and contact the IAC |
| *Implementation phase* | |
| Setting | Micro-level:<br>• The IAC management leads the promotion of the IAC with low front-line engagement |
| **Facilitators** | |
| *Preparation phase* | |
| Socio-cultural context | Meso-level:<br>• A champion among the research team: a family physician, head of the department of Family Medicine of the local university who voluntarily and enthusiastically contributes with ideas to overcome the barriers and facilitate the promotion of the IAC<br>• The members of the community, part of the cantonal group of this project, include representatives of health and social care organizations, family physicians, nurses, social workers and other health professionals, as well as representatives of senior organizations and caregivers. They contributed in the identification of barriers and provided recommendations on strategies to reach older adults |

Additionally, our contextual analysis allowed us to identify relevant members of the public affected by the implementation of the IAC. They were grouped in two clusters: community care providers including family physicians, heads of internal medicine departments of the main hospitals and directors of hospitals, clinics, social care organizations, nursing homes, and other organizations providing services to older adults; and older adults and their caregivers including

representatives of senior organizations and community venues. In the implementation phase, we included the IAC management as a relevant member too, due to their main role in the delivery of the implementation strategies to community care providers and the older adults and informal caregivers (see figure 2).

Step 2 - Identification of implementation outcomes, performance objectives, personal determinants, and development of matrices of change objectives. We selected *reach* as the implementation outcome to measure the impact of our implementation strategies, as we wanted to capture older adults who were referred, called or visited the IAC as a result of the implementation strategies delivered by the IAC management.

In parallel, we identified that to stimulate referrals, visits and calls to the IAC, each member of the public needed to perform certain tasks. Performance objectives for community care providers included: reading the informational material, meeting with the research team and IAC management, as well as identifying and referring older adults who can benefit from the services of the IAC. For the older adults and their caregivers, we identified participation of a senior organization representative in the co-development of messages for the informational material, which would be read by the older adults, as well as older adults' visits/calls to the IAC as performance objectives. For the IAC management, the main task included the delivery of all the implementation strategies as planned (see figure 2).

Determinants influencing community care providers, older adults and their informal caregivers in their willingness to refer, visit or contact the IAC, respectively, were obtained from the previous step (Table 2, Figure 2). For example, in our contextual analysis we identified that the care region had multiple care providers with conflicting interests and contradictory information. Thus, we reflected that community care providers' awareness, perception and attitude towards the IAC or their outcome expectations about the services of the IAC may influence their decision to refer older adults to the IAC. Likewise, for older adults and caregivers, their awareness and perception of the IAC could influence their decision to contact the center. Additionally, due to the importance of the IAC management to take a leadership role in the IAC promotion, we identified that their level of front-line engagement could impact the overall promotion of the IAC among community care providers, older adults and caregivers

(see figure 2). Finally, we developed a matrix of change objectives (see supplementary material A).

**Step 3 - Selection of theory-based methods and implementation strategies to operationalize these methods.** We identified theory-based methods using Kok's Intervention Mapping taxonomy of behavior change methods (30). This taxonomy for intervention development describes behavior change methods which carefully match specific determinants (e.g., attitude) and provide practical applications (30). In parallel, we used the Expert Recommendations for Implementing Change (ERIC) to describe these methods through several implementation strategies (14). As multiple methods and strategies can be used to address one determinant, we created bundles of implementation strategies for each group of community care providers and older adults and caregivers. For example: separate bundles of two implementation strategies were created for hospitals and specialized clinics as well as for older adults and their caregivers. Most of the strategies were selected and developed in the preparation phase. In the implementation phase, an additional implementation strategy was introduced to support the IAC management (see table 3).

**Step 4 – Production of implementation protocols.** We developed implementation protocols guided by the recommendations of Proctor and colleagues to specify implementation strategies (15). In the implementation protocols, we described for each implementation strategy the actor (who enacts the strategy), action (specific activities that need to be enacted), action target (mechanism through which the strategy attempts to impact the implementation outcome), temporality (when the strategy is used), dose (dosage of the strategy), and the justification (theoretical justification for the selection of the strategy) (15) (table 3).

Facilitators identified in our contextual analysis were also considered for the development of the protocols and materials. For example, a champion (member of the research team) and a Senior Organization representative were involved in the development and implementation of some of the strategies. The implementation of the selected strategies was planned to be led by the IAC management (see figure 2 & table 3).

**Step 5 - Evaluation of implementation outcomes.** Our evaluation plan consisted of determining the impact of the implementation strategies on reach (implementation outcome). Additionally,

we included as performance objective measurements for the IAC management, the fidelity to the delivery of the implementation strategies and bundles according to the protocol and the coverage of each strategy. For community care providers, older adults and caregivers, referral source of community-dwelling older adults to the IAC was used as a performance measurement. Adaptations to the strategies were also documented.

A logic model to illustrate steps 1 to 5, and how they relate to each other is presented in Figure 2.

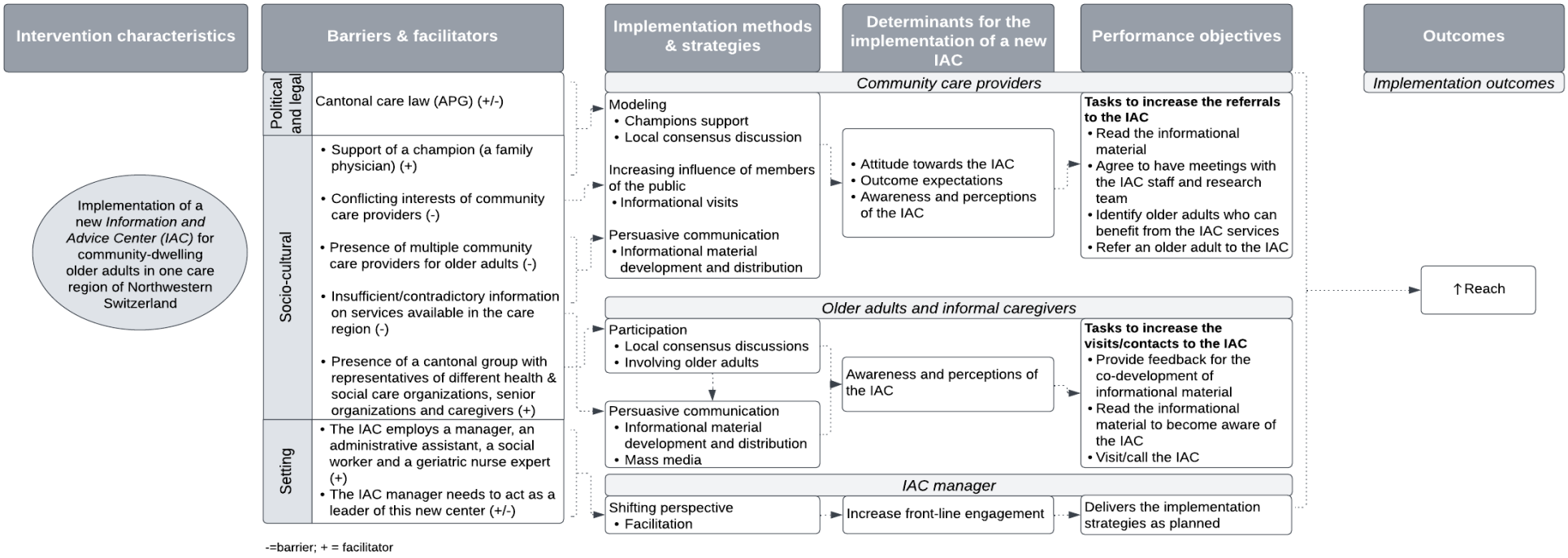


**Figure 2.** Implementation mapping logic model to reach community-dwelling older adults

### 4.3.4 Data Sources

We captured data on the delivery of the implementation strategies to promote the IAC, adaptations and data on older adults' reach retrospectively from January 4th to March 20th, 2022, and prospectively from March 21st to September 2022.

We used two data sources: 1) notes from informal exchange and meetings held with the IAC management to capture fidelity in the delivery and adaptations of the selected implementation strategies; and 2) IAC administrative data about the number of referrals/visitors of the IAC and the source of referral.

### 4.3.5 Variables and measurements

*Performance objective measurements*

**Fidelity: We calculated the** fidelity to implementation strategies and corresponding bundles that were delivered by the IAC manager in the implementation phase. For each implementation strategy, a fidelity score was determined as the total number of strategy-associated activities delivered by the IAC management divided by the total number of planned activities. Using these scores, a mean score was calculated to determine the fidelity in the delivery of each bundle of implementation strategies. To track the delivery of the strategy-associated activities by the IAC management and compare them to the original plan, we developed a tracking system following the guide of Stewart et. al (31). This system included: information describing the target member of the public; implementation strategies; activities associated to each strategy; dose and frequency (planned and delivered); and number of individuals receiving the strategy in two time points (T1=before the opening of the IAC and T2=after the opening of the IAC). A score of 1 was given when the activity was completed as planned and 0 if it was not.

Following the recommendation of Caroll et al. (2007), we tracked the **coverage** of each implementation strategy by documenting the number of members of the public who received the strategy on two time points. Coverage was determined by looking at the total number of

members of the public who received each activity compared to the number of targeted populations for each strategy (see supplementary material C).

Source of referral: consisted of the person who contacted the IAC to refer an older adult. The sources were classified into five categories: self-referred, informal caregiver, nursing home, hospital, home care organizations, family physicians and community venues. Some older adults had two referral sources (e.g., family physician and informal caregiver). For the current study, only the first referral source, as it appeared on the administrative records, was considered for the calculations.

*Outcome variable*

Reach was determined as the combined impact of the implementation strategies delivered to community care providers, older adults and their caregivers. It was measured by dividing the number of older adults 65+ who visited/called or were referred to the IAC of the care region included in this study by the total number of older adults of 65+ living in this care region. The total population of the care region included in this study was calculated using data of the

### 4.3.6 Data analysis

We calculated descriptive statistics including frequencies and percentages. The IAC visitors were categorized into two age groups: 65-74 and 75+ years, as differences in the physical, cognitive, and psychosocial status among these two groups and their use of healthcare services have been reported (32,33). All analyses were conducted using R version 4.0.4 (34)

### 4.3.7 Adaptations to implementation strategies

To document any adaptations done to the implementation strategies during both the preparation and implementation phases, we used the Framework for Reporting Adaptations and Modifications to Evidence-based Implementation Strategies (FRAME-IS) (35). The FRAME-IS is a tool to document modifications to implementation strategies (35).

## 4.4 Results

### 4.4.1 Selected Implementation strategies and corresponding protocols for promoting the IAC

These results address the findings of steps 3 and 4 of the implementation mapping approach guided by Fernandez (27). We identified seven implementation strategies and developed their protocol. Table 3 summarizes these strategies, described according to the recommendations of Proctor and colleagues. In Table 4, we then describe seven bundles of implementation strategies targeting each member of the community.

Table 3: Selected implementation strategies and their implementation protocol

| Implementation strategy* (14) | Actor | Action | Action target | Temporality | Dose | Justification |
|---|---|---|---|---|---|---|
| *Involving older adults* | A senior organization representative | Provides feedback, proposes changes and makes suggestions on content of the message to be included in the letter and the video, and best strategies to reach older adults in their homes | Get feedback from patient/consumers about the messages and implementation strategies selected | Preparation phase | Two meetings | Research has shown positive benefits of involving public and patients in the recruitment process (35) |
| *Champion support* | A champion, member of the INSPIRE project | Promotes the implementation of the IAC and its services among his colleagues (mostly family doctors and internal medicine specialists), through e-mails.<br>Develops the content of letters for his colleagues and signs them<br>Provides feedback on the script and participates as a spokesman in a video (video A). The video is inserted as a QR code in letters. | Overcome resistance in the opening of the IAC among health care professionals and increase awareness of the IAC | Preparation phase | One e-mail sent to the heads of the internal medicine Department of 5 local hospitals<br><br>One letter per family physician before and after the opening of the IAC | Studies have reported the identification of champions as a key factor for implementation success (36) |
| *Local consensus discussions* | A champion and a senior organization representative | Reflect and agree on the messages on the content of the informational material to inform community care providers, older adults and caregivers and the public in general about the new IAC. | Determine the feasibility of the implementation strategies, and appropriateness of the content of the informational material | Preparation phase | One meeting with the family physician and two meetings with the senior organization representative | Research has shown positive benefits of involving public and patients in the recruitment process (35) |
| *Informational visits* | IAC management | Organizes individual meetings with targeted community care providers to raise awareness, introduce the IAC with the intent to clarify expectations regarding | Knowledge about the IAC, intention to refer older adults to the IAC | Implementation phase | One visit per targeted care provider for approximately | Research has shown positive benefits of involving public |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | the opening and services offered in the center and their role in the implementation. | | | 60 minutes before and after the opening of the IAC | and patients in the recruitment process (35) |
| *Informational material development and distribution* | Three research team members, our champion, a senior organization representative and the IAC management D*eveloped the material*<br><br>IAC management *Distributed the material* | Develop layout and final content of the letters, brochures and flyers to be sent to older adults and e-mails to be sent to community care providers.<br>Develop the script for a video (video B) for other community care providers. The video is inserted as a QR code in the e-mails<br>The IAC management participates as a spokesman in this video, using the local language and dialect (Swiss German).<br><br>Disseminates relevant informational material according to protocol:<br>- Community care providers: e-mails<br>- Older adults: letters, brochures & sent by post to their homes.<br>- Older adults: flyers delivered in their homes & also through care organizations (e.g., meals on wheels) | Inform older adults & community care providers about the IAC; engage community care providers to collaborate in the referral of older adults to the IAC | Implementation phase | One letter & brochure/flyer per older adult before and after the opening of the IAC<br><br>One e-mail per community care provider before and after the opening of the IAC | Research has shown that informing and training members of the public can increase their involvement (37) |
| *Use mass media* | IAC management | - Publishes articles in the local newspaper to announce the opening date & services of the IAC<br>- Publishes the contact details of the IAC in the local newspaper.<br>- Gives at least one interview in local radio. | Inform older adults & improve contact with the IAC | Implementation phase | Ten articles & 34 biweekly announcements | Research has shown that most populations become aware of new interventions through mass media (38) |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Facilitation* | A member of the research team | Supports the IAC management to recognize the importance of engaging community care providers in the referral process of the target population | Increases front-line engagement of the IAC management | Implementation phase | As required | Leadership in healthcare is challenging and appropriate training is recommended (39) |

* A refined compilation of implementation strategies: Results from the Expert Recommendations for Implementing Change (ERIC) project

### 4.4.2 Fidelity to the delivery of implementation strategies used to promote the IAC

Table 4 describes the bundles of implementation strategies and activities to promote the IAC among community care providers, older adults and their caregivers. The community care providers have been divided in target groups to facilitate the visualization of the information. Our results show that the implementation strategies targeted at nursing homes were delivered with the lowest fidelity (25% for informational material and 25% for informational visits). Higher fidelity scores were observed for strategies targeting older adults and caregivers (78.6% use of mass media and 60% informational material). Similarly, the highest fidelity score per bundle was observed in the bundle of implementation strategies delivered to older adults and their caregivers (69.3%).

Additionally, table 4 describes the coverage of each implementation strategy according to each member of the community. We observed that "informational visits" was the strategy with the lowest coverage (2.5% for nursing homes and 10.5% for hospitals and specialized clinics), while "distribution of informational material" was the implementation strategy with the highest coverage.

**Table 4.** Fidelity to the delivery of implementation strategies to promote the IAC by the IAC management

| Target groups (n) | Implementation strategies selected | Activities | Coverage per strategy (%) | Fidelity by IAC management to each strategy (%) | Fidelity by IAC management to each bundle (%) |
|---|---|---|---|---|---|
| Family physicians (n=31) [a] | Informational material | Letters sent by IAC management with Video A [b] | 50.0 | 50 | 50 |
| Hospitals and specialized clinics (n=31) | Informational material | E-mails sent by IAC management | 50 | 50 | 50 |
| | Informational visits | Meetings organized by IAC management | 10.5 | 50 | |
| | | Phone calls by IAC management | | | |
| Home care organizations, social care | Informational material | E-mails sent by IAC management with Video B [c] | 19.9 | 60 | 55 |

| Target groups (n) | Implementation strategies selected | Activities | Coverage per strategy (%) | Fidelity by IAC management to each strategy (%) | Fidelity by IAC management to each bundle (%) |
|---|---|---|---|---|---|
| organizations & other community services (n=77) | | Letters sent by IAC management with Video B | | | |
| | | Flyers delivered by IAC management | | | |
| | Informational visits | Meetings organized by IAC management | 18.2 | 50 | |
| | | Phone calls done by IAC management | | | |
| Nursing homes (n=20) | Informational material | E-mails sent by IAC management with Video B | 25.0 | 25 | 25 |
| | | Letters sent by IAC management with Video B | | | |
| | Informational visits | Phone calls done by IAC management | 2.5 | 25 | |
| | | Meetings organized by IAC management | | | |
| Older adults 65+ (n=8840) & caregivers | Informational material | Letters sent by IAC management | 50.8 | 60 | 69,3 |
| | | Brochures delivered by IAC management | | | |
| | | Flyers delivered by IAC management | | | |
| | Use mass media | Interviews to the IAC management in local newspaper | N/A | 78,6 | |
| | | Bi-weekly adds organized by the IAC management | | | |
| | | Radio interviews done by IAC management | | | |
| Community venues [d] (n=19) | Informational visits | Phone calls done by IAC management | 15.8 | 50 | 50 |
| | | Meetings organized by IAC management | | | |
| | Informational material | E-mails sent by IAC management with Video B | 50 | 50 | |
| Seniors' organizations (n=20) | Informational material | E-mails sent by IAC management with Video B sent | 50 | 50 | 50 |
| | Informational visits | Phone calls done by IAC management | 30 | 50 | |

[a] Numbers in () indicate the number of targeted populations in the care region included in this study. [b] Video A addressed to family physicians, is counted as a separate action as we tracked the number of views. [c] Video B addressed to other community care providers, is counted as a separate action as we tracked the number of views. [d] Include churches, libraries, senior's centers, pharmacies, local coffee shops/bakeries

### 4.4.3 Source of referral

Table 5 summarizes the number of visitors/referrals by referral source and age group (65-74 years and 75+). We found that 81.4% and 48.1% older adults aged 65-74 years and 75+ respectively self-referred to the IAC. The next highest referral sources of the older adults were nursing homes, hospitals and home care organizations for both age groups.

**Table 5**. Number of older adults' referrals to IAC by referral source and age category

| Referral source | Number of referred older adults 65-74 (%) N=113 | Number of referred older adults 75+ (%) N=362 |
|---|---|---|
| Self-referral† | 92 (81.4) | 174 (48.1) |
| Informal caregiver | 8 (7.1) | 71 (19.6) |
| Nursing home | 4 (3.5) | 55 (15.2) |
| Hospital | 4 (3.5) | 35 (9.7) |
| Home care organizations | 4 (3.5) | 17 (4.7) |
| Family physician | 1(<1) | 9 (2.5) |
| Community venues | 0 | 1 (<1) |

†older adults reaching out to the IAC themselves.

### 4.4.4 Reach of the IAC

Figure 3 describes the impact of the implementation strategies on the reach of the IAC based on the number of referrals/visitors of the IAC. From the total number of older adults 65+ living in the care region included in this study (n=8,840), only 5.4% were referred, visited or contacted the IAC. Among the 75+ population, the reach was 9.1%.

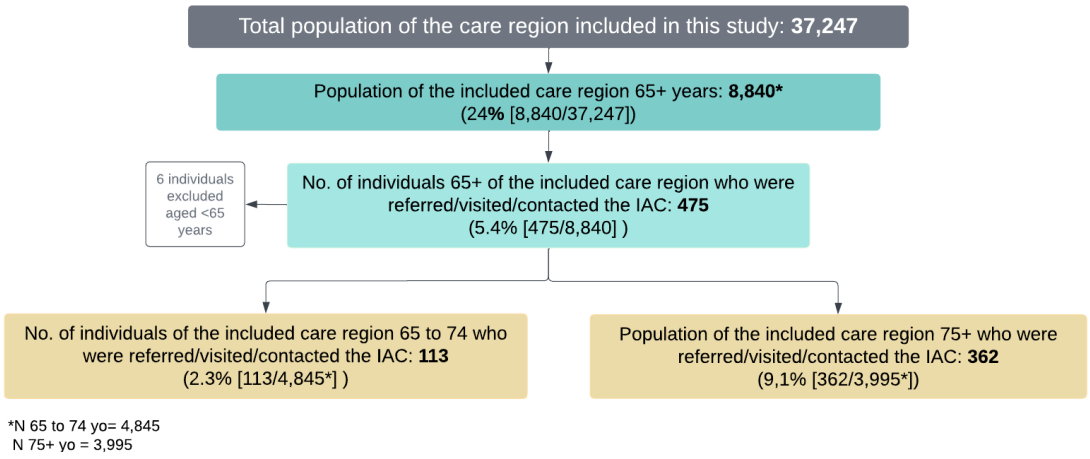


**Figure 3**: Reach of community-dwelling older adults by the IAC between January and September 2022

### 4.4.5 Adaptations of the implementation strategies

Using the FRAME-IS, we documented adaptations to three implementation strategies: a) *informational visits to promote the IAC with community care organizations implementation phase, b) informational material development and distribution (letters and emails) sent to community care organizations and c) use of mass media.* Most of the modifications corresponded to changes in the temporality of delivery of the strategy (e.g., only prior or only after the opening of the IAC), which were a consequence of a decision of the IAC management. Other modifications were made to improve reach, address cultural norms or the restrictions due to the pandemic of Covid-19. In these cases, the decisions were made jointly between the research team and the IAC management (Table 6).

Table 6. Adaptations to the implementation strategies according to the FRAME-IS*

| The EBP being implemented is: | | *Implementation of an Information and Advice Center to provide integrated care for (pre)frail community-dwelling older adults* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **The implementation strategy being modified is:** | **The modification(s) being made were:** | **The reason(s) for the modification(s) is/are:** | **What was modified?** | **What was the goal?** | **What was the level of the rationale for the modification?** | **When was the modification initiated?** | **Was the modification planned?** | **Who participates in the decision to modify?** | **How widespread is the modification?** |
| Informational visits to promote the IAC with community care organizations in the preparation and Implementation phase | Temporality of the visits (only in the preparation or Implementation phase) to community care organizations | Decision of the IAC management | Context (temporality of the visit, only one visit either pre or after opening) | Other: decision by the IAC management | Organizational level (IAC management decided the temporality of the visits) | Preparation & Implementation phase | No | IAC management | Some hospitals, nursing homes, care organizations & senior organizations |
| | Replacing some visits with phone calls | • For safety reasons due to pandemic<br>• To address cultural norms | Context (format, phone calls instead of in person visits) | • Increase reach of the EBP<br>• Increase the adoption of the EBP | Practitioner level (IAC management) | Preparation phase | Yes | Researchers and IAC management | Community |
| | Involvement of a member of the research team in the visits | Improve reach of community-dwelling older adults | Context (personnel, a member of the research team participated in the visits too) | Increase reach of community-dwelling older adults | Implementer level (research team) | Preparation phase | No | Researchers and IAC management | Some nursing homes & care organization |
| Informational material development and distribution (letters & emails) sent to community care organizations and older adults | Temporality of the letters/e-mails sent (only in the preparation or Implementation phase) | Decision of the IAC management | Context (temporality of the letters/e-mails, only one e-mail or letter sent either pre or after opening) | Other: decision by the IAC management | Organizational level (IAC management decided the temporality of the visits) | Preparation & Implementation phase | No | IAC management | Some hospitals, nursing homes, care organization, senior organizations & older adults |
| | Replacing some letters with e-mails | To address cultural norms | Context (format, e-mails instead of letters) | • Increase reach of EBP<br>• Increase adoption of EBP | Practitioner level (IAC management) | Preparation phase | Yes | Researchers and IAC management | Community |
| Use mass media (radio announcements/interviews) | Not done | Decision of the IAC management | N/A | Other: decision by the IAC management | N/A | N/A | N/A | IAC management | N/A |

*The FRAME-IS: a framework for documenting modifications to implementation strategies in healthcare (34)

## 4.5 Discussion

We systematically identified implementation strategies to promote an IAC and reach community-dwelling older adults in one care region of Northwest Switzerland after a law was established to reorganize care for older adults. Additionally, we monitored their implementation by measuring fidelity to their delivery by the IAC management, coverage and impact of the strategies on reach. We identified low fidelity in the delivery of implementation strategies targeted at nursing homes while the highest fidelity score was observed among older adults and their caregivers. This may have resulted in a somewhat lower reach of the target population by the IAC (5.4%) when comparing to other studies in Canada and the US that have calculated a reach of 12-19% of older adults for community-based interventions (11,12).

Reaching community-dwelling older adults can be challenging but is essential for obtaining the potential public health benefits of community-based programs. A systematic selection of implementation strategies that address specific determinants has the potential to strengthen the collaboration of community care providers in the referral of community-dwelling older adults, which contributes to increasing their reach. Following an implementation mapping approach, we were able to identify different bundles of implementation strategies tailored to each member of the community (e.g., informational visits and informational material for nursing homes – see supplementary material B) which target specific determinants (e.g. attitudes and outcome expectations) influencing the referral of older adults to the IAC, and ultimately affecting the reach of the IAC. To the date, there is no other study that has used this approach for identifying and selecting implementation strategies aimed at reaching community-dwelling older adults. We therefore highly encourage the use of implementation mapping to guide the selection of implementation strategies in order to reach hard-to-reach populations.

A key element of implementation mapping is the identification of different members of the community who can influence the implementation of an intervention (27). Due to the regular contact that community care providers have with community-dwelling older adults, they constitute major actors in promoting community-based centers (36) and referring older adults to these centers. Moreover, by involving different community members in the implementation

process, stronger relationships can be built (37). In this study, we have identified which community care providers provided crucial contribution to the referral of older adults to the IAC. However, our results showed low referrals of older adults, especially by home care organizations, family physicians and community venues. A possible explanation lies in the low delivery of the implementation strategies by the IAC manager leading to low coverage, with informational visits being the strategy with the lowest coverage. Additionally, we consider that we could have overlooked important barriers and determinants (steps 1 & 2), as the contextual information used were derived from the contextual analysis of the whole Canton conducted in 2019 (18) and not specifically from the care region where this study took place. Moreover, in our evaluation plan, further performance measures of community care providers and their impact on overcoming personal determinants (attitudes towards the IAC) were not considered, nor was the link between strategies used and the mechanisms through which each implementation strategy is hypothesized to work (38). Therefore, we recommend that the evaluation plan must start by reflecting back on the causal pathway of implementation strategies used and their outcomes to identify moderators or pre-conditions that can affect the causal mechanisms of implementation strategies, as this will help to decode why a strategy achieved its intended effect or not (39).

We acknowledge the low reach of the IAC among the target population. We reflect on potential reasons which could explain this result. *First*, problems with fidelity to the delivery of the bundles of implementation strategies impacted the level of information and awareness of the IAC among community care providers. Having an unclear notion of the role of this new center, may have impacted their decision to refer older adults to the IAC. Existing interventional studies have reported a low reach of older adults due to the lack of awareness and negative beliefs among community care providers (e.g. family physicians) towards these programs (8,9,11,12). *Second*, implementing new services in the community can be a challenge in itself: it takes time to build trusting relationships and convince care organizations, with a long history in the community, to be open to collaboration (37,40). Additionally, when there are no formal structures to define the degree of collaboration between a new center and different care providers, the collaboration relies mostly on informal relationships that can be lost over time (37). In our case, the legal framework (APG) supporting the implementation of the IAC does not specify the responsibilities of community care providers and their degree of collaboration

with the center (17). This could have contributed to the lack of a shared vision on the role of the IAC, and consequently, the low level of referrals to the IAC. Thus, to improve the reach of community-dwelling older adults, major efforts are needed. For example, this can be reached by creating regulatory frameworks to improve the quality of care of community-dwelling older adults that promote the establishment of formal contracts or agreements between care providers and new community-based centers. These regulations could clarify roles, processes and responsibilities of all parties involved. Additionally, it is important to invest in efforts to promote communication, and build good relationships with care providers, so that they engage in the referral of adults to community-based centers.

The process of establishing good relationships and motivating care providers to collaborate requires high levels of engagement in the front-line, which is usually considered a characteristic pertained to leaders (40). Multiple studies have highlighted the importance of leadership in healthcare, especially for populations with complex needs, such as frail older adults (37,41,42). Leaders in healthcare have the ability to effectively influence others for the benefit of populations (43). For example, the supportive leadership of the strategic director of a hospital in Hungary was described as an enabler to persuade physicians to effectively participate in an integrated care program to improve clinical outcomes for cancer patients (37). In the current study, we observed low levels of front-line engagement by the IAC management, reflected by the low level of delivery of the implementation strategies. This could have negatively impacted the engagement of community care providers, and ultimately could also explain the low reach of the target population.

## 4.6 Strengths and limitations

Although we were able to track data on the delivery of the selected implementation strategies, we could not estimate the effectiveness of each of them. In our original plan, we aimed to collect data to identify which implementation strategies were more effective to reach older adults. However, due to cultural reasons and to avoid creating additional burdens for the older adult and the staff of the IAC, we decided not to pursue this aim. Finally, as there are not previous studies that assess the fidelity of implementation strategies to reach community-dwelling older adults, we did not have a benchmark score to compare our results to.

Nevertheless, as this study is part of the feasibility evaluation of the INSPIRE care model, the results obtained will help shape our strategies for reaching community-dwelling older adults for the next phase, the effectiveness evaluation. For example, our findings demonstrated that the new IAC requires strong leadership and time to establish itself and build trusting relationships in the community. Thus, to reach community-dwelling older adults of the next phase, we will collaborate with already established organizations in the community.

## 4.7 Conclusion

This study provides information on how to systematically select implementation strategies to reach community-dwelling older adults in order to provide health care programs delivered to the community. At the same time, we measured their implementation by considering implementation outcomes and performance objectives. The lack of fidelity observed in the delivery of the implementation strategies partially explains the low reach of community-dwelling older adults. As other factors could explain the low reach of the target population, there might be the need to reflect back on the causal pathway of the implementation strategies and the related outcomes. Therefore, prior to the identification of implementation strategies to engage community care providers in the referral process, in-depth contextual analysis and careful consideration of the mediators and moderators of the mechanism of action of implementation strategies is required. We believe that the results of this study can provide valuable information for implementers and community leaders on how to improve the reach of older adults living at home, so they can gain the public health benefits of new services and programs established for them in the community.

## 4.8 Ethics approval and consent to participate

Prior to conducting the INSPIRE feasibility study, the ethical approval was requested to the Ethics Commission Northwestern and Central Switzerland (Ethikkommission Nordwest- und Zentralschweiz – EKNZ). The EKNZ declared that the study was not subject to cantonal and federal legislation, as it was not considered a research study as defined by the Human Research Act Art. 2. Therefore, the EKNZ did not issue a formal ethical approval but concluded that the study did meet the general ethical principles for research involving human beings (cf. Art. 51 para. 2 Human Research Act). The methods used in this

study were carried out in accordance with relevant guidelines and regulations. As the data collected comes from the administrative data of the IAC, no informed consent was obtained.

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## 4.10 Supplementary material A

### 4.10.1 Identification and selection of performance objectives, personal determinants, change objectives, methods and implementation strategies

| Target members of the public | Implementation outcomes | Performance objectives | Determinants | Change objectives | Methods[1] | Implementation strategies |
|---|---|---|---|---|---|---|
| **Preparation phase** | | | | | | |
| **COMMUNITY CARE PROVIDERS** | *Reach*<br>*Fidelity* | • Read the informational material to become informed about the IAC<br>• Agree to have meetings with the IAC staff and research team<br>• Identify older adults who can benefit from the IAC services<br>• Contact the IAC to refer an older adult | Attitude, awareness and perceptions of the IAC | Express the importance of referring older adults to the IAC | • Persuasive communication | • Informational material development and distribution |
| | | | Outcome expectations | • Expect that the IAC services will help to improve the care of older adults compared to the current practice<br>• Expect that the quality of life of older adults will improve with the IAC services | • Modeling | • Champions support<br>• Local consensus discussions |
| | | | | | • Increasing influence of members of the public | • Informational visits |
| **OLDER ADULTS AND INFORMAL CAREGIVERS** | | • Provide feedback for the development of informational material<br>• Read the informational material to become aware of the IAC<br>• Visit/call the IAC | Awareness and perceptions of the IAC | • Describe the services of the IAC<br>• Describe the access or communication with the IAC as not too complex | • Participation | • Local consensus discussions<br>• Involving patients/consumers |
| | | | | | • Persuasive communication | • Informational material development and distribution<br>• Mass media |
| | | **Implementation phase** | | | | |
| **IAC MANAGEMENT** | | • Delivers all the implementation strategies identified by the research team | Attitude (level front-line engagement) | • Establish an understanding of the role of the IAC with community care providers, by being visible through visits and messages | • Shifting perspective | • Facilitation by INSPIRE team member |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | • Express the importance of building trust with community care providers | | |

[1] Methods selected based on the taxonomy of behavior change methods of Kok G. and colleagues (29)

## 4.10.2 Supplementary material B

Sehr geehrte Damen und Herren

Ab dem 3. Januar 2022 ist es so weit:
**die Fachstelle der Versorgungsregion BPA [redacted] nimmt ihren regulären Betrieb auf.**

An verschiedenen Veranstaltungen und auch in individuellen Treffen konnten wir Sie in den vergangenen Monaten bereits über die Entwicklungen in der Versorgungsregion BPA [redacted] orientieren. In diesem Schreiben fassen wir nochmals die wichtigsten Punkte zum Start der Fachstelle zusammen.

**Ausgangslage**

Wie Sie sicher wissen, hat der Kanton Baselland im 2018 ein neues Gesetz über die Betreuung älterer Menschen eingeführt – das Altersbetreuungs- und Pflegegesetz (APG in SGS 941). Im Rahmen des APGs haben sich die sechs Gemeinden [redacted] und [redacted] zur Versorgungsregion BPA [redacted] zusammengeschlossen, wobei «BPA» für Betreuung, Pflege, Alter steht.

**Was ist die Fachstelle BPA [redacted]?**

Die Fachstelle BPA [redacted] ist die zentrale Anlaufstelle für Informationen und Beratungen zu den Themen Betreuung, Pflege, Alter, Gesundheitsförderung und Prävention im Altersbereich im [redacted].

Sie hat ihren Standort in [redacted] und wird aus einem Team von vier erfahrenen Fachpersonen gebildet. Zu diesem Team gehören eine Pflegeexpertin, eine Sozialarbeiterin, eine Case Managerin und ein Gerontologe. Weitere Informationen dazu finden Sie auf einem gesonderten Informationsblatt.

**Was bietet die Fachstelle BPA?**

Die Fachstelle BPA [redacted] steht vor allem älteren Personen, ihren Angehörigen und / oder Betreuungspersonen beratend zur Verfügung. Diese Beratungen können in der Fachstelle oder vor Ort stattfinden. Dabei geht es um die Vermittlung von Informationen rund ums Alter. Dazu gehören vor allem folgende Themenbereiche.

- Beratung und Begleitung von betroffenen Menschen und deren Angehörigen in Betreuungs- und Pflegesituationen
- Pflegerische Abklärungen, insbesondere vor einem möglichen Erst-Eintritt in eine stationäre Langzeitinstitution (Alters- und Pflegeheim)
- Beratung von ratsuchenden Personen in Sozial- und Finanzfragen
- Vermittlung und Zuweisung an spezialisierte Anbieter und Organisationen
- Planen / Umsetzen von Massnahmen der Gesundheitsförderung und Prävention für die ältere Bevölkerung

**Wie arbeitet die Fachstelle BPA [redacted] mit den Organisationen zusammen?**

Die Fachstelle BPA [redacted] versteht sich als Anlauf- und Koordinationsstelle rund um die Fragen zu Betreuung, Pflege, Alter und steht auch allen Fachpersonen und Organisationen, die in diesen Bereichen tätig sind, als Partner offen. Durch die Abklärung der Bedürfnisse, Wünsche und Ziele der älteren Personen werden die Mitarbeitenden der Fachstelle in der Lage sein, gemeinsam mit den involvierten Leistungserbringern und Organisationen eine koordinierte Versorgung zu realisieren.

Im Pflegebereich erfolgt falls notwendig eine zielgerichtete Bedarfsabklärung in Form eines umfassenden Assessements. Mit diesem sollen die medizinischen, betreuerischen, psychologischen, sozialen und spirituellen Bedürfnisse der jeweiligen Person erkannt werden. Im Anschluss koordiniert die Fachstelle den Pflege- und Betreuungsbedarf und vermittelt die gewünschten Dienstleistungen mit dem Ziel, dass die älteren Personen weiterhin möglichst selbstständig in ihrem gewohnten Umfeld zu Hause leben können.

**Wie kann Ihre Organisation mit der Fachstelle BPA [redacted] zusammenarbeiten?**

Für die Fachstelle BPA [redacted] ist es wichtig, dass möglichst viele ältere und interessierte Personen in dieser Versorgungsregion von der neuen Dienstleistung profitieren können. Deshalb sind wir Ihnen dankbar, wenn Sie Ihre Kundinnen oder Kunden über die Informations- und Beratungsstelle BPA Leimental informieren und sie bei Bedarf an uns verweisen.

**Wie können Sie sich informieren und die BPA [redacted] kontaktieren?**

Sie finden im Anhang zu diesem Schreiben ein Informationsblatt mit allen wichtigen Angaben, wie und wann Sie die BPA [redacted] erreichen können.

Gerne bedienen wir Sie ab Mitte Januar 2022 auch mit weiteren informativen Unterlagen zur BPA [redacted], in digitaler und gedruckter Form. Alle wichtigen Informationen rund um die Versorgungsregion finden Sie auf der Webseite www.[redacted].ch (ab Januar 2022).

Wir freuen uns, dass wir ab dem kommenden Jahr gemeinsam mit Ihnen die Versorgungsregion BPA [redacted] aktiv gestalten werden – zugunsten der Lebensqualität der älteren Menschen in unserer Region. Viele dieser Aufgaben sind für uns alle neu und so müssen sich einige Abläufe und Prozesse auch zuerst einspielen. Die vorgesehenen Dienstleistungen und Informationen werden kontinuierlich weiter aufgebaut.

Mit verschiedensten Partnern und Organisationen haben wir bereits Kontakt aufgenommen und werden dies auch so weiterführen. Für uns als Fachstelle ist es wichtig, einen Überblick über das gesamte Angebots- und Leistungsspektrum zu erhalten. Wir bedanken uns, dass Sie mit Ihren Angeboten und Leistungen einen wichtigen Teil zu einer umfassenden und guten Versorgung beitragen und uns bei der Dokumentation und dem Aufbau der Informations- und Beratungsstelle unterstützen.

Wir wünschen Ihnen alles Gute, besinnliche und gesunde Festtage und einen guten Start ins Jahr 2022.

Freundliche Grüsse

## 4.10.3 Supplementary material C

### Tracking system of the delivery of implementation strategies to reach community-dwelling older adults

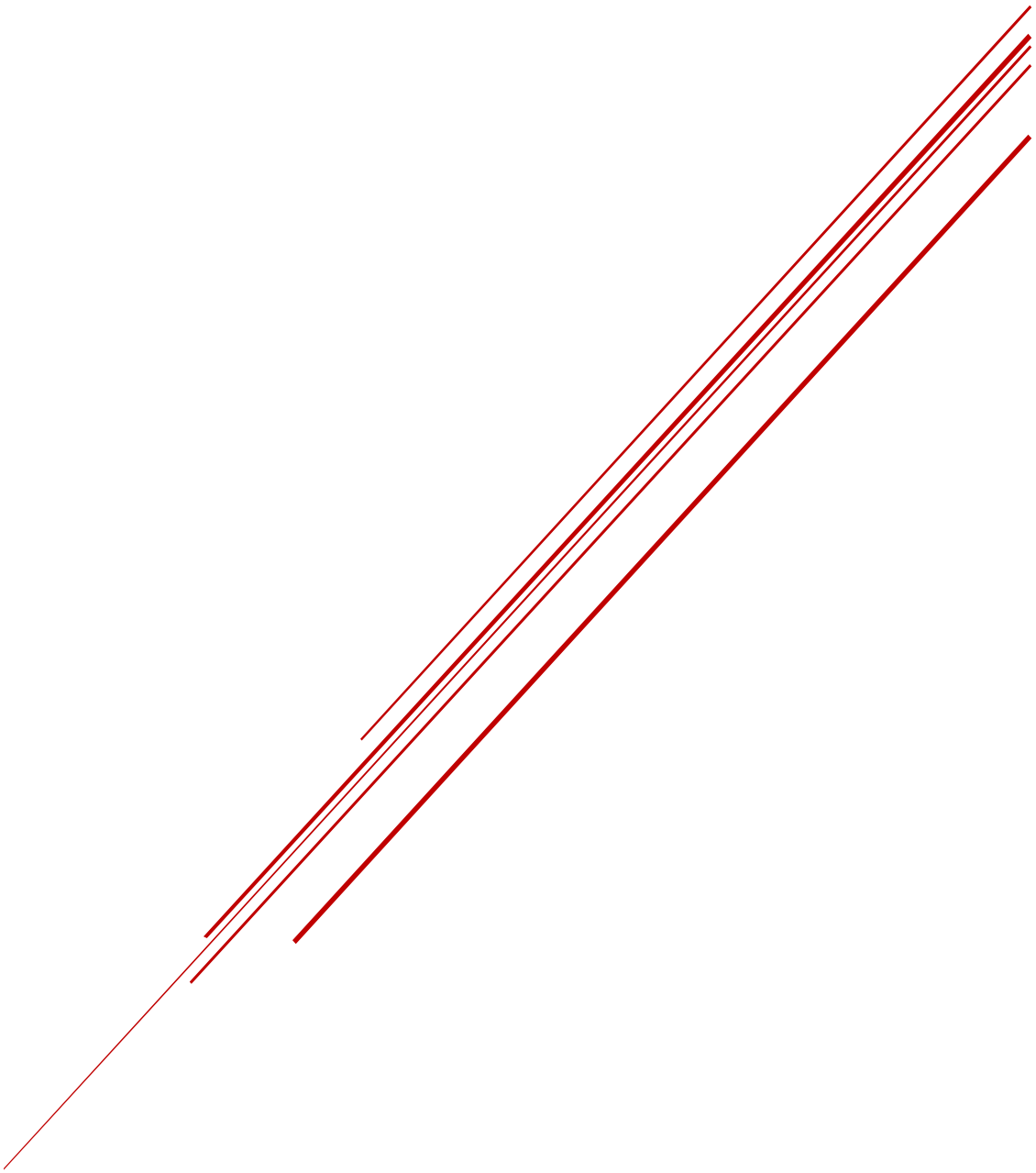
| Target groups (n) | Implementation strategies selected | Activities | Dose frequency | | Coverage | |
|---|---|---|---|---|---|---|
| | | | Dose frequency of planned activity [b] | Dose frequency of delivered activity [b] | n [c] of members of the public receiving the activity (T1) | n [c] of members of the public receiving the activity (T2) |
| Family physicians (n=31) [a] | Informational material development & distribution | Letters sent by IAC management with Video A | 2 | 1 | 31 | 0 |
| Hospitals and specialized clinics (n=31) | Informational material development & distribution | E-mails sent by IAC management | 2 | 1 | 31 | 0 |
| | Informational visits | Meetings organized by IAC management | 2 | 1 | 0 | 1 |
| | | Phone calls by IAC management | 2 | 1 | 12 | 0 |
| Home care organizations, social care organizations & other community services (n=77) | Informational material development & distribution | E-mails sent by IAC management with Video B | 2 | 1 | 77 | 0 |
| | | Letters sent by IAC management with Video B | 2 | 1 | 0 | 0 |
| | | Flyers delivered by IAC management | 1 | 1 | NP [d] | 3 |
| | Informational visits | Meetings organized by IAC management | 2 | 1 | 0 | 17 |
| | | Phone calls done by IAC management | 2 | 1 | 39 | 0 |
| Nursing homes (n=20) | Informational material development & distribution | E-mails sent by IAC management with Video B | 2 | 1 | 20 | 0 |
| | | Letters sent by IAC management with Video B | 2 | 0 | 0 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Informational visits | Phone calls done by IAC management | 2 | 1 | 2 | 0 |
| | | Meetings organized by IAC management | 2 | 0 | 0 | 0 |
| Older adults 65+ (n=8840) & caregivers | Informational material development & distribution | Letters sent by IAC management | 2 | 1 | 0 | 8840 |
| | | Brochures delivered by IAC management | 2 | 1 | NP | 8840 |
| | | Flyers delivered by IAC management | 1 | 1 | NP | 200 |
| | Use mass media | Interviews to the IAC management in local newspaper | 11 | 4 | NA | NA |
| | | Bi-weekly adds organized by the IAC management | 29 | 29 | NA | NA |
| | | Radio interviews done by IAC management | 2 | 0 | NA | NA |
| Community venues: churches, libraries, senior's centers, pharmacies, local coffee shops/bakeries (n=19) | Informational visits | Phone calls done by IAC management | 2 | 1 | 10 | 0 |
| | | Meetings organized by IAC management | 2 | 1 | 0 | 2 |
| | Informational material development & distribution | E-mails sent by IAC management with Video B | 2 | 1 | 19 | 0 |
| Seniors' organizations (n=20) | Informational material development & distribution | E-mails sent by IAC management with Video B sent | 2 | 1 | 20 | 0 |
| | Informational visits | Phone calls done by IAC management | 2 | 1 | 12 | 0 |

[a] Numbers in () indicate the number of targeted populations in the care region included in this study. [b] Planned activities refer to the activities planned by the INSPIRE team; Delivered activities refer to the activities delivered by the IAC management. [c] n refers to the number of individuals who received the activity in each time point (T1 & T2). [d] Activity was planned to be delivered only at one time point

# CHAPTER 5:

## UNVEILING THE UNKNOWN OF INTEGRATED CARE MODELS FOR FRAIL HOME-DWELLING OLDER ADULTS: FEASIBILITY STUDY OF A COMMUNITY-BASED INTEGRATED CARE MODEL



# CHAPTER 5:

## UNVEILING THE UNKNOWN OF INTEGRATED CARE MODELS FOR FRAIL HOME-DWELLING OLDER ADULTS: FEASIBILITY STUDY OF A COMMUNITY-BASED INTEGRATED CARE MODEL

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## 5.1 Abstract

**Introduction:** Feasibility studies are crucial to improve the successful implementation of complex interventions such as integrated care models for frail home-dwelling older adults. Few studies have reported integrated care models' feasibility, nor measurement of implementation outcomes. This study aimed to evaluate the feasibility of the INSPIRE care model for frail older adults by assessing its acceptability, feasibility, fidelity and reach from older adults', informal caregivers', IAC staff's and community care providers' perspectives. This care model with four core components (screening, multidimensional assessment, care plan development and follow-up) was implemented in one Information and Advice Center (IAC) in Canton Basel-Landschaft in Switzerland. This study was conducted as part of the TRANS-SENIOR project.

**Methods:** Using a convergent parallel mixed-methods design, we collected quantitative data to measure reach of the care model in the target population (n=987), fidelity to its delivery by the IAC staff (n=18) and acceptability and feasibility from community care providers' perspectives (n=24). Descriptive statistics were calculated. Qualitative data was collected to assess the acceptability, and feasibility from older adults (n=8), informal caregivers (n=8) and IAC staff (n=2), and analysed using rapid qualitative analysis and content analysis. Quantitative and qualitative data were analysed separately before merging them in a table for comparison.

**Results:** Our analysis showed high fidelity (100%) and good acceptability and feasibility for *screening*. *Multidimensional assessment* had a moderate fidelity (75%), good acceptability, but some reported feasibility issues. *Care planning and coordination* had low fidelity (42%); and good acceptability, except by community care providers; and poor feasibility due to collaboration challenges with community care providers. *Follow-up* had the lowest fidelity (10%) due to time constraints. The INSPIRE care model's reach was 4,5%.

**Conclusion:** Our findings revealed varied feasibility of the model core components. Screening and multidimensional assessment demonstrate potential for successful implementation. Collaboration with community care providers and follow-up present challenges, highlighting the need for trust-building and suitable technology. Successful implementation may require longer timelines, clearer roles, and improved information systems, as suggested by previous studies.

**Key words (3-6 words):** integrated care, older people, feasibility, implementation science

## 5.2 Introduction:

As the global population ages, the number of older adults suffering from frailty increases. It has been estimated that approximately 20% of older adults aged 70 years and older are frail, and this prevalence increases among the oldest old (80+) and women (1). Frailty in older adults refers to a state of decreased physiological reserve and increased vulnerability to external stressors (2). Frail older adults are at risk for falls, disability, hospitalization, institutionalization, mortality and a lower quality of life (2). Due to the complex health and social care needs of frail older adults, they often require different types of services and the support of various care providers, which often tends to be fragmented (3,4). Traditional acute disease-focused care models fail to meet the ever-changing needs of this population (5). Therefore, it is crucial to implement innovative holistic interventions centered around the needs of frail older adults.

Proactive, person-centered, integrated care models that ensure continuity of care delivery among different care providers have been identified as the best strategy for providing care for frail older adults (6,7). Integrated care models have shown to reduce mortality, improve health-related quality of life, decrease hospital admissions and emergency department visits in frail older adults (8). However, in a systematic review and meta-analysis conducted by our research team; we could not demonstrate a beneficial impact of integrated nurse-led care models on those outcomes (8). Additionally, we were unable to discern if the nonsignificant findings were related to intervention or implementation failure, as only few studies included process evaluations to identify feasibility or implementation problems (8).

Integrated care models are considered complex interventions (6,9,10). As such, the UK Medical Research Council recommends that the development and evaluation of complex interventions should be considered in terms of phases, including an assessment of their feasibility (11). Feasibility studies can provide crucial guidance for shaping future evaluation design, intervention refinement, tackling of implementation challenges, and serving as a decisive point prior to moving into full-scale implementation and evaluation (11–13). Few feasibility studies have been conducted on integrated care models for community-dwelling older adults (14,15), with limited focus on the frail older population (16), as others have mainly examined different settings (e.g., geriatric rehabilitation units) (17) or specific conditions (e.g., COPD or stroke) (18).

Moreover, the lack of standardized guidelines for conducting feasibility studies (11–13) has resulted in significant variability in the content of feasibility studies of integrated care models (14–17). Similarly, none of these studies has been conducted following an implementation science approach, which is crucial to obtain a more granular understanding (19,20) of the "what", "why" and "how" integrated care

models work in real world settings (21). To date, many feasibility studies primarily focused on evaluating recruitment or whether the intervention was carried out according to the protocol (14–17), overlooking other crucial indicators of implementation success such as adoption, acceptability, feasibility or reach (22). These indicators, also known as implementation outcomes, are considered proximal indicators of the implementation process, providing evidence of how well the intervention is being put into practice (22). Additionally, few of these feasibility studies were preceded by the use of other valuable implementation science methods. For example, Yi and colleagues (2021) incorporated stakeholders involvement in intervention development prior to feasibility assessment (14). However, none of these studies conducted an analysis of the context where the intervention will be implemented or identified implementation strategies. Lacking this crucial information before assessing the feasibility of an integrated care model can result in a model that doesn't align with the context, potentially leading to implementation failure and research inefficiency (21,23). Hence, to unveil the unknow of integrated care models for frail home-dwelling older adults, it's important to evaluate its feasibility within the sphere of implementation science methods.

In 2018, Canton Basel-Landschaft introduced a new legal framework to address the needs of home-dwelling older adults (26). This law mandated the reorganization of the Canton in care regions and the establishment of an Information and Advice Center (IAC) in each region (26). Considering this legal environment, the University of Basel partnered with Canton BL to collaboratively develop, implement, and evaluate a community-based integrated care model for frail home-dwelling older adults (the INSPIRE care model) (27). This care model was developed as part of the INSPIRE (ImplemeNtation of a community-baSed care Program for home dwelling senIoR citizEns) project, a multiphase implementation science project, developed in alignment with the recommendations of the MRC Framework (11). It involves the development (phase 1) (23,26), as well as the assessment of feasibility (phase 2) and effectiveness (phase 3) of the INSPIRE care model. During the first phase of this project, implementation science methods such as a context analysis, use of theories and frameworks, stakeholder involvement, and the identification of implementation strategies were used for the development of the INSPIRE care model; also, a program theory and logic model were developed to elucidate how the care model would bring about the desired outcomes in the community (27). The first phase was completed between 2019 and 2020 (23,26). The current paper reports on the feasibility of the INSPIRE care model implemented in one IAC.

Due to the lack of clear guidance on what to assess in a feasibility study of a complex intervention such as integrated care models, we adopted an implementation science approach, utilizing the implementation outcomes taxonomy developed by Proctor (22). This taxonomy encompasses eight

implementation outcomes, yet our focus was on those intended for measurement in the early stages of the process, including acceptability, fidelity, feasibility and reach (22).

## 5.3 Objectives:

This mixed-method study aims to evaluate the feasibility of the INSPIRE care model within one IAC in one care region of Canton BL, Switzerland. The specific aims are:

1) To assess whether the core elements of the INSPIRE care model were implemented by the IAC staff as planned (fidelity); reached the target population and was perceived as acceptable and feasible from the perspective of community care providers (Quantitative aim)

2) To describe whether the core elements of the INSPIRE care model were perceived as acceptable and feasible among the IAC staff, older adults and informal caregivers (Qualitative aim)

3) To gain a comprehensive understanding of the feasibility of the core elements of the INSPIRE care model to inform whether to proceed with the effectiveness evaluation or/and identify if refinements are needed to the care model or if additional implementation strategies are needed to enhance implementation (Mixed-methods aim)

## 5.4 Methods:

This study is part of the INSPIRE Project, and assess the feasibility of the INSPIRE care model implemented in one IAC (phase 2).

### 5.4.1 Design

This study used a convergent parallel mixed-methods design, consisting of two distinct, concurrent phases: quantitative (using a non-experimental design) and qualitative (descriptive design) (27).

We collected and analyzed the two data sets separately and independently from each other, and the results were merged for interpretation. The INSPIRE feasibility study protocol has previously been published (28) (**figure 1**).

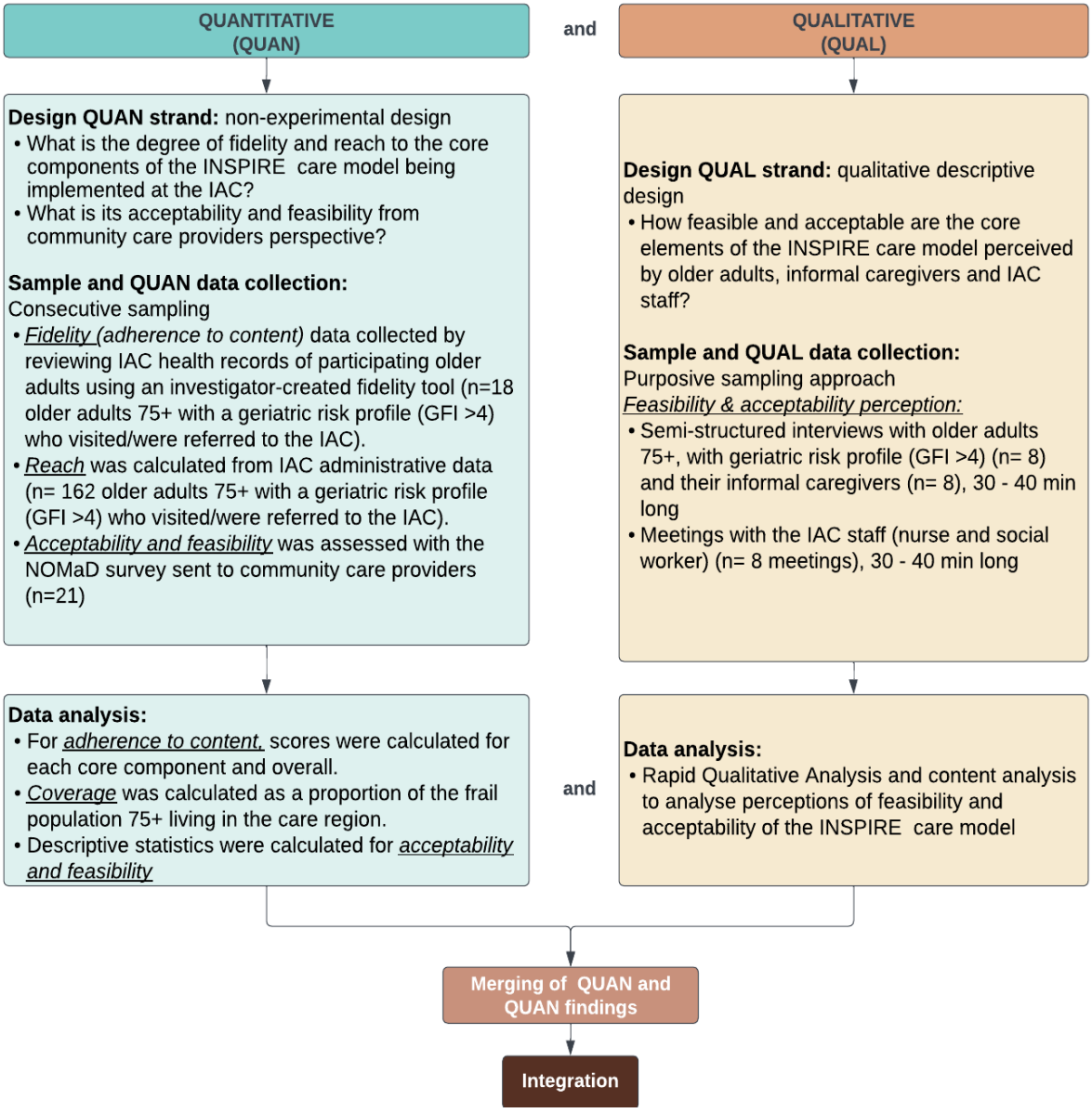


**Figure 1.** Design of the convergent parallel mixed-methods study of the feasibility of the INSPIRE care model at the IAC

### 5.4.2 Setting

The INSPIRE care model was implemented in one IAC of one care region of Canton BL. This care region has a total population of more than 37 thousand inhabitants, of which 11% are above 75 years (32). The IAC started operating on January 2022, with January and February 2022 dedicated to a preparation phase in which the research team (a geriatric nurse expert and a PhD student), was highly involved before the intervention's implementation prior to the implementation of the intervention. The recruitment started on March 21st, 2022 and ended in August 30th, 2022. This study ended in September 30th, 2022 according to plan.

### 5.4.3 Intervention: the INSPIRE care model

The INSPIRE care model aims to promote the integration of health and social care service delivered to frail home-dwelling older adults aged 75 years and more. A detailed description of the INSPIRE care model components structured according to the SELFIE (Sustainable intEgrated chronic care modeLs for multi-morbidity: delivery, FInancing, and performance) Framework domains, is provided in the supplementary material A (6). Table 1 summarizes the INSPIRE care model's minimal requirements for each core component that were tested in this feasibility study.

**Table 1.** Core components (minimal requirements) and peripheral elements of the INSPIRE intervention

| Core components | Peripheral components* |
|---|---|
| • Frailty **screening** of older adults ≥75 years at intake using a standardized screening tool | • *Tools* used for the screening: Groningen Frailty Indicator (paper based)<br>• *Setting*: IAC, older adult's house<br>• *Personnel who performs the screening*: IAC nurse or social worker<br>• *Frequency and duration*: 1 time upon first contact |
| • **Multidimensional assessment** of older adults identified as frail | • *Tools* used for the multidimensional assessment: WHO ICOPE guidance for person-centred assessment and pathways in primary care (ICOPE Handbook) and additional standardized instruments (paper based)<br>• *Setting*: IAC or older adult's house<br>• *Personnel who performs the assessment*: nurse and social worker<br>• *Person who answer the questions in the assessments*: older person<br>• *Frequency and duration of the appointments*: 1 to 2 appointments with a duration of 30 to 60 minutes per appointment |
| • Development of an **individualized care plan** by the nurse and social worker and **care coordination** with the participation of older adults, informal caregivers and other care providers involved in the care of the older adult | • *Personnel who lead the care planning and coordination*: nurse and the social worker<br>• *Frequency and duration of care planning meetings*: 1 meeting per older adult<br>• *Format*: Phone call, e-mail or in-person |
| • **Follow-up** on a case-by-case basis | • *Personnel who performs the follow-up*: nurse and social worker<br>• *Format*: phone call, e-mail or in-person |

*Peripheral components: intervention components that can be changed or adapted to enhance its fit to the context

*Implementation strategies to support the implementation of the INSPIRE care model*

A list of implementation strategies was pre-selected by the research team and in collaboration with different stakeholders during the development phase of the INSPIRE care model (phase 1) (27). Consistent with the Expert Recommendations for Implementing Change (ERIC) taxonomy (23), these strategies aimed to facilitate the implementation of the core components of the INSPIRE care model

in the IAC. An overview and operationalization of the strategies following the recommendations for specifying and reporting implementation strategies are presented in supplementary material B (23,24,27,30).

### 5.4.4 Step 1: Quantitative

#### 5.4.4.1Sample

To determine the degree of fidelity to the core components of the INSPIRE care model, we included a consecutive sample of 18 frail older adults aged 75+ living in the care region included in this study.

Additionally, we included a convenience sample of 23 community care providers who were collaborating with the IAC staff for the care coordination of the older adult. These community care providers included managers, administrative staff and direct providers of services of nine home care and social care organizations.

#### 5.4.4.2Variables and measurements

Older adults' socio-demographic characteristics included; age (year of birth), gender and living situation (e.g. living alone or with others). Additionally, using the ICOPE screening questions we collected data related to cognitive status, psychological capacity, nutritional status and fall history (33). Data for multimorbidity was self-reported (or by a proxy) and included the number of diagnoses the older person presented with during their first visit to the IAC. The geriatric risk profile was determined with the Groningen Frailty Indicator (GFI score). The GFI is a valid 15-item instrument for frailty screening where a score of greater than four indicates frailty (34).

Fidelity was evaluated following the approach of Carroll and colleagues in terms of *adherence to the content* (35), which was defined as whether the core elements of the INSPIRE care model were delivered according to the protocol (22,30). Using a fidelity tool developed by the research team, the IAC health records of each participant were reviewed. This tool contained 46 items (corresponding to the core components of the intervention) with yes (receiving a score of 1), and no or N/A answers (receiving a score of 0), (see supplementary material C). These items corresponded to the minimal requirements that needed to be completed in order to consider the intervention delivered as planned (35). A score of 1 was given to each positive answer (yes) and 0 to each negative or N/A answer. The maximum score was 46 (i.e. screening=1; multidimensional assessment=34; care planning and coordination=8; follow-up=3). Fidelity scores per core component were calculated for each participant as the percentage of minimal requirements per core component delivered as intended. Likewise, a total fidelity score was calculated as the percentage of the overall minimal requirements delivered as

intended (35). To determine the degree of fidelity to the INSPIRE care model, and per core component, an overall mean percentage was calculated. Our levels of fidelity were interpreted according to previously reported cuts-off: 80–100% 'high' fidelity, 51–79% 'moderate' and 0–50% 'low' fidelity (36).

Reach: we assessed the *reach* of the INSPIRE care model by dividing the total number of frail older adults aged 75+ who received the INSPIRE care model by the total number of frail older adults aged 75+ living in the care region of the IAC (35). The number of frail older adults 75+ who received the intervention was extracted from the IAC administrative data. The total amount of 75+ frail older adults living in this care region was estimated from the INSPIRE Population Survey we conducted in 2019 (29).

Acceptability and feasibility of the INSPIRE care model were determined using a validated version of the NoMAD questionnaire in German (37). This 23-item questionnaire, based on the Normalization Process Theory, assess care providers' perceptions of factors relevant to embedding a new intervention into their work practices (37). The survey consists of three sections, including the responders' role, general questions about the intervention, and detailed questions about the implementation of the intervention, in terms of four constructs: coherence, cognitive participation, collective action and reflexive monitoring (37,38). Answer options include a Likert-type scale to agree or disagree with what is being asked (agree, rather agree, neither, do not agree, rather disagree, not relevant) (38). There is no fixed approach for scoring this survey (38). *Acceptability* of the overall INSPIRE care model from the community care provider's perspective was determined using the answers to the following constructs: coherence, cognitive participation and collective action. *Feasibility* was determined using the answers to the reflexive monitoring construct (37).

#### 5.4.4.3Statistical methods

Descriptive statistics (e.g., frequencies, percentages, medians, means) were calculated for demographic data, fidelity (in terms of content adherence) to the core components of the INSPIRE care model by the IAC staff. To determine the acceptability and feasibility by community care providers, we calculated the frequencies of the responses for each construct of the NoMAD survey.

Data was analysed using R version 4.0.4 (39).

### 5.4.5 Step 2: qualitative

#### 5.4.5.1 Sample

Qualitative data was collected from two sources: interviews with older adults and informal caregivers and the bi-weekly meetings logs from the meetings with the IAC staff. For the interviews, using a purposeful sampling strategy, 8 frail (GFI ≥4) older adults aged 75+ who received the intervention by the IAC staff were invited, as well separate interviews with 8 informal caregivers who attended the IAC appointment with the older adult. Eight meetings were held with the nurse and social worker of the IAC.

#### 5.4.5.2Interview guide development

We developed the interview guides using Proctor's definitions of feasibility and acceptability (22). Interview guides were developed with input from multidisciplinary team members. The interview guides for older adults included six questions while the one for informal caregivers included nine questions. No specific questions related to screening or follow-up were asked to them. The guide for the meetings with the IAC staff included fourteen questions. The interview and meeting guides were developed in English and then translated into German but the interviews were conducted in Swiss German. The German versions of the guides were pilot tested with two older adults not included in the study (see supplementary material D).

#### 5.4.5.3Data Collection

After obtaining consent, the older adult was invited for a 30-40 min in-person interview. In cases where the older adult agreed their informal caregiver to be contacted for an interview, the caregiver was then invited for a separate interview. Interviews were conducted by a research assistant (KR) fluent in the local language and a member of the INSPIRE team (FS) with moderate knowledge of the local language. Notes were taken in German (by KR) and English (by FS) using a template with the interview guide questions. These notes were then transferred by two members of the research team (FS and MJM) to a matrix developed by the research team (RAP sheet) (40). A similar process was followed for meeting logs with the IAC staff. After each interview and meeting, KR and FS had an exchange to clarify any doubts in the answers due to language barriers. Audio recordings of the interviews and meetings were collected in case further verification was needed.

#### 5.4.5.4Analysis:

Before the analysis, the notes were translated from Swiss German to high German and then to English, as the main author was not fluent in German. Validation of content between the two languages was performed by a native speaker member of the research team.

For the analysis we used a combination of rapid qualitative analysis (41) and latent content analysis (42). The definitions of implementation outcomes according to Proctor and colleagues (22) were used to identify the categories (i.e. acceptability and feasibility) and generate a first list of codes. The analysis was conducted so that first, the main author (MJM) and a member of the research team (FS) were familiarized with the data collected, which then were transferred to a matrix (RAP sheet) (40). This matrix included the questions and the categories aimed to appraise (i.e. acceptability and feasibility). Next, the main author identified emergent codes and added them to the previous code list (42,43). Then, meaning units were identified along the matrices and labeled with a code, and the text was re-read again to check whether important pieces of content were excluded (42). A condensation process was performed before categorizing the text (42).

#### 5.4.5.5Techniques to enhance trustworthiness

##### Rigor

Initial results were discussed with the members of the research team and the IAC staff during the analysis, to gather feedback based on their methodological and local expertise, respectively. To maintain an audit trail, all codebooks' modifications, matrices and analytical documents prepared during the study have been archived.

##### Data Integration

For the analysis, quantitative and qualitative data were organized and analysed separately. Quantitative and qualitative data were merged using a table to compare the separate results (31) (see supplementary material E). To interpret to what extent and in what ways the two sets of results converged and relate to each other, we summarized the results using a weaving approach (44).

## 5.5 Results:

### 5.5.1 Quantitative data

##### Socio-demographic characteristics of participating older adults

Age of the participating older adults (N=10) ranged between 79 to 97 years, with a mean of 89.1 years [SD=4.8], 70% were females and 60% lived alone. The median GFI score was 6 [IQR: 4-7.8]; 30% of the participants had a history of falls in the previous 12 months prior to the visit to the IAC; 60% screened positive for cognitive decline; 40% screened positive for risk of depression; 20% screened positive for

risk of malnutrition; and all of them presented multimorbidity, with a median of 3 diagnoses [IQR: 2.3-4.5].

### Fidelity (adherence to content) to the core components of the INSPIRE care model by the IAC staff

Table 2 shows the individual and mean scores for fidelity per domain and overall. Highest fidelity to content was observed for screening (100%), while the lowest fidelity scores were observed for care plan and coordination (42%) and follow-up (7,4%). The overall mean fidelity of the INSPIRE care model was moderate (71%).

**Table 2:** Individual and mean fidelity weighted scores in terms of adherence to content of the INSPIRE care model.

| Participant code* | Screening score (%) | Multidimensional Assessment score (%) | Care plan & coordination score (%) | Follow-up (%) | Total fidelity score (%) |
|---|---|---|---|---|---|
| PATIENT 1 | 100 | 70,3 | 62,5 | 33,3 | 72,9 |
| PATIENT 2 | 100 | 75,7 | 25 | 0,0 | 68,8 |
| PATIENT 3 | 100 | 59,5 | 37,5 | 0,0 | 58,3 |
| PATIENT 4 | 100 | 78,4 | 62,5 | 66,7 | 81,3 |
| PATIENT 5 | 100 | 73,0 | 37,5 | 0,0 | 68,8 |
| PATIENT 6 | 100 | 73,0 | 25 | 0,0 | 66,7 |
| PATIENT 7 | 100 | 73,0 | 62,5 | 0,0 | 72,9 |
| PATIENT 8 | 100 | 83,8 | 37,5 | 0,0 | 77,1 |
| PATIENT 9 | 100 | 78,4 | 37,5 | 0,0 | 72,9 |
| PATIENT 10 | 100 | 75,7 | 50 | 0,0 | 72,9 |
| MEAN | 100,0 | 74,5 | 41,7 | 7,4 | 71,1 |

*Participant code used to identify participants in the study.

### Feasibility of the INSPIRE care model from the perspective of community care providers

We received 21 out of the 24 surveys sent out to community providers who were involved in the care coordination of older adults (response rate of 87.5%). Of them, 86% corresponded to community care providers directly involved in the provision of services. Of them 33% were nurses, followed by social workers, administrative staff and managers. Supplementary material F summarizes the responses to the coherence, cognitive participation and collective action constructs. Based on these responses, we could conclude that the INSPIRE care model was perceived as feasible. For example, 91% reported that they can easily integrate collaboration with the IAC to coordinate care into their existing work. On the other hand, 52% of community care providers were not convinced that their involvement in the coordination of care through collaboration with the IAC is an essential part of their duties, whereas 48% did not recognize potential benefits to their work if collaborating with the IAC to coordinate care.

### Acceptability of the INSPIRE care model from the perspective of community care providers

Supplementary material G summarizes the answers to the reflexive monitoring construct. According to these responses, the perception of acceptability of the INSPIRE care model does not appear to be uniform among the participants. Only 11 out of 21 respondents were aware of the positive outcomes associated with collaborating with the IAC to coordinate care, 7 out of 21 agreed or rather agreed that this collaboration was worthwhile and 9 out of 21 appreciated the positive impact the collaboration might have on their own work.

### Reach of the INSPIRE care model

Based on our population survey (29), we estimated that 987 older adults aged 75+ living in the care region were frail (29,32). Between March to September 2022, 45 frail older adults aged 75+ received the intervention, making the coverage of the intervention 4.5% (**Figure 2**).

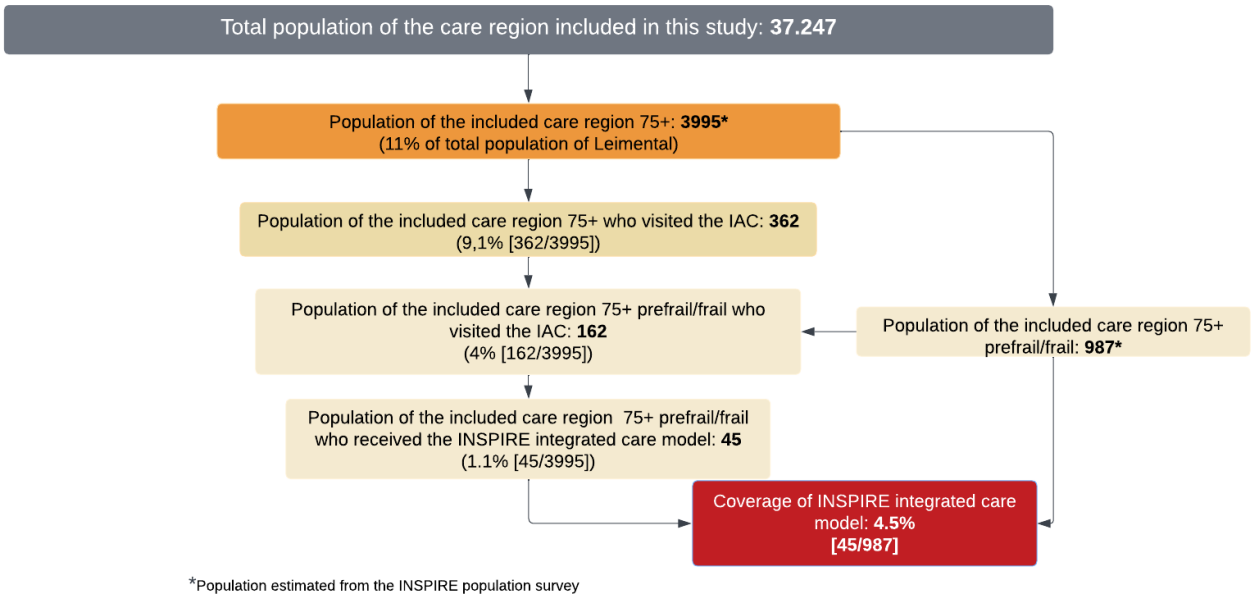


**Figure 2.** Reach of the INSPIRE care model

## 5.5.2 Qualitative data

We interviewed frail older adults aged 75 + (n=6) and informal caregivers (n=8). The nurse participated in all eight meetings whereas the social worker was only available in six of them.

### Acceptability of the core components of the INSPIRE care model from the perspective of older adults, informal caregivers and IAC staff

Screening

*IAC staff:* Positive perception towards screening older adults for frailty *"Screening so far it is very good, much is observable even without askingt questions"* (IAC staff 1).

Multidimensional assessment

*Older adults:* High acceptability of the multidimensional assessment was reported by older adults. Five out of six older adults had a positive impression towards this component and will recommend it to others. This could be influenced by the positive perception that almost all of them had about the staff of the IAC (especially for the nurse), who were considered as very friendly and considerate by the participants. Only one older adult seemed to have a neutral opinion about the multidimensional assessment, as according to the notetakers the older person was reluctant about their presence and showed a reduced willingness to answer the questions. One older adult felt that they did not need it at the moment and thought that the multidimensional assessment was not helpful for them.

*Informal caregivers:* High acceptability of the multidimensional assessment was also observed among informal caregivers. All interviewees had a positive impression of the assessment delivered to the older adult. Informal caregivers valued that the assessment was person-centred "*the nurse had put the person in the center"* (PATIENT 4), and tailored to their needs "*It is tailored to our situation (for me and my mother)*" (PATIENT 2). However, they also suggested there was some room for improvement in the communication between the IAC staff *"the communication between the nurse and the social worker could be better; I spoke to them both and they asked me the same questions (it was not a problem for me but still I thought I mention this)"* (PATIENT 2).

*IAC staff*: Acceptability of this component of the INSPIRE care model was high among the IAC staff. Their satisfaction with the intervention mainly came from the exchanges that they had with older adults and informal caregivers -as part of the assessment-, who expressed gratitude towards the service received. However, concerns towards the length of the multidimensional assessment were expressed, as it could take between 1 hour and 1 hour and a half to complete it. Nevertheless, the staff also valued the comprehensiveness of this assessment *"The multidimensional assessment is an extreme number of questions. But it gives a comprehensive picture of the older person"* (IAC staff 1).

Care plan and care coordination

*Older adults:* Older adults appeared to be satisfied with the information provided by the IAC staff as well as about the available services for both themselves and their caregivers *"I find helpful the services that the IAC provides me (the options that they gave me for services), so they will help me with my wish to stay at home"* (PATIENT 1).

*Informal caregivers:* Informal caregivers appreciated being included in the decision-making process and that their opinions were being acknowledge "*I was very pleased and I think it is so great that the caregiver is also involved"* (PATIENT 4), as well as the voice of the older adult *"The conversations gave the client an opportunity to talk about her life"* (PATIENT 10). Two informal caregivers specifically expressed their positive opinion towards developing a care plan and the advices they receive as part of this process. Some other informal caregivers expressed relief knowing that there is a support person available "*I felt the first time so relieved that I have some place / someone to call and ask for advice or support"; (…) "I had a phone call with my sister at the end of the day that day and we said we now do not feel alone"* (PATIENT 4). One informal caregiver mentioned not considering this advice provided by the IAC AS they were already collaborating with different organizations.

*IAC staff:* We found a high acceptability towards involving older adults, informal caregivers and other community care providers in the development of the care plan and the organizing of care. The IAC staff considered that collaborating with community care providers was central as they are more familiar with the older adult, especially with complex cases (i.e., those with dementia) *"It is more difficult to find out about the needs and concerns of people with dementia, this is why is important to involve the caregiver"* (IAC staff 1) *"Cooperation with organization x is very good. Organization x contacted the IAC and asked for help with a complex case"* (IAC staff 2).

In the other hand, the collaboration between the nurse and social worker of the IAC evolved over time. Initially, only one staff member expressed positive comments related to the collaboration with each other. However, by the fifth meeting, positive comments related to the nurse-social worker collaboration were expressed by both staff members "*Cooperation with* IAC staff 2 *is very much appreciated - the different focus from two disciplines is very positive, especially for the care plan. The cooperation has been consolidated and has become well-established"* (IAC staff 1). "*Cooperation is good. The concept is based on a holistic approach, which is very good" (*IAC staff 2).

Follow-up

*IAC staff:* The acceptability of the IAC staff towards conducting follow-up of the older people also evolved over time. During the first six meetings, the nurse and social worker exhibited a positive attitude towards conducting this component. In fact, the IAC staff 2 considered this as an automatic task of their profession, especially for complex cases. However, afterward, their opinion became more neutral, likely influenced by feasibility considerations regarding this component (i.e. lack of time).

## Feasibility of the core components of the INSPIRE care model from the perspective of IAC staff, older adults and informal caregivers

### Screening

*IAC staff:* IAC staff found it highly feasible to perform the screening process. They both viewed it as an effortless task, particularly when the information is obtained directly from the older person. However, it was emphasized that obtaining information from older adults, especially in the presence of difficult diagnoses such as dementia, was a challenging task. In such cases, the reliance primarily shifts to informal caregivers as the main source of information and the screening was not performed. Also, they considered that the screening tool selected for the INSPIRE care model (i.e. Groningen Frailty Indicator) should be reviewed or changed due to its length *"Screening for frailty is too long with 15 questions"* (IAC staff 1), and content (i.e. screening for loneliness) *"when questions about loneliness are asked, the conversation becomes emotional"* (IAC staff 1).

### Multidimensional assessment

*Older adults:* Older adults found the multidimensional assessment to be feasible and well-received. In general, they expressed positive feedback and did not consider it burdensome. However, one participant pointed out that the questions were too academically-oriented and suggested incorporating more personalized aspects to enhance the assessment experience "*I could have imagined more questions about personal interests, e.g. about hobbies*" (PATIENT 5).

*Informal caregivers:* All informal caregivers reported that it was feasible to complete the multidimensional assessment. They expressed willingness to attend meetings with the IAC staff and the older adult and reported it convenient that the assessments occurred at the older adult's home. The caregivers found the assessment to be relatively straightforward and not overly time-consuming, describing the experience as positive, even when they were the ones providing answers to the assessment questions *"It was also a positive experience to do the assessment for my aunt instead of her"* (PATIENT 3). Only two informal caregivers of older adults with dementia referred difficulties regarding the performance of this component, due to the condition of the older person (e.g. disoriented) *"My aunt does not really know anything that happens around her so I don`t think she knew what was happening"* (PATIENT 3).

*IAC staff:* The IAC nurse and social worker considered that this component was doable. One IAC staff member considered that conducting the entire multidimensional assessment was a feasible task for them, as it included easy-.to-answer questions. According to them, the whole assessment was

conducted in one appointment, lasting 1.5 hours in the beginning, which decreased to an hour duration as the study proceeded. An additional meeting with the older adult and/or the informal caregiver was introduced prior to the assessment. However, this staff member also had concerns about the length and impact of the multidimensional assessment in the older adult *"It is doable, but I keep asking if the older person still likes it and is not tired (…) Conducting the multidimensional assessment can cause anxiety in the older person"* (IAC staff 1); as well as the difficulty of performing the assessment under certain situations *"The multidimensional assessment is feasible. However, if the affected person has dementia, I am heavily dependent on the relatives, whereby the answers regarding well-being (loneliness, sadness, etc.) are not very meaningful. Tests (e.g., vision/hearing/walking tests) cannot be carried out completely or not at all be performed. Thus, the instrument is practically not applicable in advanced dementia"* (IAC staff 1). *"Sometimes respondents do not want to answer some questions (e.g., clock test, loneliness questions) or they do not want to do the whole multidimensional assessment"* (IAC staff 1). The other member of the staff mentioned not being able to do the assessment due to lack of skills based on their prior education, and thus, only conducted the screening.

Care plan and care coordination

*Older adults:* One older adult mentioned feeling overwhelmed by the amount of information provided by the IAC staff "*I was a little overwhelmed with all the information but that is more because I need time to read everything in between*" (PATIENT 4).

*Informal caregivers*: Informal caregivers reported problems with the collaboration of community care providers and the IAC staff for care coordination. They think that communication between all the parties is an area that should improve *"The collaboration between care providers should still be improved and there should be an exchange of information (…) otherwise the information is fragmented"* (LEIMF05). Informal caregivers also mentioned issues with staff organization at the IAC. One informal caregiver reported problems reaching the nurse, who was on holiday without a replacement, leading to a lack of support.

*IAC staff:* The nurse and social worker of the IAC strongly agreed on the feasibility and importance of discussing the overall care plan with the older adult and their informal caregivers, especially in the case of older adults with dementia *"Both groups (i.e. older adults and informal caregivers) are strongly involved"* (IAC staff 1), *"The relatives are always explicitly involved in the case of cognitive impairments or at the request of the person concerned"* (IAC staff 2).

The collaboration between both IAC staff members to develop the care plan improved throughout the course of study. Initially, both staff members reported problems in collaborating with each-other due to unclear task definitions; however, by the fourth meeting, an improvement in the collaboration was mentioned. Shared concerns about holiday replacements and their capacity to cover the demand of services were also raised as a topic to be considered to improve the intervention.

An evolution in the collaboration between the IAC staff members and community care providers to create the care plan and coordinate care was also mentioned. Initially, the IAC staff members stated that community care providers feel threatened by them due to lack of awareness, clarity regarding the role of the IAC and mistrust *"The social services of the hospital yz are aware of the services offered by the IAC, but the nursing staff are not"* (IAC staff 1), *"At the beginning, there were difficulties with the organization xy, because they perceived the social worker of the IAC as competition" (…) "I let them know who I am then I explain why I need to collaborate with them (…) we are not your competition"* (IAC staff 2). Problems in establishing good communication with community care providers *to care planning and coordination were* also mentioned *"It was a little difficult communicating with the organization xx for household help as I asked the organization xx for additional help for another client, and they were annoyed as to why the older person did not ask themselves for it"* (IAC staff 2). However, after the fifth meeting, the IAC nurse and social worker shared examples of successful collaboration with other community care providers in creating and coordinating care plans. They acknowledged that this partnership is continually evolving and improving. However, the IAC staff also recognizes the need for improvement in this area, as they sometimes hesitated to contact other care providers due to feeling treated unequally.

Follow-up

*IAC staff:* Both IAC staff members initially considered follow-up as feasible; however, close to the end of the study they considered it practically non-existent due to lack of time.

### 5.5.3 Mixed-methods comparison

Comparisons between the quantitative and qualitative findings revealed how the fidelity of delivering the core components of the INSPIRE care model, its reach, feasibility and acceptability were related to each-other. Our quantitative findings demonstrated that the care model reached 4.5% frail home-dwelling older adults, and the IAC staff conducted frailty *screening* in all the cases (high fidelity). In parallel, our qualitative findings demonstrated a considerable degree of perceived acceptability and

feasibility among the IAC staff for implementing this component. However, it was noted that in situations involving older adults with dementia or severe frailty, there was a heavy reliance on informal caregivers, which was deemed suboptimal and cited as a reason for omitting the screening.

Regarding the *multidimensional assessment*, our quantitative analysis indicated that the IAC staff demonstrated a moderate fidelity in conducting this component. Although, our qualitative findings revealed a high level of acceptability among older adults, informal caregivers, and the IAC staff, the study also identified some feasibility issues, particularly highlighted by the IAC staff. According to them, the assessment was generally feasible to conduct, with a few exceptions. For instance, they faced challenges when older adults chose not to answer the questions, or when they were dealing with an older adult with dementia (a problem also highlighted by informal caregivers). An additional issue concerning the feasibility of the assessment was its length and the type of questions included. Certain questions (e.g. those related to loneliness) were not well-received by older adults, as they had a negative impact on their emotional status, and were perceived as too academic.

The *development of a care plan* and the *coordination of care* was conducted by the IAC staff with a low fidelity. Our qualitative analysis can contribute to understand this finding. Older adults and informal caregivers welcomed their participation in the care planning. Similarly, the IAC staff recognized the significance of working as a team (IAC nurse and IAC social worker), involving both the older adults and informal caregivers, along with community care providers, as they are more familiar with the older adult. However, the surveys sent to community care providers revealed that only a minority of them were willing to collaborate with the IAC, as they did not see this collaboration as an essential part of their duties and some doubted about the positive impact of this collaboration on their work. As a result, the IAC staff referred some feasibility problems in establishing this collaboration with communication issues, mistrust, and unclear role definitions being the most emphasized. Nevertheless, our study also exposed promising findings. The majority of community care providers expressed openness to collaborate with the IAC staff and integrate this collaboration into their existing work. Moreover, towards the end of this study, positive examples of successful collaboration were highlighted, indicating that more time will be needed to increase the fidelity of this component of the care model.

Lastly, our quantitative analysis revealed that *follow-up* was the component of the care model implemented with the lowest fidelity by the IAC staff. The analysis of the meetings with the staff revealed that while this component was highly accepted by the IAC staff at the start of the study, as the time went by, lack of time emerged as the main obstacle preventing adequate follow-up.

## 5.6 Discussion:

This study aimed to assess the feasibility of the core components of the INSPIRE care models in the community setting, by assessing its acceptability, fidelity, reach and feasibility using a mixed methods approach. This is the first feasibility study reported within the scope of an implementation science project aiming to implement an integrated care model for frail home-dwelling older adults. Our findings revealed that the INSPIRE care model reached a low proportion of the target population, with a varying feasibility for each core component. Frailty screening is a feasible component of the care model with high levels of fidelity and perceived acceptability and feasibility. This finding aligns with the feasibility results reported by Tavassoli and colleagues (2022) (15), who successfully screened home-dwelling older adults using the Integrated Care for Older People (ICOPE) guidelines provided by the WHO in France. It is however important to mention that their screening method varied from ours. They engaged healthcare professionals, older adults, or their relatives with the help of a digital tool (15). In contrast, our screening was conducted by IAC staff during intake using a paper-based version of a different screening tool. Thus, it appears that both screening mechanisms are equally feasible for identifying older adults at risk in the community. However, it's essential to ensure that the chosen tool aligns with the cultural context and doesn't add to the patient's burden.

Additionally, our study revealed that conducting a multidisciplinary assessment on frail home-dwelling older adults by IAC staff is feasible and well-accepted, showing moderate to high levels of fidelity (75%) and feasibility. In contrast, the Tavassoli's study found that less than 10% of older adults with a positive screening underwent a multidimensional assessment (15). The divergence in results could be attributed to variations in intervention delivery and funding mechanisms. The assessment mostly occurred at the older adult's home, carried out by dedicated IAC staff, while Tavassoli's approach relied on general practitioners conducting the assessment at their office without compensation. Additionally, given that the INSPIRE care model was developed using an implementation science approach, we not only developed an intervention that fit the context, but we also identified barriers to its implementation and selected implementation strategies to address them prior to assessing its feasibility (23). Consequently, we encountered fewer difficulties in conducting the assessment compared to Tavassoli's study, where low involvement of general practitioners was reported as the main cause of the limited delivery of this component (15). Nevertheless, our study highlighted the significance of incorporating flexibility into the assessment process, particularly when dealing with intricate conditions (e.g., dementia) or encountering negative reactions from older individuals towards the assessment questions. In fact, it has been suggested that allowing for flexibility in delivering integrated care to address the complexities of older adults is a strategic approach for successfully implementing integrated care (45).

Our findings also showed that further efforts are needed to improve the fidelity, acceptability and feasibility of the other two core components: care planning and coordination and follow-up. Several reasons could explain these results. First, in contrast to the other two components of the care model, which were directly administered by the IAC staff to the target population, the development of care plans and care coordination and follow-up required active engagement of external entities, particularly the community care providers. According to our findings, the collaboration between IAC staff and community care providers did not yield successful results, aligning with issues reported by Tavassoli and colleagues (15). The crucial role of multidisciplinary teamwork in the successful implementation of integrated care has been highlighted by numerous studies (45–48). Yet, these studies have also acknowledged the inherent challenges in achieving such collaboration and the need to address this with contextually adapted implementation strategies. At the core of effective multidisciplinary teamwork lies the establishment of trust-based relationships (49), a process that demands simultaneous efforts at different levels and time?. Initiating with organizational readiness for change and the presence of strong leadership to effectively support multidisciplinary teamwork (45–48,50), it is equally important to foster a shared value of the goals of integrated care (47), define roles and enhance good communication among all members of the multidisciplinary team (46,47). However, the lingering presence of professional tensions between the health and social care sectors (51,52) can become a barrier for the establishment of multidisciplinary teamwork. Evidence indicates that these tensions can influence a care provider's decision to refrain from participating in integrated care, either due to perceiving it as beyond their area of expertise or because of their skepticism about its potential benefits (51). This complexity highlights the importance of employing implementation science methods, especially implementation strategies, to modify community care providers' behaviors towards the adoption of integrated care models. In the case of the INSPIRE care model several implementation strategies were employed (see supplementary material B) to address these aspects, but they were primarily targeted at the staff of the IAC. As a result, achieving higher collaboration from community care providers to coordinate care remains a challenge.

An alternative explanation to the problems in the collaboration of the IAC staff and community care providers could be attributed to the recognition that building trusting relationships demands a significant amount of time as well. When considering integrated care models, some studies propose that it might take more than 12 months to cultivate trust among members of the multidisciplinary team. (46). This feasibility study as part of an implementation science approach was conducted over a period of 7 months, implying that a longer period might be essential for fostering trust among the IAC's staff, as well as between the newly introduced community centre and the care providers well-established in the community. Moreover, although our care model capitalized on an existing law to reorganize the

care for home-dwelling older adults (26), it is important to note that this legal framework was not specifically designed for implementing integrated care. Consequently, the roles and responsibilities of other community care providers in the implementation of this care law were not clearly defined. In this regard, employing implementation science methods like context analysis and implementation strategies can assist in preliminarily identifying these barriers and devising strategies to address them. For example, Threapleton and colleagues (2017) suggest that integrated care policies that offer autonomy and flexibility within the system can effectively support the implementation of integrated care models by facilitating professional engagement, credibility and shared values (47). Similarly, Looman and colleagues (2021) argue that the presence of formal structures such as contracts or agreements can facilitate collaboration among various community care providers, clarifying roles and ensuring sustainability over time (45). Hence, it is crucial prioritize time, but also the use of implementation strategies to establish robust collaboration structures among all the individuals involved in the feasibility phase of an integrated care model before embarking on a large-scale implementation.

Finally, our study revealed that providing follow-up care to frail, home-dwelling older adults by the IAC staff was the least feasible component of our care model. The primary reason for this outcome was the lack of time, which was attributed to the complex needs of the older adults receiving services from the IAC. However, we also believe that there might have been suboptimal registration of this process due to the ICT system not being designed for integrated care purposes. As a result, it did not adequately support the registration of information for each older adult, potentially contributing to the lack of proper recording of data. Some studies have recognized how Information and communication technologies (ICT) systems can be helpful tools for monitoring and organizing follow-up of older adults receiving integrated care (15,45,48), so we consider that this is an aspect that needs to be improved to successfully implement integrated care.

### 5.6.1 Methodological considerations

Our research deals with some limitations. First, the data for implementation outcomes (fidelity, acceptability and feasibility) was collected at a single point for each participant, potentially missing the opportunity to observe changes throughout the study period. This limitation restricts our understanding of the dynamic nature of these outcomes and our ability to capture their potential variations over time, as observed during the meetings with the IAC staff. Additionally, we recognize the absence of a clear assessment of the adoption of the INSPIRE care model. Adoption is recognized as an indicator of uptake of an evidence-based intervention (22) and serves as a precursor for achieving high

fidelity. For future research, we could consider using a more standardized tool such as the Evidence-Based Practice Attitude Scale (EBPA (53) combined with qualitative information to assess this implementation outcome. Moreover, it is essential for the feasibility evaluation of integrated care models to revisit the program theory of the care model and identify all uncertain processes requiring clarification during the feasibility assessment, (e.g. coordination among care providers, communication and information sharing). Finally, it would have been enriching to our results if we would have had the opportunity to also conduct interviews with community care providers as part of the feasibility evaluation. Due to their fundamental role in integrated care, community care providers insights could have provided valuable clarification on the survey results and the assumptions we made. Therefore, we strongly recommend that future feasibility evaluations of integrated care models in the community prioritize including a qualitative assessment of the perspectives of all individuals affected by the implementation. This approach will enable the identification of additional barriers and facilitate the selection of effective implementation strategies to overcome them.

## 5.7 Conclusion:

This feasibility study sheds light on the challenges and opportunities for improving the implementation of an integrated care model for frail home-dwelling older adults in the community setting prior to conducting an effectiveness study. While frailty screening and multidisciplinary assessment showed promising levels of feasibility, acceptability, and fidelity; the development of care plans and care coordination was found to be difficult as it required collaboration with external community care providers. The establishment of trust-based relationships and the fostering of shared values among all stakeholders emerged as critical factors for successful multidisciplinary teamwork, which can be identified and tackled with the use of implementation science methods. Additionally, the study highlighted the need for a longer implementation period to cultivate trust and ensure effective collaboration. The lack of time and suboptimal ICT system support posed barriers to providing follow-up care. These findings underscore the importance of considering context-specific challenges and employing implementation science methods to facilitate the adoption of integrated care models.

## 5.8 Ethical considerations and informed consent

Ethical approval for the feasibility study was sought from the Ethikkommission Nordwest- und Zentralschweiz (EKNZ) in Switzerland, EKNZ 2021–02430. The EKNZ declared that the study was not subject to cantonal and federal legislation, as it was not considered a research study as defined by the Human Research Act Art. 2, para.1. The study was re-submitted for an Advisory Opinion and was able

to proceed based on positive opinion, as per the EKNZ response on March 3, 2022. The study was registered in ClinicalTrials.gov: NCT05302310.

Written informed consent was obtained from the research team via signature from all study participants (except community care providers whose consent was implied by survey completion). In the case of older adults with an altered capacity to consent based on the Mini-Cog assessment and clinical judgement, a proxy consent was obtained from a legal representative.

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## 5.10 Supplementary material A: The INSPIRE integrated care model for frail home-dwelling older adults 75+

| INSPIRE (inspire-bl.unibas.ch) | Integrated care model for frail home-dwelling older adults |
|---|---|
| **Service delivery** | Core components:<br>• Frailty screening of older adults ≥75 years at intake using a standardized screening tool<br>• Multidimensional assessment in older adults identified as frail, including the following domains: cognitive decline, limited mobility, malnutrition, visual impairment, hearing loss, depressive symptoms, risk of falls, multimorbidity, functional status, physical activity, delirium, sleep problems, incontinence and social assessment. Only under evident limitations (e.g. severe cognitive decline, mobility problems, hearing problems or space restrictions), some domains can be excluded.<br>• Follows-up on a case-by-case basis to monitor progress of the older person and detecting difficulties in participating in interventions, adverse effects of interventions, and changes in functional status. Considerations for follow-up: agreement established with the older adult or informal caregiver when discussing the care plan; when referrals to an external care organization were recommended in the care plan or if required based on subsequent interactions with their other care providers (e.g., GP or home care nurse). The older adult's health record should remain open, but the follow-up will cease when no further action is required from the nurse and social worker according to the older adult's needs or if the older adult is referred into a nursing home.<br><br>Peripheral elements:<br>• *Tools* used for the screening & multidimensional assessment: INSPIRE used the Groningen Frailty Indicator (GFI) questionnaire to screen older adults and the WHO ICOPE guidance for person-centred assessment and pathways in primary care (ICOPE Handbook) plus additional standardized instruments such as the Wexner-Score for fecal incontinence.<br>• *Setting*: IAC, older adult's house<br>• *Personnel* who performs the screenig, assessment & follow-up: nurse and social worker<br>• *Person who answer the questions in the assessments:* older person or their informal caregiver<br>• *Frequency and duration of the appointments:* Two to three appointments with a duration of 30 to 60 minutes per meeting<br>• *Format* for follow-up: phone call, e-mail or in-person |
| **Leadership & governance** | Core components:<br>• Development of an individualized care plan by the nurse and social worker. The care plan must include older adult's needs, goals and preferences (e.g., what is important to them); views of health and social care professionals (i.e., medical history, conditions and priorities); care and support arrangements; and the development of an action plan. The nurse and social worker discuss the care plan with the older person, their informal caregivers and other professionals involved in their current care (community health and social care providers). The nurse and social worker coordinate the care plan by having an overview of the older adults' needs and goals, current care/support, and new care/support recommended; sharing and monitoring the care plan with the older adult, informal caregivers and other care providers; as well as managing referrals to other providers/organizations.<br><br>Peripheral elements<br>• *Personnel who leads the care planning and coordination:* nurse together with the social worker<br>• *Frequency and duration of care planning meetings:* 1 meeting per client<br>• *Format:* Phone call, e-mail or in-person |
| **Workforce** | Core elements:<br>• Multidisciplinary team composed by a geriatric nurse expert and a social worker, family physician, the older person and informal caregivers<br>• Core group composed by a geriatric nurse expert and a social worker<br>• Named coordinator: a geriatric nurse expert<br><br>Peripheral elements:<br>• Other professionals can be included as part of the multidisciplinary team (e.g. social workers or nurses of home-care providers) |
| **Financing** | This INSPIRE integrated care model is offered for free to all frail older adults 75+ as part of the services of the Information and Advice Center of the care region included in the study. The setting up of the center, salaries of the geriatric nurse expert, social worker and administrative staff are covered by the contributions of each municipalities that belong to the care region.<br><br>There is no direct and specific reimbursement to family physicians or other professionals involved in the care of the older person for participating in the care planning and coordination<br><br>Additional healthcare and professional support included in the care plan is covered by the health insurance of the older person or out of pocket payments (if the service is not covered by the health insurance) |
| **Technologies** | An information system is suggested that allows to create a health record of the older person and to offer a secured platform to share information between the nurse and social worker. This information can be shared with family physicians or other home care organizations using an encrypted e-mail account upon request. |
| **Information** | Individual information is collected from each older adult including: demographic information, contact details of the older person, caregivers and family physician, results of the screening and multidimensional assessment and a summary of any interaction with the older person, their caregiver or other professional involved in the care of the older person. The information of the assessments can be shared with the family physician upon request. |

## 5.11 Supplementary material B: Implementation strategies for the INSPIRE care model

**Table 1:** Overview of the implementation strategies of the INSPIRE care model

| ERIC cluster | ERIC Implementation strategy | Actor | Action | Action target | Temporality | Dose | Justification |
|---|---|---|---|---|---|---|---|
| Train and educate stakeholders | Conduct ongoing training | Research team [a] | Developed a training curriculum for the IAC nurse and social worker. In-person training was provided. | Improve skills, intention to use and degree of delivery of the intervention | Preparation phase | 31 hours (as part of the IAC Staff working time) | When new roles are introduced, it is necessary to provide additional education and training to foster the development of new competencies (45) |
| | Make training dynamic | | | | | | |
| | Provide ongoing consultation | Geriatric nurse expert | Provided support to the IAC staff through individual coaching, phone calls, emails or direct supervision | | Preparation & Implementation phase [b] | Daily or as requested | |
| Support clinicians | Revise professional roles | Research team [a] | Co-development of a job description for the IAC nurse and creation of an integrated care pathway to outline the different roles | Improve the use and degree of delivery of the intervention | Preparation phase | 1 time | Clarifying professional roles can contribute to appropriate implementation of an intervention and foster interprofessional collaboration (45,54) |
| Change of infrastructure | Change record systems | Research team [a] | Met with the IAC staff and suggested adaptations to the software used in the IAC | Improve the degree of delivery of the intervention | Preparation phase | 3 meetings | As many electronic systems are mostly designed to facilitate the accountability of an organization, it is key to adapt the systems to facilitate exchange of information between professionals (45) |

[a] Research team: a geriatric nurse expert and a PhD student; [b] Preparation phase: January to February 2022. [b] Implementation phase: March to September 2022.

## 5.12 Supplementary material C: Fidelity tool

# INSPIRE Fidelity Tool

Purpose of tool: to determine the degree to which the intervention was implemented as it was planned in the original protocol. The tool below describes the quantitative fidelity items.

- Types of files to be reviewed = INSPIRE study participants only (sample 1B)
- # of files to be reviewed in feasibility study = consecutive sample of all eligible participants
- Individual responsible for data entry = INSPIRE research team
- Data entry schedule = every week and once at the end of the feasibility study to review completion of follow-up activities
- Scoring is done by tallying up the (1)'s at the end to calculate the percentage of the number of cases in which specific component was scored with "yes"/1 over the total number of IAC health records reviewed.
- Comments section is for analysts to track any questions which may need clarification from IAC staff or any important details (e.g., if the multidimensional assessment had to be paused because patient wasn't feeling well)

1. Was there a multidimensional assessment for this client? ☐ YES ☐NO

If no, what type of service was completed for this client?

☐ Health promotion and prevention ☐Nursing home referral ☐ Other: _____

➔ Stop data collection.

If yes, please complete the tool below.

Participant Code: _____

| | *Data Source* | YES | NO | N/A | Comments |
|---|---|---|---|---|---|
| WORKFORCE | | | | | |
| SCREENING | | | | | |
| • Was the GFI completed in the IAC health record (IAC HEALTH RECORD)? | *IAC HEALTH RECORD* | YES (1) | NO | | |
| MULTIDIMENSIONAL ASSESSMENT: *Definition of* multidimensional assessment *completed: if the screening questions and further assessments are completed by the nurse and social assessment completed by the social worker during their first 1-3 appointments with the IAC*<br>*Assessment is considered "performed" if the questions were asked for each section.* | | | | | |
| • Is the multidimensional assessment section in the IAC HEALTH RECORD completed by both the nurse and the social worker? | *IAC HEALTH RECORD* | YES (1) | NO | | |
| • Were screening questions completed on cognitive decline? | *IAC HEALTH RECORD* | YES (1) | NO | | |
| • Was further assessment of cognitive decline completed? | | YES (1) | NO | N/A<br>If no further assessment was required based on screening results | |
| • Were screening questions completed on limited mobility? | | YES (1) | NO | | |

| | | | | | |
|---|---|---|---|---|---|
| • Was further assessment of limited mobility completed? | | YES (1) | NO | N/A<br>If no further assessment was required based on screening results | |
| • Were screening questions completed on malnutrition? | | YES (1) | NO | | |
| • Was further assessment of malnutrition completed? | | YES (1) | NO | N/A<br>If no further assessment was required based on screening results | |
| • Were screening questions completed on visual impairment? | | YES (1) | NO | | |
| • Was further assessment of visual impairment completed? | | YES (1) | NO | N/A<br>If no further assessment was required based on screening results | |
| • Were screening questions completed on hearing loss? | | YES (1) | NO | | |
| • Was further assessment of hearing loss completed? | | YES (1) | NO | N/A<br>If no further assessment was required based on screening results | |
| • Were screening questions completed on depressive symptoms? | | YES (1) | NO | | |
| • Was further assessment of mood completed? | | YES (1) | NO | N/A<br>If no further assessment was required based on screening results | |
| • Were screening questions of delirium completed? | | YES (1) | NO | | |
| • Was further assessment of delirium completed? | | YES (1) | NO | N/A<br>If no further assessment was required based on screening results | |
| • Were screening questions of incontinence completed? | | YES (1) | NO | | |
| • Was further assessment of incontinence completed? | | YES (1) | NO | N/A<br>If no further assessment was required based on screening results | |
| • Was an assessment of sleep performed? | | YES (1) | NO | | |
| • Was an assessment of activities of daily living performed? | | YES (1) | NO | | |
| • Was an assessment of physical activity performed? | | YES(1) | NO | | |
| • Was an assessment of fall risk and history performed? | | YES(1) | NO | | |

| | | | | | |
|---|---|---|---|---|---|
| • Was an assessment of pain performed? | | YES (1) | NO | | |
| • Was multimorbidity asked? | | YES (1) | NO | | |
| • Were medications reviewed and analyzed according to the PRISCUS list criteria? | | YES (1) | NO | | |
| • Was the GP contacted to get additional information on health history and medications? | | YES (1) | NO | | |
| • Was the support system and caregivers evaluated? | | YES (1) | NO | N/A<br>No assessment with social worker | |
| • Was an assessment of living conditions completed? | | YES (1) | NO | N/A<br>No assessment with social worker | |
| • Was an assessment of housing conditions completed? | | YES (1) | NO | N/A<br>No assessment with social worker | |
| • Was an assessment of administrative concerns completed? | | YES (1) | NO | N/A<br>No assessment with social worker | |
| • Was an assessment of financial concerns completed? | | YES (1) | NO | N/A<br>No assessment with social worker | |
| • Was an assessment of pets completed? | | YES (1) | NO | N/A<br>No assessment with social worker | |
| • Was an assessment of loneliness completed? | | YES (1) | NO | N/A<br>No assessment with social worker | |
| • Was an assessment of leisure interests completed? | | YES (1) | NO | N/A<br>No assessment with social worker | |
| • Was an assessment of elder abuse risk completed? | | YES (1) | NO | N/A<br>No assessment with social worker | |
| • Was an assessment of spirituality needs completed? | | YES (1) | NO | N/A<br>No assessment with social worker | |
| • Was the older adult asked if they have a patient will? | | YES (1) | NO | N/A<br>No assessment with social worker | |
| CARE PLAN AND CARE COORDINATION<br>*Care Plan is considered created if the problems have been identified and the list of actions have been discussed with the patient (and caregiver) and discussed/shared with the GP within two weeks after the MULTIDIMENSIONAL ASSESSMENT was finished* | | | | | |
| • Was a care plan <u>created</u> in the IAC health record?<br>• | *IAC HEALTH RECORD* | YES (1)<br>. | NO | N/A | |
| • Have the IAC Nurse and Social Worker met at least once to | *IAC HEALTH RECORD*<br>*Nurse and social worker's records* | YES (1) | NO | N/A<br>The patient didn't see the social worker | |

| | | | | | |
|---|---|---|---|---|---|
| discuss the care plan (within 10-working days of the multidimensional assessment being completed)? | | | | | |
| • Have the IAC nurse/social worker shared or discussed the assessment or care plan with other relevant health and social professionals if they were part of the patients' current care (within 5 working days)? (Eg health professionals, social support services, other support services (housing, meals, transportation) | *IAC HEALTH RECORD*<br>*Nurse and social worker's records* | YES (1) | NO | | |
| • Is there clear documentation of the goals of the older adult that has a care plan? | *IAC HEALTH RECORD* | YES (1) | NO | | |
| • In an older adult identified as needing referral to another health or social professional/service during the MULTIDIMENSIONAL ASSESSMENT, were referral suggestions included in the care plan? | *IAC HEALTH RECORD* | YES (1) | NO | N/A<br>No referral was needed | |
| • In an older adult identified as needing referral to another health or social professional/service during the multidimensional assessment, were any referrals arranged? | *IAC HEALTH RECORD* | YES (1) | No | N/A<br>No referral was needed | |
| FOLLOW-UP | | | | | |
| • If the older adult needed a follow-up appointment with IAC staff according to the care plan, was the appointment scheduled? | *IAC HEALTH RECORD* | YES (1) | NO | N/A<br>No follow-up was needed | |
| • If the older adult needed a follow-up appointment according to the care plan, did the follow- | *IAC HEALTH RECORD* | YES (1) | NO | N/A<br>No follow-up was needed | |

| | | | | | |
|---|---|---|---|---|---|
| up appointment take place in the time frame defined for the older adult? | | | | | |
| • Did the IAC nurse or social worker follow-up with an older adult if there is any indication that their condition has changed (e.g., a report of hospitalization, a letter from GP, phone call from family?) | *IAC HEALTH RECORD* | YES (1) | NO | N/A<br>No indication that the patient's condition had changed | |

Total score = ___ / 47

## 5.13 Supplementary material D: Interview guides for older adults, informal caregivers and IAC staff

### Interviews mit älteren Personen

INTERVIEW-DREHBUCH

# Einführung

Offene Fragen während des Interviews dienen dazu, die Studienteilnehmenden zu ermutigen, detailliert über ihre Erfahrungen zu sprechen. Der Interviewer, die Interviewerin folgt dem Gesprächsverlauf der Studienteilnehmenden, solange er oder sie sich im Rahmen des zu erforschenden Themas bewegt. Rückfragen sichern den Fluss der Erzählung. Um Aussagen zu vertiefen, stellt der Interviewer, die Interviewerin Folgefragen.

# Willkommen

- Dank für die Teilnahme aussprechen
- Frage zum Wohlbefinden des Studienteilnehmers, der Studienteilnehmerin ansprechen

# Informationen zur Studie

- Schlagen Sie vor, die Einverständniserklärung noch einmal gemeinsam durchzugehen, sie oder er an die Abläufe zu erinnern und zu fragen, ob sie oder er noch unbeantwortete Fragen haben
- Gehen Sie anhand der Studieninformationen auf die wichtigsten Punkte ein:
  - Die Teilnahme ist freiwillig. Alle Informationen während dieses Gesprächs werden vertraulich und anonym behandelt
  - Wenn Fragen nicht beantwortet werden wollen, ist dies in jedem Fall ohne Begründung möglich.
  - Das Interview wird aufgezeichnet und nach Gebrauch gelöscht
  - Die Dauer des Interviews beträgt ca. 45 Minuten
  - Das Gespräch kann jederzeit ohne Begründung abgebrochen werden
  - Die beiden Forscher oder Forscherinnen machen sich während des Gesprächs
  - 
  - 
  - 
  - Notizen. Da heisst die Person, welche Fragen stellt, wird sich ebenfalls Notizen machen und z.T. keinen Augenkontakt zur interviewten Person herstellen.
  - Bitten Sie erneut um die mündliche Zustimmung (aber nicht schriftlich).

# Ablauf des Interviews erläutern

- Ich werde Ihnen überwiegend offene Fragen stellen mit der Bitte, mir einfach von Ihren Erfahrungen zu den Dienstleistungen mit der neuen Fachstelle zu erzählen. Falls erforderlich, werde ich Folgefragen stellen, um ein tieferes Verständnis zu erhalten. Dieser Leitfaden ist für meine Orientierung
- Das Ziel dieses Interviews ist es, Ihre Erfahrung der Dienstleistung der Fachstelle herauszufinden und ob es etwas gibt, was wir tun können, um sie zu verbessern.

# Schalten Sie das Aufnahmegerät ein

Meeting date: _____

Meeting attendees: _____

Notetaker: _____

| Frage | Notizen |
|---|---|
| 1. Wie sind Sie auf die Fachstelle Betreuung, Pflege, Alter Leimental aufmerksam geworden?<br>• Was hat Sie dazu bewogen, die Fachstelle zu kontaktieren? | |
| 2. Wie verlief für Sie der erste Kontakt mit den Mitarbeiterinnen der Fachstelle? War etwas anders, als Sie erwartet hatten?<br>• Was haben Sie beim ersten Kontakt der Mitarbeiterinnen der Fachstelle als hilfreich empfunden?<br>• Hat es Probleme gegeben? | |
| 3. Wie empfinden Sie die Dienstleistungen, die Sie erhalten haben?<br>Haben Sie die gewünschten Informationen erhalten? Wie empfanden Sie die Bedarfsabklärung | |
| 4. Können Sie beschreiben, was Sie beim Besuch der Mitarbeiterinnen der Fachstelle als hilfreich empfunden haben (wenn überhaupt)? | |
| 5. Was hätten die Mitarbeiterinnen der Fachstelle besser machen können? | |
| 6. Was möchten Sie uns sonst noch mitteilen?<br>• Möchten Sie weiterhin die Dienstleistungen der Fachstelle in Anspruch nehmen?<br>Würden Sie anderen Personen die Fachstelle empfehlen? | |

Abschluss: Das ist alles! Wir danken Ihnen vielmals für Ihre Zeit und wünschen Ihnen einen schönen Tag.

Aufnahmegerät ausschalten

# Skript und Interviewleitfaden – pflegende Angehörige oder Betreuungspersonen

## Einführung

Offene Fragen während des Interviews dienen dazu, die Studienteilnehmenden zu ermutigen, detailliert über ihre Erfahrungen zu sprechen. Der Interviewer, die Interviewerin folgt dem Gesprächsverlauf der Studienteilnehmenden, solange er oder sie sich im Rahmen des zu erforschenden Themas bewegt. Rückfragen sichern den Fluss der Erzählung. Um Aussagen zu vertiefen, stellt der Interviewer, die Interviewerin Folgefragen.

## Willkommen

- Dank für die Teilnahme aussprechen
- Frage zum Wohlbefinden des Studienteilnehmers, der Studienteilnehmerin ansprechen

## Informationen zur Studie

- Schlagen Sie vor, die Einverständniserklärung noch einmal gemeinsam durchzugehen, sie oder er an die Abläufe zu erinnern und zu fragen, ob sie oder er noch unbeantwortete Fragen haben
- Gehen Sie anhand der Studieninformationen auf die wichtigsten Punkte ein:
  - Die Teilnahme ist freiwillig. Alle Informationen während dieses Gesprächs werden vertraulich und anonym behandelt
  - Wenn Fragen nicht beantwortet werden wollen, ist dies in jedem Fall ohne Begründung möglich.
  - Das Interview wird aufgezeichnet und nach Gebrauch gelöscht
  - Die Dauer des Interviews beträgt ca. 45 Minuten
  - Das Gespräch kann jederzeit ohne Begründung abgebrochen werden
  - Die beiden Forscher oder Forscherinnen machen sich während des Gesprächs Notizen. Da heisst die Person, welche Fragen stellt, wird sich ebenfalls Notizen machen und z.T. keinen Augenkontakt zur interviewten Person herstellen.
  - Bitten Sie erneut um die mündliche Zustimmung (aber nicht schriftlich).

## Ablauf des Interviews erläutern

- Ich werde Ihnen überwiegend offene Fragen stellen mit der Bitte, mir einfach von Ihren Erfahrungen zu den Dienstleistungen mit der neuen Fachstelle zu erzählen. Falls erforderlich, werde ich Folgefragen stellen, um ein tieferes Verständnis zu erhalten. Dieser Leitfaden ist für meine Orientierung
- Das Ziel dieses Interviews ist es, Ihre Erfahrung der Dienstleistung der Fachstelle herauszufinden und ob es etwas gibt, was wir tun können, um sie zu verbessern.

Wäre es für Sie in Ordnung, wenn wir mit dem Interview beginnen?

Schalten Sie das Aufnahmegerät ein

## Pflegende Angehörige oder Betreuungspersonen – Fragen

Meeting date: _____

Meeting attendees: _____

Notetaker: _____

| Frage | Notizen |
|---|---|
| 1. Pflegen und Betreuen Sie regelmäßig Frau Gorrencourt ? Sind Sie ein Verwandter, Nachbar, oder...? | |
| 2. Waren Sie bei dem Termin oder bei den Terminen immer dabei? | |
| 3. Gab es irgendetwas, das es schwierig machte, den Termin mit __(NAME)___wahrzunehmen? | |
| 4. Wie fanden Sie die Beurteilung (geriatrisches Assessment) welche die Pflegefachperson mit _( NAME)_____erhoben hat und den anschliessenden Versorgungsplan welche die Mitarbeiterinnen der Fachstelle erstellt haben? | |
| 5. Gibt es irgendetwas, das schwierig war/es für __(NAME)_____ einfacher gemacht hätte, die Fachstelle zu besuchen bzw. *die Mitarbeitenden der Fachstelle zu* __(NAME)_____ *nach Hause kommen zu* lassen? | |
| 6. Was war bei der Dienstleistung gut, welche sie von den Mitarbeiterinnen der Fachstelle erhalten haben. | |
| 7. Gesamthaft, waren Sie mit der Dienstleistung der Mitarbeitenden der Fachstelle zufrieden? | |
| 8. Was war für Sie am hilfreichsten/nützlichsten? Wie war es für die ältere Person? | |
| 9. Gibt es etwas was Sie uns sonst mitteilen möchten? | |

Abschluss: Das ist alles! Wir danken Ihnen vielmals für Ihre Zeit und wünschen Ihnen einen schönen Tag.

Aufnahmegerät ausschalten

## Regular meeting logs with Nurse and Social Worker

### Process:

- A new log will be created for each meeting with the nurse and social worker together
- It is not intended that every question will be asked on each call, it is just meant to be a template where we can have some semi-structured questions available, but it is OK if we spend a whole interview only talking about one part
- 2 INSPIRE attendees/notetakers will attend every call; they will trade and have 2nd reviewer review each other's log and codes; the process can be collaborative: we can meet to discuss any questions
- Likely this guide will "funnel" and each interview we will ask less questions
- To maintain confidence, please refer to the participants as "Nurse" and "Social Worker" (or N or S if you are rushing to take notes)

Meeting date: _____

Meeting attendees: _____

Notetaker: _____

### OVERALL

| Frage | Notizen |
|---|---|
| 1. Welche Gemeinsamkeiten gibt es bei den Personen, die bisher zu Terminen gekommen sind? Welche Arten von Dienstleistungen habt ihr ihnen angeboten?<br>• Wie oft finden die Termine mit der älteren Person zu Hause oder auf der Fachstelle statt? Gibt es andere Orte, wo Termine stattgefunden haben?<br>• Kommen die älteren Personen oft mit ihren Angehörigen oder Betreuungspersonen auf die Fachstelle oder sind sie bei den älteren Personen zu Hause anwesend? | |

## Umfassendes geriatrisches Assessment

| | |
|---|---|
| 2a. Wie ist es, ein umfassendes geriatrisches Assessment mit einer älteren Person durchzuführen? Ist es machbar und realistisch? Wie lange dauert es im Durchschnitt, beide Teile (Screening Fragen und Soziale Betreuung und Unterstützung) durchzuführen?<br><br>• *(an die Pflegefachperson)* Wie lief es bei der Durchführung des CGA, wenn Du zuerst das Screening gemacht hast? Wie lief es, als Du das Assessment durchführen musstest?<br>• (*an die Sozialarbeiterin an den Sozialarbeiter)* Wie lief der Teil mit der sozialen Betreuung und Unterstützung im CGA?<br>• Was ist gut gelaufen?<br>• Gibt es Themen, die fehlen und die Eurer Meinung nach angesprochen werden sollten?<br><br>2b. Habt ihr das Gefühl, dass ihr mehr Training benötigt, um das CGA auszufüllen?<br><br>2c. Warst Du in der Lage, alle Teile des CGA durchzuführen? Welche Teile hast Du nicht durchgeführt? | |

## Versorgungsplan

| | |
|---|---|
| 3. Wie war es für Euch, miteinander zusammenzuarbeiten, um einen Versorgungsplan für die älteren Person zu erstellen?<br><br>• War der Versorgungsplan machbar? Wenn nicht, schlagt Ihr irgendwelche Änderungen vor? | |
| 4. Auf welche Weise wurden ältere Personen und ihre pflegenden Angehörigen oder Betreuungspersonen in die Erstellung des Versorgungsplans miteinbezogen, wenn überhaupt? | |

## Koordination mit anderen Fachleuten und Überweisung

| | |
|---|---|
| 5. Wie war es für Euch, mit anderen Leistungserbringern zusammenzuarbeiten, um einen Versorgungsplan für die älteren Person zu erstellen? | |

| | |
|---|---|
| • Habt Ihr das Erstellen des Versorgungsplans als schwierig empfunden? Was war am Schwierigsten? Benötigt ihr zusätzliche Ressourcen? | |
| 6. Habt ihr Überweisungen an andere Organisationen vorgenommen?<br><br>• Wie oft? Wie ist es gelaufen? Wird noch etwas benötigt?<br>• Was waren die wichtigsten Bedenken, die zu der Entscheidung der Überweisung geführt haben? | |
| 7. Könnt ihr eure Erfahrungen in der Kommunikation mit anderen Fachpersonen beschreiben, die an der Versorgung der älteren Personen beteiligt sind und mit denen ihr euch ausgetauscht habt (z.B. Hausarzt, Spitex, Apothekerin und Apotheker, Physiotherapeutin und Physiotherapeut), um die Versorgung der älteren Personen zu koordinieren (z.B. Überweisung, Pflegeplanung, Pflegekoordination, Treffen zur Besprechung der Pflege und Betreuung)?<br><br>• War es für euch möglich, mit Fachpersonen Kontakt aufzunehmen?<br>• Welche Art von Szenarien/Ereignissen führen zu der Entscheidung, auf andere Fachleute zuzugehen und mit ihnen zusammenzuarbeiten (ein oder zwei Beispiele geben)<br>• Denkt ihr, dass diese Zusammenarbeit mit anderen Fachpersonen zur Koordinierung der Versorgung ein normaler Teil eurer Arbeit werden wird? Warum oder warum nicht?<br>• Habt ihr das Gefühl, dass die Zusammenarbeit einen möglichen Wert für Ihre Arbeit hat?<br>• Benötigt ihr zusätzliche Ressourcen für die Zusammenarbeit mit anderen Fachpersonen, um die Versorgung zu koordinieren? Wenn ja, was braucht ihr? | |

## Nachsorge

| | |
|---|---|
| 8. Könnt ihr mir sagen, wie ihr die Nachsorge mit den älteren Personen weitergeführt habt?<br><br>• Aus welchen Gründen haben Sie bei der älteren Person nachgefragt? (z.B. wenn es Anzeichen dafür gibt, dass sich ihr Zustand verändert hat [z.B. ein Brief vom Hausarzt oder der Spitex, ein Anruf von der Familie...])?<br>• War die Nachsorge für Euch machbar? | |

| | |
|---|---|
| | |

## Möglichkeiten zur Verbesserung der Fachstelle

| | |
|---|---|
| 9. Gibt es etwas, das anders gemacht werden könnte, in Bezug auf die Kundinnen und Kunden, wenn sie die Fachstelle besuchen oder ihr sie zu Hause besucht<br><br>10. Gibt es etwas, das anders gemacht werden könnte, um die von Euch erbrachten Dienstleistungen in der Fachstelle oder bei der älteren Person zu Hause zu verbessern? | |

## Fachstelle Gesundheitsakte

| | |
|---|---|
| 12. Wie habt ihr das Erfassen von Informationen der Kundinnen und Kunden im Bexio erebt? | |

## Implementierungsstrategien *(nur in späteren Sitzungen gefragt)*

| | |
|---|---|
| 13. Was halten Sie von den bisher angewandten Strategien, die bei der Umsetzung des Versorgungsmodells helfen (z. B. Schulungen, Supervision, Protokolle, entwickelte Hilfsmittel)? | |

## Letzte Frage

| | |
|---|---|
| 14. Gibt es noch etwas, das ihr besprechen möchtet, etwas, worüber wir noch nicht gesprochen haben? | |

## 5.14 Supplementary material E: Merging matrix

| Core component of the INSPIRE care model | Quantitative | | | | Qualitative | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Acceptability | | | Feasibility | | |
| | fidelity | Acceptability | Feasibility | Reach | Older adults | Informal caregivers | IAC Staff | Older adults | Informal caregivers | IAC Staff |
| **Screening** | 100% adherence to content | 11/21 community care providers are aware of the positive outcomes of the collaboration with the IAC to coordinate care 7/11 agree/rather agree that this collaboration is worthwhile 9/21 appreciate the positive impact on their own work. | 5/21 community care provides agree/rather agree that they have a common understanding of the purpose of collaborating with the IAC for coordinating care. 20/21 community care providers are open to new approaches to work with the IAC staff to coordinate care 19 / 21 consider that they can easily integrate collaboration with the IAC to coordinate care into their existing work. 11/21 community care providers are not convinced that their involvement in the coordination of care through collaboration with the IAC is an essential part of my duties 10/ 21 do not recognize the potential benefits to their work of collaborating with the IAC to coordinate care. | 4.5% Frail home-dwelling older adults 75+ | | | positive perception towards screening older adults for frailty *"Screening so far good, much is observable even without questions"* (IAC staff 1). | | | The perception of the IAC staff regarding the feasibility of performing the screening was highly positive. They both viewed it as an effortless task, particularly when the information is obtained directly from the older person. However, it was highly emphasized that obtaining information from older adults, especially in the presence of difficult diagnoses like dementia, is a challenging task. In such cases, the reliance primarily shifts to informal caregivers as the main source of information. Thus, in such situations, they prefer to skip the screening. Also, they considered that the screening tool selected for the INSPIRE care model (i.e. Groningen Frailty Indicator) should be reviewed or changed due to its length *"Screening for frailty is too long with 15 questions"* (IAC staff 1), and content (i.e. screening for loneliness) *"when questions about loneliness are asked, the conversation becomes emotional"* (IAC staff 1). |
| **Multidimensional assessment** | 74.5% adherence to content by the IAC staff | | | | High acceptability of the multidimensional assessment component was reported by older adults. Five out of six older adults had a positive impression towards this component of the model and will recommend it to others. This could be influenced by the positive perception that all of them, except one, had about the staff of the IAC (specially the nurse), who were considered as very friendly and considerate. Only one older adult seemed to have a neutral opinion about the multidimensional assessment, as according to the notetakers the older person was bothered about their presence and not willing to answer the questions. Additionally, one older adult thought that he/she doesn't need it at the moment and thought that the multidimensional assessment was not helpful for him/her | high acceptability of the multidimensional assessment component of the INSPIRE care model was also observed on informal caregivers. All the interviewees had a positive impression of the assessment delivered to the older adult they take care of. According to them, they value that this is a person-centred assessment "*the nurse had put the person in the center"* (LEIMF05), and tailored to their needs "*It is tailored to our situation (for me and my mother)*" (LEIMFO3). However, they also referred some room for improvement in the communication between the IAC staff *"the communication between the nurse and the social worker could be better; I spoke to them both and they asked me the same questions (it was not a problem for me but still I thought I mention this)"* (LEIMF03). | acceptability of this component of the INSPIRE care model was high among the IAC staff. Their satisfaction with the intervention mainly came from the exchanges that they had with older adults and informal caregivers -as part of the assessment-, who expressed gratitude towards the service received. Concerns towards the length of the multidimensional assessment were also expressed, although the staff also value the comprehensive picture of the older person obtained through this assessment *"The multidimensional assessment is an extreme amount of questions. But it gives a comprehensive picture of the older person"* (IAC staff 1). | Older adults found the multidimensional assessment to be feasible and well-received. In general, they expressed positive feedback and did not consider it burdensome. However, one participant pointed out that the questions were too academically oriented and suggested incorporating more personalized aspects to enhance the assessment experience "I *could have imagined more questions about personal interests, e.g. about hobbies* (PATIENT 5). Another older adult referred being upset by the presence of many people coming to their house to ask questions. | all informal caregivers referred as feasible being involved in the multidimensional assessment. They expressed their willingness to attend meetings with the IAC staff and the older person, as they conveniently occurred at the older person's home. The caregivers found the assessment to be relatively straightforward and not overly time-consuming, describing the experience as positive, even when they were the ones providing answers to the assessment questions *"It was also a positive experience to do the assessment for my aunt instead of her"* (PATIENT 3). Only two informal caregivers of older adults with dementia referred difficulties regarding the performance of this component, due to the condition of the older person (e.g. disoriented) *"My aunt does not really know anything that happens around her so I don`t think she knew what* | the IAC nurse and social worker considered that this component was doable. One IAC staff member considered that conducting the entire multidimensional assessment was a feasible task for them, as it included easy to answer questions. According to them, the whole assessment was conducted in one appointment, that lasted 1.5 hours at the beginning while at the end of the study it took only 1 hour. An additional meeting with the older person and/or the informal caregiver was introduced prior to the assessment *"Before each multidimensional assessment there is a visit during which information is given, only after that an appointment for the multidimensional assessment is set. This procedure has been done 3 times so far and is considered positive"* (IAC staff 1). However, this staff member also referred concerns about the length and impact of the multidimensional assessment in the older adult *"It is doable, but I keep asking if the older person still likes it and is not tired (…) Conducting the multidimensional assessment can cause anxiety in the older person"* (IAC staff 1), and the difficulty in performing the assessment under certain situations *"The multidimensional assessment is* |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | was happening" (PATIENT 3) | *feasible. However, if the affected person has dementia, I am heavily dependent on the relatives, whereby the answers regarding well-being (loneliness, sadness, etc.) are not very meaningful. Tests (e.g. vision/hearing/walking tests) cannot be carried out completely or not at all be performed. Thus, the instrument is practically not applicable in advanced dementia"* (IAC staff 1). *"Sometimes respondents do not want to answer some questions (e.g., clock test, loneliness questions) or they do not want to do the whole multidimensional assessment"* (IAC staff 1). The other member of the staff referred not being able to do the assessment due to lack of skills based on their prior education, and thus, only conducted the screening. |
| **Care plan and care coordination** | 41.7% adherence to content by the IAC staff | | | | they referred to be satisfied with the information provided by the IAC staff, about all available care services options for both themselves and their caregivers *"I find it helpful the services the IAC provides me with (the options that they gave me for services), so they will help me with my wish to stay at home"* (PATIENT 1) | Informal caregivers expressed positive comments towards being included in the decisions of the care of the older person and that their ideas are being heard "*I was very pleased and I think it is so great that the caregiver is also involved"* (PATIENT 4), as well as the voice of the older adult *"The conversations gave the client an opportunity to talk about her life"* (PATIENT 10). Two informal caregivers specifically expressed their positive opinion towards developing a care plan and the advice that comes with it. Some others expressed the relief they felt after developing the care plan and knowing that there is a person that can bring them support "*I felt the first time so relieved that I have some place / someone to call and ask for advice or support"; (…) "I had a phone call with my sister at the end of the day that day and we said we now do not feel alone"* (PATIENT 4). Nevertheless, one informal caregiver mentioned not considering this advice and he/she was already involved with different organizations. | high acceptability towards involving care older adults, informal caregivers and other community care providers for developing the care plan and organizing the care. They consider that collaborating with community care providers is central as they are more familiar with the older adult, specially with complex cases (i.e. older adults with dementia) *"It is more difficult to find out about the needs and concerns of people with dementia, this is why is important to involve the caregiver"* (IAC staff 1) *"Cooperation with organization x is very good. Organization x contacted the IAC and asked for help with a complex case"* (IAC staff 2). In the other hand, collaboration between the IAC nurse and social worker evolved over time. Initially, only one staff member expressed positive comments related to the collaboration between them. However, by the fifth meeting, positive comments related to the nurse-social worker collaboration were expressed by both staff members "*Cooperation with* IAC staff 2 *is very much appreciated - the different focus from two disciplines is very positive, especially for the care plan. The cooperation has been consolidated and has become well established"* (IAC staff 1). "*Cooperation is good. The concept is based on a holistic* | although no comments were made regarding difficulties in participating in the development of the care plan, one older adult mentioned feeling overwhelmed by the amount of information provided by the IAC staff "*I was a little overwhelmed with all the information but that is more because I need time to read everything in between*" (PATIENT 4). | informal caregivers reported problems with the collaboration of community care providers and the IAC staff for care coordination. They think that communication between all the parties is an area that should improve *"The collaboration between care providers should still be improved and there should be an exchange of information (…) otherwise the information is fragmented"* (LEIMF05). Informal caregivers also mentioned issues with staff organization at the IAC. According to one interviewee, they faced problems reaching the nurse, who was on holiday without a replacement, leading to a lack of support. | the nurse and social worker of the IAC strongly agreed on the feasibility and importance of discussing the overall care plan with the older person and their informal caregivers, especially in the case of older adults with dementia *"Both groups (i.e. older adults and informal caregivers) are strongly involved"* (IAC staff 1),*"The relatives are always explicitly involved in the case of cognitive impairments or at the request of the person concerned"* (IAC staff 2). In the other hand, the collaboration between both IAC staff members to develop the care plan improved throughout the study. Initially, both staff members reported problems in collaboration with each other due to unclear task definitions; however, by the fourth meeting, an improvement in the collaboration was mentioned. Shared concerns about holiday replacements and their capacity to cover the demand of services were also raised, as a topic to be considered to improve the intervention. An evolution in the collaboration between the IAC staff members and community care providers to create the care plan and coordinate care was also mentioned. Initially, the IAC staff members referred that community care providers feel threatened by them due to lack of awareness, clarity regarding the role of the IAC and mistrust *"The social services of the hospital yz are aware of the services offered by the IAC, but the nursing staff are not"* (IAC staff 1), *"At the beginning, there were difficulties with the organization xy, because they perceived the social worker of the IAC as competition" (…) "I let them know who I am then I explain why I need to collaborate with* |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | *approach, which is very good"* (IAC staff 2). | | | *them (…) we are not your competition* (IAC staff 2). Problems in establishing good communication with community care providers, to conduct this component of the care model were also mentioned *"It was a little difficult communicating with the organization xx for household help as I asked the organization xx for additional help for another client, and they were annoyed as to why the older person did not ask themselves for it"* (IAC staff 2). However, after the fifth meeting, the IAC nurse and social worker shared examples of successful collaboration with other community care providers in creating and coordinating care plans. They acknowledged that this partnership is continually evolving and improving. However, the IAC staff also recognizes the need for improvement in this area, as they sometimes hesitate to contact other providers due to feeling unequal in their treatment. |
| **Follow-up** | 7.4% adherence to content by the IAC staff | | | | | | the acceptability of the IAC staff towards conducting follow-up of the older people also evolved over time. During the first six meetings, the nurse and social worker exhibited a positive attitude towards conducting this component. In fact, the IAC staff 2 considered this as an automatic task of their profession, especially for complex cases. However, afterward, their opinion became more neutral, likely influenced by feasibility considerations regarding this component. | | | regarding follow-up, both IAC staff members considered it as feasible at the start of the study; however, close to the end of the study they considered it practically non-existent due to lack of time. |

## 5.15 Supplementary material F: Community care providers feasibility perception to the INSPIRE care model

**Table 4.** Community care providers feasibility perception to the INSPIRE care model based on the results of the NoMAD questionnaire (coherence, cognitive participation and collective action)

| | | |
|---|---|---|
| FEASIBILITY | **C1: COHERENCE** | |
| | **C1.1 I can see how the new coordination of care through collaboration with the IAC differs from traditional ways of working** | |
| | Agree/rather agree | 7 |
| | do not agree/rather disagree | 7 |
| | Neither/Not relevant/no answer | 7 |
| | **C1.2 The staff of your organization have a common understanding of the purpose of the new care coordination through collaboration with the IAC** | |
| | Agree/rather agree | 15 |
| | do not agree/rather disagree | 2 |
| | Neither/Not relevant/no answer | 4 |
| | **C1.3 I have an idea of how the new coordination of care through collaboration with the IAC affects the way I work.** | |
| | Agree/rather agree | 15 |
| | do not agree/rather disagree | 6 |
| | Neither/Not relevant/no answer | 0 |
| | **C1.4 I recognize the potential benefits to my work of working with the IAC to coordinate care.** | |
| | Agree/rather agree | 10 |
| | do not agree/rather disagree | 10 |
| | Neither/Not relevant/no answer | 1 |
| | **C2: COGNITIVE PARTICIPATION** | |
| | **C2.1 There are leaders in my work unit who advance care coordination through collaboration with the IAC and involve other staff in my work unit.** | |
| | Agree/rather agree | 15 |
| | do not agree/rather disagree | 2 |
| | Neither/Not relevant/no answer | 4 |
| | **C2.2 I am convinced that my involvement in the coordination of care through collaboration with the IAC is an essential part of my duties** | |
| | Agree/rather agree | 6 |
| | do not agree/rather disagree | 11 |
| | Neither/Not relevant/no answer | 4 |
| | **C2.3 I am open to new approaches to working with colleagues from the IAC to coordinate care** | |
| | Agree/rather agree | 20 |
| | do not agree/rather disagree | 0 |
| | Neither/Not relevant/no answer | 1 |
| | **C2.4 I will continue to support coordination of care through collaboration with the IAC** | |
| | Agree/rather agree | 21 |
| | do not agree/rather disagree | 0 |
| | Neither/Not relevant/no answer | 0 |
| | **C3: COLLECTIVE ACTION** | |
| | **C3.1 I can easily integrate collaboration with the IAC to coordinate care into my existing work.** | |
| | Agree/rather agree | 19 |

| | | |
|---|---|---|
| | do not agree/rather disagree | 1 |
| | Neither/Not relevant/no answer | 1 |
| | **C3.2 Collaboration with the IAC affects working relationships.** | |
| | Agree/rather agree | 1 |
| | do not agree/rather disagree | 11 |
| | Neither/Not relevant/no answer | 9 |
| | **C3.3 I can trust the competence of the employees of the IAC in the coordination of care.** | |
| | Agree/rather agree | 18 |
| | do not agree/rather disagree | 0 |
| | Neither/Not relevant/no answer | 3 |
| | **C3.4 The staff of the IAC have the necessary skills to coordinate care for older persons.** | |
| | Agree/rather agree | 16 |
| | do not agree/rather disagree | 1 |
| | Neither/Not relevant/no answer | 4 |
| | **C3.5 Sufficient resources (e.g., information, time, resources, training) are available to work with the IAC to coordinate care.** | |
| | Agree/rather agree | 12 |
| | do not agree/rather disagree | 7 |
| | Neither/Not relevant/no answer | 2 |
| | **C3.6 My organization's leadership provides sufficient support for collaboration with the IAC.** | |
| | Agree/rather agree | 18 |
| | do not agree/rather disagree | 0 |
| | Neither/Not relevant/no answer | 3 |

## 5.16 Supplementary material G: Community care providers acceptability perception to the INSPIRE care model

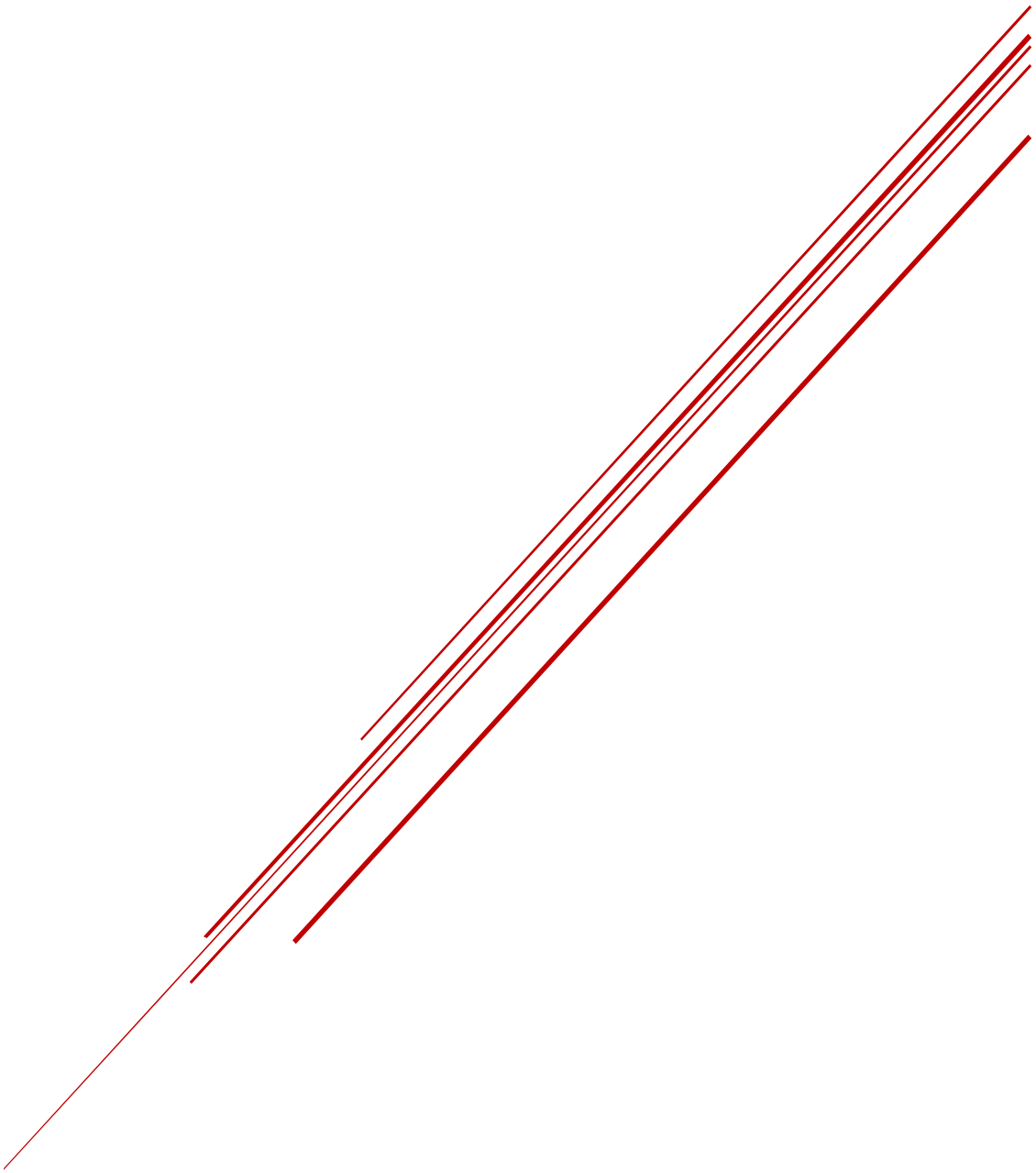
**Table 3.** Community care providers acceptability to the INSPIRE care model perception based on the results of the NoMAD questionnaire (reflexive monitoring)

| | | |
|---|---|---|
| ACCEPTABILITY | **C4: REFLEXIVE MONITORING** | |
| | **C4.1 I am aware of the outcomes (e.g., improved quality of life, avoidable hospital admissions) of care coordination through collaboration with the IAC** | |
| | Agree/rather agree | 11 |
| | do not agree/rather disagree | 2 |
| | Neither/Not relevant/no answer | 8 |
| | **C4.2 Staff agree that coordinating care through collaboration with the IAC, is worthwhile.** | |
| | Agree/rather agree | 7 |
| | do not agree/rather disagree | 5 |
| | Neither/Not relevant/no answer | 9 |
| | **C4.3 I appreciate the positive impact that care coordination through collaboration with the IAC has on my work.** | |
| | Agree/rather agree | 9 |
| | do not agree/rather disagree | 4 |
| | Neither/Not relevant/no answer | 8 |
| | **C4.4 Feedback about working with the IAC to coordinate care can be used to improve services in the future.** | |
| | Agree/rather agree | 13 |

| | | |
|---|---|---|
| | do not agree/rather disagree | 1 |
| | Neither/Not relevant/no answer | 7 |
| | **C4.5 In order to coordinate care with the IAC, I can adjust the way I work.** | |
| | Agree/rather agree | 8 |
| | do not agree/rather disagree | 6 |
| | Neither/Not relevant/no answer | 7 |

# CHAPTER 6:

## SYNTHESIS AND DISCUSSION



An increasingly ageing society and a rapid increase in the number of people suffering from multimorbidity poses a challenge for health and social care systems. Innovative solutions are urgently needed in order to meet the needs of this growing segment of the population, while also limiting their progression towards a fragile health status, which would cause large increases of healthcare use and expenditure. One of these promising interventions is integrated care models. Person-centred integrated care models have shown the potential to improve mortality, health-related quality of life, reduce hospital admissions, and emergency department visits in frail older adults (1). However, how to effectively implement integrated care models in real world settings remains an open question among researchers and policy makers (2–5). Using implementation science methods at the start of any integrated care endeavour could contribute to successful implementation and increase the sustainability of these interventions over time. Therefore, it is essential to assess the feasibility of an integrated care model for frail home-dwelling older adults in order ensure that it would be an effective method for real-world improvement of the care for this target group.

In this chapter, we will begin by summarizing the main findings of chapters 3 to 5. Next, we will reflect on the significance of these results within and beyond the scope of this dissertation. Then, we will present what we consider the methodological strengths and limitations. Finally, we will use our results to present some possible implications for research, policy and practice.

## 6.1 Key findings

In chapter 3, we explored the factors associated with unmet needs for home support in home-dwelling older adults of the Canton of BL following an ecological approach (6). This was a secondary cross-sectional analysis using data from the INSPIRE Population Survey (7). This survey was conducted as part of the contextual analysis of the larger INSPIRE project among 75+ home-dwelling older adults of the Canton BL (8). Our results showed that among the participants, the reported prevalence of *unmet needs for home support* was 4.3%. The introduction of an ecological approach in the design and analysis of this study allowed us to identify factors at the macro, meso and micro level that were associated with unmet needs for home support. Being a recipient of governmental support (macro level); the use of transportation services (meso level); and feeling depressed or abandoned (micro level) increased the odds of having unmet needs for home support (6). On the other hand, having a private health insurance (macro level), speaking the official language, having a high level of education, and informal care, (micro level) were associated with decreased the odds of having unmet needs for home support (6).

Chapter 4 exposed the results of mapping and monitoring implementation strategies attempting to reach 65+ home-dwelling older adults for a new Information and Advice Center (IAC) in one care region of the Canton BL. This study was conducted as part of the feasibility evaluation of the INSPIRE care model using an implementation mapping approach (9). Our evaluation included: estimation of fidelity of the delivery of implementation strategies and bundles by the IAC management and their coverage, referral source of older adults to the IAC, and impact of the strategies on reach of the IAC on the 65+ population living in the care region. Seven implementation strategies were selected and organized in bundles for different *members of the community* (i.e. community care providers, older adults and their caregivers), as they constitute major actors in promoting community-based centers (10) and referring older adults to these centers. Our analysis showed variations in the delivery of implementation strategies among different community care providers, with some strategies being more faithfully executed than others. This could explain why the main referral sources to the IAC were self-referrals and referrals by caregivers. The *reach* of the IAC to the target population was 5.4%.

In chapter 5 we presented the results of the feasibility evaluation of the INSPIRE care model for frail home-dwelling older adults in an IAC. Using a mixed-methods parallel convergent approach, we assessed the *fidelity* of the core components of the INSPIRE care model, as well as the *acceptability* and *feasibility* of the intervention from the perspectives of all stakeholders affected by it (i.e. older adults, informal caregivers, IAC staff and community care providers). Our findings revealed a high-fidelity score (100%), well-perceived acceptability and feasibility for the *screening* component. The *multidimensional assessment* component had a moderate fidelity score (75%), good acceptability, but had some reported feasibility issues related to its length, type of questions included in the assessment, and moderate reluctance in participation by older adults. The *care planning and coordination* component had a low fidelity score (42%), good acceptability, except by community care providers, and poor feasibility due to challenges in the collaboration between the IAC staff and community care providers. Results from the surveys sent to community care providers to assess their acceptability towards the care model and their perception of its feasibility revealed that they were not convinced that their collaboration in care coordination with the IAC was part of their duties. Additionally, just few of them perceive a benefit to their work from this collaboration. The *follow-up* component registered the lowest fidelity score (10%), primarily due to time constraints, as indicated by the IAC staff. The INSPIRE care model's reach was 4,5%.

## 6.2 Interpretation of the results of chapters 3, 4 and 5

The INSPIRE care model is a community-based integrated care model designed to address the complex needs of frail home-dwelling older adults who are 75 and older. This dissertation aimed to get

a deeper understanding of the unmet needs of home-dwelling older adults and their underlying determinants of unmet needs, in order to design targeted implementation strategies to effectively reach this population, and test the feasibility of the INSPIRE care model in one IAC of a care region of Northwest Switzerland. This information will serve as a basis to identify which adaptations are needed in the care model and implementation strategies previous to assess its feasibility in another care region.

In chapter 3, we described a lower prevalence of unmet needs for home-support among home-dwelling older adults (4.3%) compared to similar studies in Canada (58%) and the UK (55%) (11–13). However, the validity of this comparison is challengedby the lack of a standardized definition of unmet needs for home support and differences in the assessment methodologies. Nevertheless, a significant implication of these findings is that despite the presence of robust support systems for older adults in these high-income countries (14–16), there persists an observable gap in meeting the needs of this population. Many countries have established support systems aimed to provide extra social and health assistance to older adults in cases of disability, illness, or insufficient pensions in order to guarantee a minimal standard of living (16). Yet, in many instances these systems remain unfamiliar to older adults or are difficult to access due to their complex nature (17). In highly decentralized countries such as Switzerland, where the support system for home-dwelling older adults is divided between the federal, cantonal and municipal authorities, discerning the precise channels and processes through which such support can be accessed and coordinated presents a challenge in itself (18,19). In fact, a US study investigating barriers to older adults' access to support highlighted the impact of system complexity, revealing it as a major challenge in utilizing the support system (17). In addition to the complexity of the support system, socio-economical disparities play a substantial role in older adults' access to the support and the capability to meet their needs. These disparities shape the life experiences of their populations, leading to the convergence of advantages and disadvantages in cross-sectional patterns that accumulate over time (20). Additionally, socio-economical disparities can determine an older adult's experience when navigating a complex support system. This process demands substantial effort on the part of the older adult, along with the allocation of resources and competencies, such as making visits to various offices, possessing the ability to read and communicate effectively and having health and digital literacy(21). Our study demonstrated the impact of factors such a private health insurance, educational level, language proficiency, and availability of informal support on the presence of unmet needs for home support (6). From this we can hypothesize that Swiss older adults with limited education and language skills, along with a lack of informal support, are experiencing more difficulties navigating the system and accessing the necessary support to address their needs, which aligns with previous findings in Canada, UK, Norway, and the U.S. (12,13,22,23). These findings underscore the necessity for governments to increase their efforts in mitigating socio-economical and cultural inequalities through a comprehensive life-course approach, thereby enabling individuals to attain old age under improved

conditions (24). Simultaneously, existing support systems must be restructured to proactively reach the most vulnerable populations, thereby allowing for the identification and fulfillment of their needs.

Today's healthcare and support systems are structured in such a way that older adults seek access when their health or social circumstances have become unmanageable (21,24,25). Delays in accessing medical services or required social support can lead to more severe conditions and a poorer prognosis. This will ultimately have a major impact on older adults' lives, imposing economic and emotional burdens on them and their families, and increasing healthcare costs (26). Therefore, organizations like the WHO advocates for the proactive identification of vulnerable older adults within the community (27) in order to enable their referral to tailored programs designed to address their specific needs, especially within fragmented systems However, identifying and reaching this population can be challenging as described in chapter 4. Despite our systematic efforts to select implementation strategies to reach home-dwelling older adults for IAC services, the reach was only 5.4%, lower than the 12-19% reported in similar community-based interventions in Canada and the US (28,29). Some studies have shown the significant impact of community healthcare providers in facilitating older adults' access to community-based programs (28–30), highlighting both their influence and the potential for enhancing the reach of home-dwelling older adults. Although we used specific bundles of implementation strategies for each stakeholder (i.e. community care providers) (9), the strategies did not have the expected impact. Only a few referrals from our community care providers were registered. These findings invite a critical reflection at multiple levels.

First, the presence of a legal framework to improve the care of home-dwelling older adults is not *per se* a guarantee that it will produce the intended impact. Although a legal framework, like the one implemented by Canton BL, can serve as an implementation strategy that facilitates the access to services (31), system readiness is critical for the successful implementation of any new policy (32). When individuals and organizations are ready for policy implementation, they are more likely to actively participate and support the implementation process (32–34) and ensure the resources needed (33,34). Unfortunately, the introduction of the care law in the canton was not preceded by an assessment of readiness, leaving us unaware of the level of community care providers motivation and capacities to collaborate with the implementation of the law. We operated under the assumption that the creation of a care region and the establishment of IACs would naturally indicate high levels of readiness and adoption among community care providers and IAC staff. Yet, our findings indicate that this assumption was incorrect. Additionally, research indicates that introducing new services in community settings often requires time, especially when a multitude of existing services already exists (2,35). Therefore, we believe that the implementation of legal frameworks to enhance the care of home-dwelling older adults

could benefit from the application of implementation science methods, including: theories and frameworks, use of implementation strategies, measurement of implementation outcomes, etc (36).

Similarly, we observed an insufficient investment by the IAC manager in delivering the implementation strategies as planned with low coverage of the strategies delivered. This could have also contributed to the low engagement of community care providers. A possible explanation for these findings could be that the selection of implementation strategies started prior to the appointment of the IAC manager, limiting their involvement. When stakeholders, such as the IAC manager, are excluded from the decision-making process, they can feel a diminished sense of ownership and experience a lower willingness to actively support and engage in the execution of these strategies (37). It is noteworthy to mention that the IAC manager assumed the role seven months prior to the IAC's opening. During this time, their primary focus was on establishing the center, which involved tasks such as staff recruitment, facility setup, and other administrative responsibilities. The operationalization of implementation strategies to reach home-dwelling older adults was entrusted to the research team, with the IAC manager's role primarily limited to delivery. Research has shown the negative impact of divergent priorities among stakeholders and resource allocation, leading to dispersed efforts across multiple areas instead of being focused on the most critical priorities (38). Therefore, we believe that improving the IAC manager involvement by actively engaging them in the entire process of selecting implementation strategies may not only foster a stronger sense of ownership, but also facilitate the development of similar priorities. This holds the potential to enhance the fidelity in the delivery of these strategies in order to reach the target population of the IAC.

We would like to reflect deeper on the selected implementation strategies to reach home-dwelling older adults that were implemented for the various groups of stakeholders. While our study reported a limited number of referrals from community care providers, we also observed a substantial number of self-referrals and referrals from informal caregivers to the IAC. The selection of the implementation strategies followed the same process for each of our stakeholders. But for the operationalization of the implementation strategies addressed to older adults and their caregivers, we had the involvement of an older person: a member of a senior organization. Unfortunately, we didn’t follow a similar approach in the operationalization of strategies aimed at community care providers within the care region where the IAC was established. Knapp (2022) has suggested that involving stakeholders in the identification and operationalization of implementation strategies can enhance the likelihood of selecting strategies that are well-accepted and lead to the expected outcomes (39). Our findings suggest that the exclusion of community care providers from the process of selecting and operationalizing implementation strategies may have led to insufficient consideration of their perspectives and needs. Consequently, the strategies selected for them could have resulted in being ineffective or inappropriate (38), potentially

limiting their engagement in referring older adults to the IAC. Additionally, it's important to acknowledge that the absence of a detailed contextual analysis of the care region where we implemented the INSPIRE care model may have led to the oversight of implementation barriers.

The low reach of the IAC on home-dwelling older adults can help explain the low reach of the INSPIRE care model. In chapter 5, we described that the INSPIRE care model reached only 4.5% of the estimated frail population aged 75 years and older residing in the care region. However, it's important to highlight that the health condition of the referred population also contributed to this outcome. Administrative data of the IAC showed that nursing home referrals was one of the most frequently delivered service, implying that some older adults were too frail to stay at home and benefit from integrated care. Emerging evidence highlights the importance of early frailty identification (i.e. pre-frail state), as once an older adult's condition deteriorates it is less likely to be reversed (40). However, to date there is no universally-accepted standard screening tool for identifying pre-frail older adults (41). Therefore, to improve the reach of frail home-dwelling older adults before their condition deteriorates further, strategies such as enhancing case identification during interactions with healthcare professionals (e.g., emergency departments, family physicians' offices), in-home assessments by non-healthcare individuals (e.g., family members, formal or informal caregivers), or utilizing remote patient monitoring and telehealth should be considered for the next phase of this project (40,41).

Additionally, reflecting on the results of the feasibility study of the INSPIRE care model, we would like to address some contextual factors that we believe significantly influenced the implementation of the care model. *First*, positive factor is the presence of the legal framework. Given that the INSPIRE care model is inherently linked to the legal framework of Canton BL and the IAC, this health policy played a decisive role in shaping the care model's implementation. As Crable and colleagues (2022) have referred, a health policy can act as a determinant that either enables or constrains the achievement of desired health policy outcomes (31). For example, in the Netherlands, the Dutch National Care for the Elderly Program initiated by the Dutch Ministry of Health, Welfare and Sport in 2008 fostered the establishment of a network of local healthcare providers, consumer advocates, and research centers with the aim of enhancing care and quality of life of older adults (42,43). As a result, numerous integrated care initiatives for frail older adults have been implemented in the country (42). In our case, although the care law motivated the Canton to restructure itself to enhance care for home-dwelling older adults, its ambiguous content regarding its operationalization led to varying interpretations regarding the setup of the IAC. As a consequence, the research team found difficulties in finding a care region that was motivated to operationalize the law by implementing an integrated care model within the IAC. Additionally, the need for implementation efforts at policy level resulted in delays and legal challenges in care region formation, affecting the roll-out of feasibility evaluation. As a result, we had to

shift our research efforts to a different care region when collaboration with the initial one ended. This situation resulted in a timeline adjustment, leaving us with approximately ten months to prepare the new care region for the implementation of the INSPIRE care model before assessing its feasibility, instead of the originally planned 24 months.

Insufficient time to establish a favorable environment for the implementation of the INSPIRE care model affected the multidisciplinary team work among the IAC staff, and between the IAC staff and community care providers. Trust-based relationships are essential for effective multidisciplinary teamwork, but they may take over twelve months to fully develop (44). Unfortunately, the time dedicated to preparing this environment proved insufficient, and this was reflected in our feasibility evaluation results. According to the evaluations, the core components of the INSPIRE care model necessitating multidisciplinary teamwork (i.e., individualized care planning and coordination) showed low fidelity scores and faced acceptability issues among community care providers. Community care providers indicated a lack of conviction in collaborating with the IAC, as they did not perceive potential benefits of such collaboration for their work. Similarly, problems in the collaboration between the IAC staff (nurse and social worker) were documented, but this collaboration improved over time, supported by the use of specific implementation strategies, including facilitation by a geriatric nurse expert. These findings are consistent with those reported by Tavassoli and colleagues in their feasibility evaluation of an integrated care model for older adults living at home (45). Consequently, besides enough time, selecting specific implementation strategies to modify community care providers' behaviors towards collaboration in a multidisciplinary team are needed. Regrettably, the implementation strategies selected to improve multidisciplinary teamwork were primarily targeted at the staff of the IAC. Therefore, for the next phase of this project, implementation strategies targeted to outreach more community care providers and improve their collaboration will be identified.

Problems in fostering effective multidisciplinary teamwork for integrated care are not novel, as evidenced by Eastwood (2021) (46), Looman (2021) (2), and Tavassoli (45). The longstanding professional tensions between the health and social care sectors has been shown to hinder the establishment of effective multidisciplinary teamwork in integrated care (46,47). Evidence indicates that these tensions can dissuade care providers from engaging in integrated care, either due to perceiving it as beyond their area of expertise or due to doubts about its potential benefits (46). Given Switzerland's extensive decentralization, offering individuals a wide array of privately and publicly operated healthcare and social care services, often administered separately and dispersed geographically, such tensions are not uncommon (48–50). In fact, in the contextual analysis conducted for this project at the cantonal level, Yip (2020) reported these tensions as one of the factors that could act as a barrier in the implementation of the INSPIRE care model (8). Moreover, she described the different strategies used

to address this barrier, including the creation of stakeholders groups at the cantonal and care region levels (8). While discussions at the cantonal level centered on matters related to the IAC (the care model, the INSPIRE project activities, and the care law), those at the care region level primarily focused on developing tools and preparing the region for care model implementation. Although these strategies were appropriate based on evidence about the implementation of integrated care models, (2,44,51), there are several caveats that must be considered. Our cantonal stakeholder group comprised cantonal authorities, representatives from various health and home care organizations, as well as healthcare and social care professionals from each of the Canton BL's ten care regions. As a result, the feedback they provided was rooted in their respective care regions' experiences and not specifically tailored to the region where we implemented the care model. Thus, the information obtained may not have fully captured the barriers and enablers for implementation in that particular region. On the other hand, due to the time constraints mentioned earlier, most of the preparatory work with the stakeholders of the care region (e.g. creation of a care concept) occurred in the initial care region, not in the one where we ultimately implemented the care model. Consequently, because the care model implemented in the second care region wasn't developed in collaboration with its community care providers and IAC manager and staff, we encountered lack of sense of ownership, mistrust and resistance from them towards its implementation, as reported in chapter 5. Hence, it is crucial to prioritize the thorough identification of stakeholders in the care region, utilizing tools like stakeholder mapping, to ensure a diverse range of expertise (52).

In order for multidisciplinary teamwork to be successful, it needs an organization to be willing and ready to change, strong leadership to support the team (2,3,51,53,54), and an environment of shared values, clear goals, and good communication (51,54). Organizational readiness was assessed in the initial phase of the INSPIRE project (8), but our evaluation may have been influenced by a potential bias. We only engaged members of our stakeholder groups at the cantonal and care region levels (8): individuals already inclined toward and eager to implement integrated care. Consequently, the perspectives of those who held more skepticism towards the INSPIRE care model might have been overlooked. Furthermore, we omitted the readiness assessment of stakeholders in the second care region, due to time constrains. This resulted in an underestimation of the efforts required to build readiness in the second care region, which was translated into a unfavorable environment, characterized by communication issues and scepticism.

Failing to assess the readiness level within the care region might have also impacted the performance of the IAC manager, who may not have been adequately equipped to navigate the challenges stemming from an unfavorable environment for integrated care. Despite a member of the research team provided coaching to the IAC manager to support them in their duties, it may not have

been sufficient. Several studies have pointed out that besides having organisational and change management skills, leaders of integrated care must be visionaries with skills to engage and motivate others (2,35,55). Furthermore, they need to be able to deliver clear and consistent messages that are sustained over time (2,35,56). In the context of our study, the non-participation of the IAC manager in the development of the care model resulted in a lack of ownership and a vague understanding of integrated care. This, translated into limited efforts to establish trusted relationships with community care providers.

Finally, we would like to address the challenges encountered by the IAC staff during follow-up. While the primary reason cited by the staff was a lack of time, aligning with similar studies (57,58), we cannot dismiss other potential factors, such as the lack of awareness among the IAC staff of the importance of conducting this component and suboptimal registration processes. Some studies have highlighted the benefits of using ICT systems for monitoring and organizing follow-up in integrated care for older adults (2,3,45). However, Switzerland lacks interoperable ICT systems. Despite our collaborative efforts with the care region to adapt the existing ICT system for integrated care, its original design for accounting activities posed persistent usability challenges. We believe that addressing this aspect is crucial for facilitate the successful implementation of integrated care models.

## 6.3 Methodological strengths and limitations

This dissertation exhibits various strengths and limitations throughout its chapters, which we will now summarize. Firstly, we believe that examining the prevalence and factors linked to unmet needs for home support was an asset to initiate this project (chapter 3). The information gained from this analysis provided a more profound understanding of the vulnerable home-dwelling older adult population in Canton BL, leading to improved strategies for reaching them. However, we consider this study could have been enhanced by focusing our analysis only on the frail older population, as frailty is considered a state of vulnerability. The inclusion of home-dwelling older adults who were not frail in the analysis may have acted as a confounder that affected the association of certain multilevel factors with the presence of unmet needs for home support.

Moreover, we believe that prioritizing the identification of strategies and determining their impact on reach of this population as part of the feasibility evaluation, was a sound approach (chapter 4). We acknowledge that our strategies covered not only the specific target population of the INSPIRE care model (75+ frail home-dwelling older adults) but also included the broader target population of the IAC (65+ home-dwelling older adults). This decision was influenced by the IAC's link to the cantonal care law, which mandated that the IAC services should be provided to any person aged 65 years and more

living in the care region. Nevertheless, this approach can also be seen as a strength. It raised awareness about the center's existence among the entire older population of the care region and their caregivers, thereby increasing the likelihood that more older adults in need of services could access them. Additionally, by targeting not only frail older adults but the entire population of home-dwelling older adults, we created more opportunities for the identification of frail home-dwelling older adults in the early stages, a critical time for interventions to have a meaningful impact.

Similarly, we consider that the use of implementation mapping for selecting strategies to improve the reach of home-dwelling older adults was innovative. Yet, we acknowledge that the effectiveness of this approach may have been affected by our reliance on information derived primarily from the results of the Canton's contextual analysis, so certain barriers within the care region might have been underestimated. However, our decision to involve an older adult in the operationalization of the strategies showed a positive impact on the reach of the target population. This finding leads us to consider that the synergy between implementation mapping (32) and stakeholder engagement holds significant potential for enhancing the reach of home-dwelling older adults (37). Nevertheless, we believe that the insights gained from this study will serve as a guide for selecting strategies aimed at reaching the target population in another care region for the next phase of our research.

Furthermore, we also consider the use of a mixed-methods design to determine the feasibility of the INSPIRE care model as a strength (chapter 5). The quantitative results combined with the qualitative data gathered from all stakeholders affected by the implementation of this care model contributed to a better understanding of the factors that affect the successful implementation of this integrated care model. However, we acknowledge that this evaluation could have been improved. First, by allowing more time for the care region's preparation before assessing the care model's feasibility. This will allow to clarify if the feasibility issues that we encountered were related to the care model itself or the lack of preparation of the care region. Second, by collecting data for implementation outcomes at different time points, so negative changes in these outcomes can be identified and addressed properly. Third, by going back to the program theory of the care model and identifying all the uncertain process that need to be clarified during the feasibility evaluation (e.g. coordination among care providers, communication and information sharing). Finally, by including qualitative and quantitative data of all the stakeholders affected by the care model. For example, we regret not including interviews with community care providers as part of the feasibility evaluation. Due to their fundamental role in integrated care, community care providers insights could have provided valuable clarification on the survey results and the assumptions we made.

## 6.4 Implications for research

The findings of this dissertation have important implications for future research regarding integrated care models in community settings, suggesting new areas that warrant further exploration.

First, it is recommended to use an ecological approach when investigating the determinants of unmet needs for home support (chapter 3). This approach facilitates a comprehensive examination of multifaceted factors associated with this issue and a better understanding of the setting to implement integrated care. However, future research efforts should prioritize the establishment of standardized definitions and assessment methods for unmet needs in home support among older adults. This standardization will enable more meaningful cross-study comparisons and enhance our collective understanding of this critical issue. Additionally, research should focus on assessing the impact of system complexity on older adults' access to home support, as this information will contribute to identify strategies to simplify the access to support systems and reduce the presence of unmet needs in this population.

Additionally, given the persistent challenge of reaching home-dwelling older adults, forthcoming research should prioritize the exploration of alternative approaches to identify strategies conducive to this objective. On chapter 4, we introduced the use of implementation mapping (9) as a valuable approach to systematically select implementation strategies for reaching home-dwelling older adults. Drawing from our own experiences, we propose the exploration of a hybrid approach that combines implementation mapping for strategy selection with active broad stakeholder engagement for operationalization. We consider that this approach will ensure alignment between strategies and the diverse needs and perspectives of all stakeholders involved, and will contribute to understand the underlying mechanisms through which each strategy operates in order to obtain the expected outcomes. This information will be certainly valuable for other researchers aiming to reach vulnerable populations.

Furthermore, the completion of the feasibility evaluation of the INSPIRE care model (chapter 5) has highlighted the significance of conducting such studies when implementing complex interventions. To date, only one study has published the results of the feasibility of an integrated care program for home-dwelling older adults (45). However, this study primarily focused on participant enrollment and adherence to follow-up evaluations (45), and overlooked crucial implementation outcomes such as acceptability, adoption, and fidelity, which are considered precursors to intervention effectiveness (59). By measuring implementation outcomes as part of our feasibility evaluation, we were able to identify necessary adaptations to the intervention and the need to select new strategies to address the challenges encountered in reaching the target population and involving community care providers. Hence, we recommend that future research on integrated care models in community settings prioritize

investing efforts in determining the feasibility of the intervention with the use of implementation science methods and more through process evaluations, before embarking on large-scale implementations. Likewise, we advocate for publication of the results of feasibility evaluations of integrated care, as this information will contribute to disentangle its complexity by allowing others to understand what succeeded, what didn't, why and how.

Moreover, as the effectiveness of integrated care models for frail older adults can only be determined if the intervention reaches the target population, we also consider that this is an area that needs further research. Our experience showed the importance of timely identification of frail older adults, particularly those in a pre-frail state, to guarantee access to integrated care services while they can still benefit from them. As currently there is no a standard screening tool for pre-frailty, finding optimal approaches to identify this population in the community is needed.

Furthermore, we recommend that in future integrated care projects, particularly in community-based settings, the inclusion of a multidisciplinary team as a fifth core component should be considered. While our care model originally comprised four core components resembling a Comprehensive Geriatric Assessment (CGA), it became apparent that CGA, which is more practical in clinical settings due to the proximity of different disciplines, presented challenges in community settings where care providers are dispersed. Regrettably, we underestimated the significance of multidisciplinary teamwork in our project, resulting in insufficient attention and resource allocation. As a result, the components of our care model that relied on multidisciplinary teamwork encountered significant feasibility issues. Hence, we advise other researchers to contemplate this approach in order to improve the implementation of integrated care for frail home-dwelling older adults.

Finally, we strongly advocate for research teams aiming to implement integrated care in community settings to incorporate local professionals as integral team members. Incorporating local professionals into a research team offers numerous advantages, as they possess a deep understanding of the community's culture and context, and their presence builds trust and acceptance among community members, facilitating access to networks, language proficiency, and increased credibility. In fact, our project's experience demonstrated a significant improvement in community engagement and acceptance after the addition of a local nurse with geriatric expertise to our research team. Therefore, we strongly encourage fellow researchers to consider this approach.

## 6.5 Implications for policy and practice

We consider that the findings reported in this dissertation can bring valuable information for policy makers and practitioners. Chapter 3 revealed the difficulties to determine and compare the prevalence

of unmet needs for home support among older adults with other countries due to lack of consensus on its definition and assessment. Therefore, we highly recommend that policy makers and researchers should establish standardized definitions and assessment methods will enable more meaningful cross-study comparisons and enhance our collective understanding of this critical issue. Similarly, we emphasize the importance of assessing the accessibility of support systems for vulnerable populations, particularly considering that many individuals within these groups may lack the necessary capabilities and language proficiency to access information effectively.

The findings of chapter 4 and 5 evidenced the challenges in reaching home-dwelling older adults, especially those who were not severely frail and could benefit from integrated care. Given the World Health Organization's emphasis on reshaping services to prioritize primary care and community-based initiatives for addressing the needs of frail home-dwelling older adults (24,60) and acknowledging certain governments' endeavors in this direction (61), we strongly recommend concentrating efforts on proactively reaching out to pre-frail older adults to prevent further decline. Engaging diverse healthcare and social service providers, alongside with the use of technology, could be a viable approach for actively identifying this population. Such a collaborative approach can ensure that integrated care effectively reaches its intended recipients, optimizing its potential impact and enhancing the well-being of this vulnerable population.

Additionally, our results of chapters 4 and 5 showed that health policies can either facilitate or hinder access to services based on how effectively they are implemented. The low reach of the IAC and the feasibility issues encountered in the implementation of the INSPIRE care model underscore the necessity for improvements to effectively translate the goals of the care law of Canton BL into tangible real-world outcomes. Therefore, to bridge the gap between policy development and practice, and to ensure policies achieve their intended goals, we strongly advocate for policymakers to use implementation science methods for policy implementation in addition to the further work for integrated care model implementation. This approach provides policymakers with insights into the complexities of policy execution, enabling them to respond effectively. Additionally, it promotes the involvement of diverse stakeholders in the implementation process, aligning policies with their needs and concerns. This, in turn, enhances their readiness to adopt a new policy.

Similarly, we propose that policymakers and practitioners seeking to advance integrated care for frail home-dwelling older adults should acknowledge the significance of allocating ample time and resources for establishing a conducive environment for integrated care implementation. The development of interoperable ICT systems and the cultivation of trust among multidisciplinary teams necessitate time, along with proactive leadership committed to facilitating organizational transformation and fostering integration with other community care providers (41,46). Nevertheless, it

is important to note that the development of the leadership skills essential for integrated care requires (e.g. organizational and change management skills, ability to engage and motivate others)(2) an investment of time and resources. Hence, the allocation of resources for the preparation of leaders for integrated care should also be considered as a priority for policymakers and care organizations (35).

Finally, to facilitate the implementation of integrated care at national levels, we recommend policymakers and practitioners to prioritize integration within existing health and social care organizations rather than the creation of entirely new entities. This approach aligns with the findings of Looman and colleagues' 2021 study on the drivers of successful integrated care model implementation, which emphasized the value of "*building upon what was already there*" (2). Particularly in countries characterized by high decentralization and a multitude of care organizations, the focus should shift towards enhancing the comprehensiveness and multidisciplinary nature of services offered by these existing organizations, rather than initiating the establishment of new ones.

## 6.6 Conclusions

Due to the ageing of the population (62) and the increase in the number of frail older adults (63)with complex care needs(64), there is a need for implementing innovative interventions addressing the needs of frail older adults (65) while lowering per capita cost (66). Although integrated care models are considered the best approach to address the needs of frail older adults and overcome fragmented care, their complex nature makes it challenging to determine their potential public health benefits (67,68).

The UK MRC Framework recommends assessing the feasibility of such complex interventions as a crucial step prior to assessing its overall impact (69). Moreover, the importance of implementation science methods to gain a deeper understanding of the underlying mechanisms behind the impact of integrated care, has been emphasized. (1,4,70). Therefore, this dissertation provides valuable insights into various facets of integrated care models for frail older adults, specifically within the context of the INSPIRE project.

Firstly, the exploration of unmet needs for home support in older adults shed light on the complexities of assessing and addressing these needs. The prevalence of unmet needs observed in this study, while lower than in some other countries, calls attention to the ongoing challenges faced by older adults in accessing necessary support. The absence of a standardized definition for unmet needs and variations in assessment methodologies across countries underscore the need for a unified approach to better understand and address these issues.

Secondly, our feasibility evaluation of the INSPIRE care model uncovered several critical barriers and challenges. The ambiguous nature of the legal framework surrounding integrated care in Canton BL highlighted the importance of clear and well-defined policies to guide implementation efforts. Furthermore, the limited readiness assessment within the care region proved to be a crucial oversight, emphasizing the significance of thoroughly evaluating stakeholders' preparedness and motivation for collaborative efforts in any initiatives aimed to improve the care of older adults.

The low reach of the INSPIRE care model, as well as the feasibility issues encountered in the evaluation underscore the importance of dedicating sufficient time to establish a favourable environment for integrated care implementation before embarking on its evaluation. This environment should be characterized by the presence of trust-based relationships, shared values, interoperable ICT systems and effective communication with local stakeholders.

In light of these findings, it is evident that the successful implementation of integrated care for older adults requires a multifaceted and multilevel approach, and the use of implementation science methods. Clear and well-defined policies, thorough readiness assessments, early frailty identification, targeted stakeholder engagement, and robust information systems are all essential components in achieving the expected outcomes of integrated care. As the ageing population continues to grow, the insights and lessons gained from this research will become increasingly relevant to support the successful implementation of integrated care in Canton BL and, in the next phase, hopefully achieve the desired impact on frail home-dwelling older adults.

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# CURRICULUM

MARIA JOSE MENDIETA, MD, MSc, MPH

## PERSONAL INFORMATION

Department (main institution): Institute of Nursing Science, Department Public Health, University of Basel

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## EDUCATION AND TRAINING

| | |
|---|---|
| Since 2020 | University of Basel, Switzerland & Katholieke Universiteit Leuven, Belgium<br>PhD in Nursing Science & Biomedical Sciences |
| 2017 - 2018 | Public University of Navarre, Spain<br>Master in Public Health |
| 2013 - 2014 | Leiden Universiteit, The Netherlands<br>Master in Science of Vitality and Ageing |
| 2004 to 2011 | San Francisco de Quito University, Ecuador<br>Medical Doctor |

## OTHER EDUCATION

| | |
|---|---|
| 2022 - present | International Association of Gerontology and Geriatrics, Asia-Oceania<br>e-training in Gerontology and Geriatrics 2023 (12 months) |
| 2017 | Tampere University of Applied Sciences<br>Develop customer and business centric solutions (4 months) |
| 2015 | The Hebrew University of Jerusalem |

Nutrition in a Changing Global Environment (1 month)

## RESEARCH & PROFESSIONAL EXPERIENCE

| | |
|---|---|
| 2020 - present | Institute of Nursing Science, University of Basel, Basel, Switzerland<br>Research Assistant |
| 2022 - 2023 | CURAVIVA-ARTISET Schweiz, Bern, Switzerland<br>Student Internship |
| 2019 | Vice-ministry of Governance and Health Surveillance, Ministry of Public Health, Quito, Ecuador<br>Analyst |
| 2018 | Secretariat of Health Promotion and Equality, Ministry of Public Health of Ecuador, Quito, Ecuador<br>Analyst and head of the Secretariat |
| 2014 - 2017 | National Department of Health Promotion, Ministry of Public Health of Ecuador, Quito, Ecuador<br>Analyst, Coordinator and Director of the Department |
| 2012 - 2013 | Nutrition Department, Ministry of Public Health of Ecuador, Quito, Ecuador<br>National Health Technician |
| 2011 – 2012 | Provincial Health Office of Bolivar, Guaranda, Ecuador<br>Medical director & general practitioner |

## TEACHING EXPERIENCE

| | |
|---|---|
| HS2020 | Advanced Nursing Practice – Teaching Assistant |
| FS2021 | Medical and Nursing Care in the Genomic Era – Teaching Assistant |
| HS2021, FS2022, HS2022 | Research Round Table Meetings – Teaching Assistant |

## PUBLICATIONS

### Peer-reviewed publications

Mendieta M, Goderis G, Zeller A, Yip O, Siqeca F, Zúñiga F, Zullig L, De Geest S, Deschodt M, Flamaing J, Dhaini S, the INSPIRE Consortium. Mapping implementation strategies to reach community-dwelling older adults in Northwest Switzerland. BMC Implementation Science (Submitted)

Mendieta M, De Geest S, Goderis G, Yip O, Deschodt M, Dhaini S and the INSPIRE consortium. A multi-level perspective on perceived unmet needs for home support in home-dwelling older adults in the Swiss context: a secondary data analysis of a population study. BMC Geriatr 22, 833 (2022). https://doi.org/10.1186/s12877-022-03479-5

Yip O, Mendieta M, Zullig LL, Zeller A, De Geest S, Deschodt M, et al. (2022) Protocol for a mixed methods feasibility and implementation study of a community-based integrated care model for home-dwelling older adults: The INSPIRE project. PLoS ONE 17(12): e0278767. https://doi.org/10.1371/journal.pone.0278767

Siqeca, F., Yip, O., Mendieta, M. et al. Factors associated with health-related quality of life among home-dwelling older adults aged 75 or older in Switzerland: a cross-sectional study. Health Qual Life Outcomes 20, 166 (2022). https://doi.org/10.1186/s12955-022-02080-z

Yip, Dhaini, Esser, Siqeca, Mendieta, Zeller, De Geest, Deschodt, Zuniga, Huber, Zullig, King and the INSPIRE consortium. Health and social care of home-dwelling frail older adults in Switzerland: a mixed methods study. BMC Geriatr 22, 857 (2022). https://doi.org/10.1186/s12877-022-03552-z

Rivadeneira, M.F., Mendieta, M.J., Villavicencio, J. et al. A multidimensional model of healthy ageing: proposal and evaluation of determinants based on a population survey in Ecuador. BMC Geriatr 21, 615 (2021). https://doi.org/10.1186/s12877-021-02548-5

### Non-peer reviewed publications:

Deschodt M, Siqeca F, Yip O, Stenz S, **Mendieta M**, Blozik E, Briel M, Obas K, Probst-Hensch N, Quinto C, Vounatsou P, Schwenkglenks M, Zeller A, Zuniga F, De Geest S. INSPIRE Bevölkerungsbefragung – Kantonaler Bericht. INS external report. Link: https://inspire-bl.unibas.ch/wp-content/uploads/2020/07/INSPIRE-Kantonaler-Bericht-DE-200730-FINAL.pdf

Zeller A, Deschodt M, De Geest S, **Mendieta M**, Siqeca F, Urfer P, Yip O. «INSPIRE»: Koordinierte Versorgung, damit ältere Menschen möglichst lange zu Hause bleiben können. Synapse, Das offzielle Kommunikationsorgan der Ärztegesellschaft Baselland und der Medizinischen Gesellschaft Basel, 14 August 2020. https://synapse-online.ch/article/doi/syn.2020.01343

Freire W.B., Ramírez MJ., Belmont P., **Mendieta MJ**., Silva MK., Romero N., Sáenz K., Piñeiros P., Gómez LF., Monge R. 2013. TOMO I. Encuesta Nacional de Salud y Nutrición del Ecuador. ENSANUT - ECU 2011 -2013. Ministerio de Salud Pública / Instituto Nacional de Estadística y Censos. Quito, Ecuador

### Validation team:

Durán CE, Marchand B, Espinosa V, Alvarado L, Falconí C. El Libro Verde de los Medicamentos. 5ta. ed. Quito: Vademécum Farmacoterapéutico del Ecuador; 2021.

Ministerio de Salud Pública del Ecuador. Procedimientos para la prevención y control de la Tuberculosis. Manual. 2017

Ministerio de Salud Pública del Ecuador. Diabetes Mellitus tipo 2. Guía de Práctica clínica. 2016

Ministerio de Salud Pública del Ecuador. Manual de aplicación de la sexta ronda de advertencias sanitarias en envases de productos de tabaco. Manual. 2017

## CONFERENCE AND POSTER PRESENTATIONS

Mendieta M, Dhaini, Goderis G, Zeller A, Yip O, Siqeca F, De Geest, Zúñiga F, Deschodt M, Zullig L, King H, and the INSPIRE consortium. Feasibility evaluation of the INSPIRE care model. Poster presentation at the European Implementation Event. Basel: June 8-9, 2023

Mendieta M, Dhaini, Goderis G, Zeller A, Yip O, Siqeca F, De Geest, Zúñiga F, Deschodt M, Zullig L, King H, and the INSPIRE consortium. Adaptations of a community-based integrated care model for frail home-dwelling older adults using the results of a feasibility evaluation. Oral presentation at the 23nd International Conference on Integrated Care (ICIC23). Antwerp: May 22-24, 2023

Mendieta M, Dhaini S, Gooderis G, Zeller A, Yip O, Siqeca F, De Geest S, Zúñiga F, Deschodt M, Zullig L, King H. Feasibility of a community-based integrated care model for home-dwelling older adults. Poster presentation. European Geriatric Society of Medicine Conference. London, United Kingdom, 28-30 September 2022

Mendieta M, De Geest S, Goderis G, Yip O, Dhaini S, and the INSPIRE Consortium. Factors associated with perceived unmet needs for home support in community-dwelling older adults in the Swiss context: a population study. Oral presentation. 22nd International Conference on Integrated Care. Odense, Denmark, 25 May, 2022

Urfer P, Siqeca F, Mendieta M, Yip O, Dhaini S, De Geest S and the INSPIRE Consortium. Koordinierte Versorgung für ältere Personen - Neue Rollen in der Pflege. Oral presentation at the Schweizer Pflegekongress, Bern, May 5-6, 2022

Siqeca F, Mendieta M, Yip O, Urfer P, Dhaini S, De Geest S and the INSPIRE Consortium. INSPIRE Project. Poster presented at the NRP 74 Programme Conference, Luzern, April 11-12, 2022

Siqeca F, Yip O, Mendieta M,Dhaini S, De Geest S,. Implementation of an integrated nurse led care model for home-dwelling older adults (INSPIRE). International Nursing Conference “The role of Nurses in the face of new health challenges” Tirana, Albania, 2 March., 2022

Mendieta M, Deschodt M, Zuniga F, Yip O, Stenz S, Probst N, Schwenkglenks M, Briel M, Zeller A, Siqeca F, De Geest S. INSPIRE: implementation and evaluation of a nurse-led integrated care model for home-dwelling older adults. Oral presentation at the CARE4 2021 International Scientific Nursing and Midwifery Conference. Ghent, Belgium, 10 February 2022.

Siqeca F, Mendieta M, Yip O, Urfer P, Dhaini S, De Geest S and the INSPIRE Consortium. INSPIRE Project. Poster presented at the NRP 74 Programme Conference, Zurich, November 15th, 2021

Yip O, Siqeca F, Mendieta M, Urfer P, Dhaini S, De Geest S and the INSPIRE Consortium. INSPIRE Project Pitch. NRP 74 Programme Conference, Zurich, November 15th, 2021

Mendieta M, Siqeca F, Flury S, und das INSPIRE Konsortium. Entwicklung, Implementierung und Evaluation einer interprofessionellen Informations- und Beratungsstelle (IAC) für zu Hause lebende ältere Menschen im Kanton Basellandschaft. 2. Symposiums der Plattform Interprofessionalität, Zürich, September 21st, 2021.

Siqeca F, Urfer P, Yip O, Mendieta M, Stenz S, Dhaini S, Deschodt M, De Geest S, und das INSPIRE Konsortium Entwicklung, Implementierung und Evaluation einer interprofessionellen Informations- und Beratungsstelle (IBS) für zu Hause lebende, fragile, ältere Menschen im Kanton Basellandschaft. FMC Symposium, Bern, June 16th., 2021

Siqeca F, Urfer P, Yip O, Mendieta M, Stenz S, Deschodt M , Dhaini S, De Geest S,. Entwicklung, Implementierung und Evaluation eines koordinierten Versorgungsmodells für zu Hause lebende ältere Menschen im Kanton Basel-Landschaft. Symposium Alter Bern.Bern, Switzerland.12 March 2021

Mendieta M, Deschodt M, Yip O, De Geest S. INSPIRE: implementation and evaluation of a nurse-led integrated care model for home-dwelling older adults. Poster presentation at the Winter meeting of the Belgian Society for Gerontology and Geriatrics. Brussels, Belgium, 26 February 2021

Mendieta M, Yip O, Siqeca F, Dhaini S, De Geest S. Implementation of an integrated community-based model of care for senior citizens in Canton Baselland (INSPIRE). Oral presentation the 1st Conference of the Swiss Implementation Science Network (IMPACT). Basel, Switzerland, 3 February 2021

## LANGUAGES

- Spanish – Mother tongue
- English - Advanced
- German – Basic
- Italian – Basic

## AWARDS AND HONORS

| | |
|---|---|
| 2019 - present | Marie Skłodowska-Curie Actions<br>Scholarship within the TRANS-SENIOR Project funded by the European Union and executed across Belgium, Switzerland, Germany, Israel, and the Netherlands |
| 2017 - 2018 | Carolina Foundation Scholarship<br>Awarded by the Spanish Government |
| 2015 | MASHAV Scholarship<br>Awarded by the Israel International Agency for Cooperation and Development |
| 2012 - 2013 | SENECYT Scholarship<br>Awarded by the Ecuadorian National Secretariat of Science and Technology |