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MANAGING FRAILTY

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EXECUTIVE SUMMARY

Background:

The JA ADVANTAGE “Managing Frailty” Joint Action aims to build a shared understanding among policy makers and stakeholders in order to develop a common European Prevention of Frailty approach. Work Package 7 (WP7) aims to identify models of care to prevent or delay progression of frailty and enable people to live well with frailty. Integrated care is considered most effective when applied to an older population, but there is limited data on outcomes and costs from studies of integrated care to prevent and manage frailty. Therefore we sought to analyse different models of health and social care, consider the effective and transferable components for frailty, and review the evidence of the economic impact, where available.

Methods:

A systematic search of peer-reviewed medical literature published from 2002 to 2017 was conducted in Medline via PubMed combining the concepts of frailty and models of care. This search yielded 1065 potential articles. Articles on a specific disease, process or intervention without considering the approach to service delivery were excluded leaving 163 abstracts and 43 full papers for analysis. We also reviewed information on frailty projects funded by the European Union or registered with the European Innovation Partnership on Active and Healthy Ageing, and grey literature (including good practices) identified by partners.

Recommendations for ADVANTAGE:

Few models of integrated care are specifically designed to prevent and tackle frailty in the community and at the interface between primary care and hospital. Current evidence supports the case for a more holistic and salutogenic response to frailty, blending a chronic care approach (frailty viewed as a chronic condition / syndrome) with education, enablement and rehabilitation to optimise function, particularly at times of a sudden deterioration in health, or when moving between home, hospital or care home. In all care settings, these approaches should be supported by comprehensive assessment and multidimensional interventions tailored to modifiable physical, psychological, cognitive and social factors and appropriate to the goals and circumstances of the individual.

The Frailty Prevention Approach should incorporate the following components:

- a single entry point in the community – generally in Primary Care
- use of simple frailty specific screening tools in all care settings
- comprehensive assessment and individualised care plans – including for caregivers
- tailored interventions by an interdisciplinary team – both in hospitals and community
- case management and coordination of support across the continuum of providers
- effective management of transitions between care teams and settings
- shared electronic information tools and technology enabled care solutions
- clear policies and procedures for service eligibility and care processes.

INDEX

ACRONYMS.....	4
INTRODUCTION.....	5
METHODS.....	6
RESULTS	8
CONCLUSIONS.....	13
REFERENCES.....	17
ANNEX 1	20
ANNEX 2.....	21

ACRONYMS

ACT = Adults Care in Transition.

ADL = activities diary live.

CGA = Comprehensive Geriatric Assessment.

CHS = Frailty phenotype.

COPA = CO-ordination Personnes Agées.

EIPAHA = European Innovation Partnership on Active and Healthy Ageing.

EU = European Union.

GFI = Groningen Frailty Indicator.

IADL = independence activities diary live.

JA = Joint Action.

PRISMA = Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

RCT = randomize control trial.

SF36 = 36-Item Short Form Health Survey.

UK = United Kingdom.

U-PROFIT = Utrecht primary care PROactive Frailty intervention Trial.

USA = United States of America.

WICM = Walcheren Integrated Care Model.

WP7 = work package seven.

INTRODUCTION

Traditional health and social care models are not attuned to the complex and changing needs of a population that is ageing, living with multiple physical and mental health conditions, functional and cognitive impairment, frailty or disability. Frailty and multimorbidity are complementary concepts associated with greater clinical complexity, increased use of healthcare resources and higher costs. In a cross sectional observational study of healthcare utilisation by 2598 older people in Germany, (Bock et al., 2016) reported that frailty phenotype (>3 Fried criteria) increased total healthcare costs by 680 euro over three months when controlled for comorbidity and ageing.

Harrison et al., (2015) consider that frailty shares many features of a chronic condition: a dynamic syndrome that cannot be cured but may be prevented and better managed in primary care through an interdisciplinary chronic disease management approach that anticipates and proactively manages episodes of deteriorating function. Interventions common to both multimorbidity and frailty include proactive assessment, care planning and review; coordination of care; targeted enablement and support for self management; and behaviour change approaches that go beyond the scope of a traditional biomedical approach.

Integrated care has emerged as an effective way to improve outcomes for people with chronic and complex care and support needs. Many chronic care programmes aim to deliver integrated care through continuous relationships with a primary care or social care professional, supported by coordinated care from an interdisciplinary team. It is widely suggested that integrated care may be most effective when applied to an older population, but there is limited data from cost-effectiveness studies to support this hypothesis.

Objectives:

We considered established models of integrated care for chronic disease to understand their contribution to the prevention and management of frailty.

We explored the following questions:

1. What are the core concepts within models of integrated care?
2. What is the experience of implementing models of integrated care for frailty?
3. What are the outcomes from adopting integrated care models for people who are frail?
4. What are the implications for future research and education on integrated care for frailty?

Scope:

The review had a specific focus on models of integrated care and support to address frailty in primary care and community settings. However this report also considers evidence for the effectiveness of models of care for frailty in hospital and at the interface between hospital and community.

METHODS

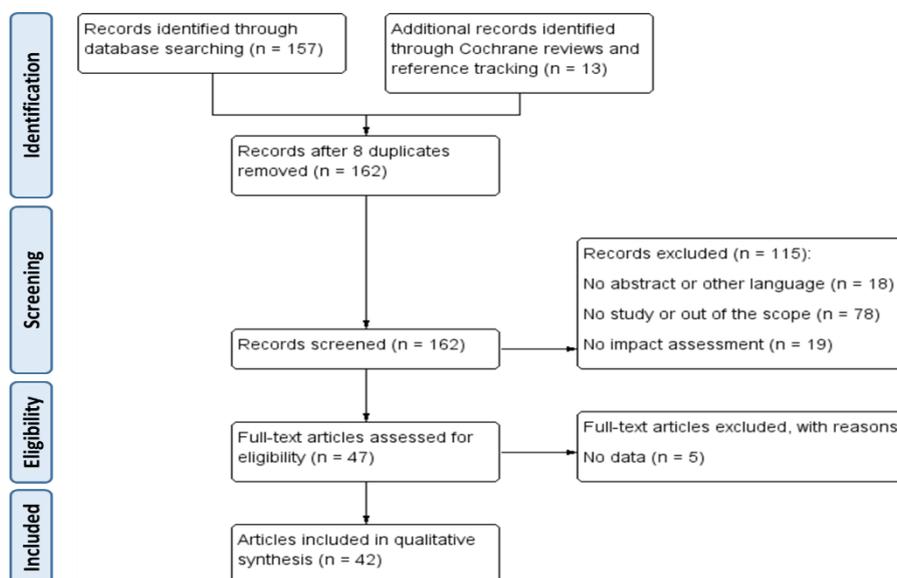
A systematic search of peer-reviewed medical literature published from 2002 to 2017 was undertaken to identify articles assessing the impact of models of care to prevent or manage frailty. The search was conducted in Medline via PubMed by combining two key concepts: a frailty approach and models of care. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were used.

Search terms *frailty* or *frail* were applied without prejudice as to the specific definition. As frailty is a complex syndrome that requires a response across a continuum or “whole system” of care, the following search terms were used: *model(s) of care; care model(s); integrated care; health and social care; managed care; coordinated care; and comprehensive care*. As prevention of frailty is particularly influenced by interventions delivered in primary care and community settings, a second query used *primary care, community care, community based care, community dwelling and care, home based care, & home care*. The specific query translation is included in Annex 1.

Peer-reviewed literature

As a first search of titles and abstracts identified 1065 potential articles other databases were not searched. A more filtered review of titles identified 157 abstracts (42 from the first query and 115 from the second). No completed systematic reviews on preventing or managing frailty in the community were registered in the PROSPERO database or Cochrane library. Systematic reviews on Comprehensive Geriatric Assessment and Intermediate care models were analysed and their references tracked to complete the report as illustrated in Figure 1. After applying exclusion criteria (focused on a specific disease or intervention without considering service delivery, or lack of data on impact), 43 articles were analysed using a standard template to capture information on frailty definition and assessment, and the scope, setting and type of interventions.

Figure 1 PRISMA flow diagram



Grey literature

The websites of relevant frailty, multimorbidity or integrated care projects funded by the European Union were reviewed to identify insights on models of care for frailty. We also reviewed two reports published in 2013 by the European Innovation Partnership on Active and Healthy Ageing (EIPAHA): a [compilation of 286 practices](#) gathered by the Frailty Action Group and a compendium of peer – reviewed examples of excellent innovation in ageing from [32 EIPAHA Reference Sites](#).

Each of the WP7 partners were invited to submit ‘grey literature’ on models of care for frailty from their country. This ‘grey literature’ could include examples of a good practice, defined as a practice *“that has been proven to work well and produce good results, and is therefore recommended as a model.....a successful experience, which has been tested and validated, in the broad sense, which has been repeated and deserves to be shared so that a greater number of people can adopt it”*.

Most of the good practices submitted were examples of multidimensional interventions or components of programmes rather than comprehensive models of care, and few specifically targeted frailty. To be included in this report, practices had to describe a comprehensive model of care that has been successfully implemented, has evaluated positively, and is considered to be transferable.

Limitations

The methodology for the review was rigorous but pragmatic and proportionate. The main limitations and mitigating factors associated with the approach to the review are:

- All publications within the scope of the research may not have been identified correctly from reviewing the titles or because of technical issues. However, it is encouraging that the selection captured a number of high quality reviews and recent publications that describe different models of care and key references on this topic.
- The use of the terms frail and frailty to ensure the models of care researched were directly related to the frailty approach excluded consideration of more general models of integrated care for older people or patients with multimorbidity.
- The “whole system” approach adopted did not search for primary empirical studies on the management of frailty in hospitals or in care home settings. Evidence for the management of frailty in these settings will be captured by Work Package 6.
- As models of care to prevent and manage frailty in the social sector may be difficult to identify from peer reviewed literature they were a specific focus for this search.
- Other studies that aim to understand how to prevent, detect and manage frailty exclusively in primary care settings will be analysed by Work Packages 5 and 6.
- There is limited cost effectiveness data on models of care that are specific to frailty prevention and management. However there is likely to be transferable lessons from the economic analysis of models of integrated care for adults with complex needs.

RESULTS

From a systematic review and best evidence synthesis of 18 comprehensive integrated care programmes encompassing various components of the Chronic Care Model for people with multimorbidity or frailty, (Hopman et al, 2016) reported some evidence of improved health-related quality of life, function, and satisfaction with care but no reduction in health services utilisation or costs. The programmes analysed were delivered in various settings, at home, in primary care, hospitals or hospice. All included innovations such as appointing case managers, establishing multi-professional teams, and implementing individualised care plans.

An important distinction between chronic disease and frailty is that frailty is more often associated with functional impairments and physical inactivity that require a restorative or enabling approach and support from both health and social care sectors, particularly when the risks of dependency are highest such as during a sudden deterioration in health of the individual or their caregiver, or following admission to hospital.

Models of Care for Frailty: A Systematic Review

Comprehensive assessment, individualised care plans, and coordination of tailored interventions are the essence of both integrated care and of Comprehensive Geriatric Assessment (CGA): a highly evidenced approach that improves outcomes for frail older people in hospital (Ellis et al., 2017). This review considers the evidence for comprehensive assessment and integrated care approaches applied at key points in the frailty care pathway.

Preventative education, enablement and care and support at home:

Ryburn et al., (2009) reviewed three non-randomised controlled trials of restorative home care (home support designed to enable recovery of independence). In the largest study, involving 1382 participants in the United States of America (USA), the restorative home care approach improved self-care, home management, mobility, increased the likelihood of remaining at home, and reduced visits to an emergency department. The two smaller studies in the review, with less than 200 participants from Australia and the United Kingdom (UK), found that enabling home care improved activities of daily living, mobility and morale and reduced falls and need for home care at no increased direct cost. In a non-randomised, controlled study of 252 community-based older people and their caregivers, interventions delivered by physicians, physiotherapists, nurses, psychologists and social-workers resulted in high levels of patient and caregiver satisfaction, reduced cognitive impairment and depression (Di Gioacchino et al, 2004).

Markle-Reid et al., (2013) reported on three single blind randomised studies of nurse led education on falls prevention, nutrition and self-management involving 498 community dwelling older people in one geographic area of Ontario. The interventions improved health related quality of life as assessed by the 36-Item Short Form Health Survey (SF36). In the largest of the three studies, involving 288 people over six months, the intervention group had better physical and mental health functioning, a greater reduction in depression, enhanced perception of social support, significantly lower cost of prescription medications, but no difference in the cost of services.

A quasi-experimental study of integrated care for 377 people reported that caregivers experienced greater support and satisfaction, reduced anxiety and caregiver burden and were more likely to continue to provide assistance at home (Janse et al., 2014).

Holistic models of enablement, education and preventative care and support at home are illustrated in the [National Strategic Policy for Active Ageing in Malta](#), [Finland's Active Age programme](#), [Ageing Well in Wales](#), and [Ageing Well in France](#).

Comprehensive Assessment and Chronic Case Management in Primary Care:

In a meta-analysis of 89 randomised controlled trials of comprehensive and complex interventions for 97,984 people in the community, (Beswick et al., 2008) reported some

evidence for improved physical function and a reduction in falls, hospital admissions and admissions to care homes. However the greatest benefit was observed in early studies, particularly those starting before 1993, raising questions about the applicability of the findings within the current model of primary care that has evolved in the last 25 years.

In an international overview, (Béland et al., 2011) analysed nine examples of integrated primary care for frail elderly that described the components of care and had good quality evaluations. Seven of the models evidenced reduced hospital and/or long term care utilisation and some evaluations were able to quantify significant savings per case (Annex 2). Key components of these successful models of integrated care for frail older people were:

a single entry point, individualised assessment and care plans, case management, coordination of home and community-based services across the continuum of care, and effective management of transitions of care, all enabled by an electronic information tool and clear policies and procedures for eligibility and care processes. These success factors resonate with the [seven international case studies](#) of integrated care for older people with complex needs published by the Kings Fund in 2014.

Several recent studies of integrated care for frail older people in European Union (EU) Member States support the case for applying the CGA approach in Primary Care as part of an integrated and interdisciplinary model of care. For example, (Hoogendijk, 2016) analysed three different integrated models in the Dutch National Care for the Elderly Program:

- 1) The Frail Older Adults Care in Transition (ACT) trial in 35 primary care practices where 'frailer' adults aged ≥ 65 years were randomised to receive in-home comprehensive assessment and interdisciplinary case management versus usual care. No significant effect was found on quality of life, psychological health, function, hospitalisation, or costs at 24 months (van Leeuwen et al., 2015). Study limitations were the screening approach, emphasis on medical interventions and suboptimal implementation fidelity.
- 2) In the Prevention of Care cluster randomised trial in 12 practices, adults ≥ 70 years with frailty (Groningen Frailty Indicator (GFI)- score ≥ 5) received comprehensive assessment and interdisciplinary care based on tailored treatment plans and regular evaluation and follow-up over 24 months. Mixed method analyses showed no significant differences compared to control group with regard to disability (primary outcome) or secondary outcomes (depressive symptoms, social support interactions, fear of falling, and social participation). Sample sizes were small and the study may have targeted a cohort that was too frail to impact on study end points.
- 3) Utrecht primary care PROactive Frailty intervention Trial (U-PROFIT) was a cluster randomised trial over 12 months in 3092 community-dwelling people ≥ 60 years from 39 primary care practices. The multi-component intervention (in-home CGA by a practice nurse, tailored care plans, and coordinated interdisciplinary interventions) was associated with small effects on activities diary live (ADL) / independence

activities diary live (IADL) and dependency but no effects on health-related quality of life, hospitalisations, mortality or satisfaction with care.

Looman et al., (2016a) reported on a study of the Walcheren Integrated Care Model (WICM). Patients aged ≥ 75 years with GFI ≥ 4 , and their caregivers, received needs assessment, multidisciplinary care plan and consultations, case management, integrated information system, psychosocial interventions, education, training, and counselling. The study had a small effect on health, quality of life, health care use and satisfaction with care after three months. However, in an economic evaluation over 12 months, WICM was not cost-effective as costs per quality-adjusted life year were high (Looman et al., 2016b).

Although they used validated frailty tools, both (Hoogendijk, 2016) and (Looman et al., 2016a) noted several limitations of these studies. The short duration (12 to 24 months) did not enable long-term and durable effects; the inclusion criteria may not have been specific enough; outcomes measures may not have been sensitive enough; non-medical solutions like social care and community support may not have been well developed; and the absence of impact may reflect pre-existing strong primary care in the Netherlands. Overall these Dutch studies suggest that more research is needed to determine which older population would benefit most from such interventions in primary care.

The French CO-ordination Personnes Agées (COPA) controlled study compared CGA and intensive case management (105) with usual care (323) in the 428 people who were included from a total of 544 eligible for the study. Total hospitalisations were unchanged, unplanned admissions declined, and there was no difference in institutionalization or mortality (de Stampa et al., 2013). The construct of frailty was based simply on a presumption of complex care needs, and cases in the intervention arm received a different mix of interventions. In another quasi-experimental study in Belgium, 4607 patients with mild or moderate - severe impairment on the interRAI Hierarchical Activities of Daily Living Scale, received case management and multicomponent interventions at home or in a short-term residential setting (de Almeida et al, 2016). Both subgroups had lower institutionalization rates. Mortality was lower for those with moderate to severe impairment receiving day care.

A prospective controlled trial in 301 frail dependent community dwelling elderly patients in Geneva, randomised home visiting nurses to standard primary care support or 24 hour support from a Community Geriatrics Unit (di Pollina et al., 2017). The intervention group had a lower hospitalisation rate after the first year, lower first emergency room visits, and were more likely to die at home. There was no difference in institutionalization or mortality rates. This model included access to urgent community geriatric assessment and advice after hours – a component that is often missing from programmes that are solely primary care based. This issue of after-hours care must be considered in the design of a model, as explored in the 2017 Commonwealth Fund briefing [Overview of Home-Based Primary Care](#). Strategies include access to specialist advice via call centres, remote monitoring with telecare or telehealth solutions, and co-location of night health and care teams.

Comprehensive Geriatric Assessment in Hospital:

Frail older people frequently experience emergency admissions to hospital where they are at high risk of experiencing adverse events and poor outcomes. There is strong evidence for the benefits of inpatient CGA delivered by specialist teams in dedicated units (Baztan et al., 2009). An updated Cochrane review of CGA (in dedicated wards or by mobile teams) for adults ≥ 65 years, admitted to hospital as an emergency, analysed 29 trials published between 1984 and 2013 involving 13,766 participants across nine countries (Ellis et al., 2017). Inpatient CGA was associated with more patients living in their own homes at three to 12 months' follow-up after discharge. The authors acknowledge that the analysis was underpowered to detect a difference in effect between CGA delivered in wards or by mobile teams. Mobile CGA teams often operate where demand for inpatient geriatrician led CGA in wards outstrips capacity, as described in the [review of CGA in Belgium](#).

A systematic review of CGA for older people assessed, treated and discharged within 72 hours of emergency admission to hospital (Conroy et al., 2011) found only five randomize control trial (RCTs) eligible for analysis. In this limited series, there was no clear evidence of benefit from CGA in terms of mortality, readmissions, institutionalisation, function, quality-of-life or cognition.

Intermediate Care Services:

The report on [Better Care for Frail Older People](#) published by the Deloitte Centre for Health Solutions in 2014, recognises the value of investing in intermediate care services that offer safe and effective community based assessment, treatment and rehabilitation alternatives to acute hospital care at times of a deterioration in the health of the older person or their caregiver. In contrast with chronic case management, intermediate care is time limited (usually for a period of days or weeks) with a clear objective of prevention of admission and readmission (where safe and appropriate), shortened length of hospital stay, smoother transfer to post-acute care, and reduced need for long term institutional care. Examples of intermediate care services include enhanced interdisciplinary assessment, treatment and rehabilitation at home, in day hospitals, or inpatient care in community hospitals.

In a systematic review of 10 randomised controlled trials of admission avoidance hospital care at home involving 1327 patients, (Shepperd et al., 2009) found lower mortality at six months and greater satisfaction for hospital care at home compared to inpatient care. Hospital at home care was less expensive when the analysis was restricted to treatment actually received and when the costs of informal care were excluded. Older patients, (n=323, mean age 76 years), managed by hospital at home in New Mexico, USA, had comparable or better clinical outcomes and higher satisfaction compared with similar inpatients, achieving 19% reduction in costs (Cryer et al., 2012).

In a home based programme for 722 frail older people (mean age 83.7 years) with severe and disabling chronic illnesses, an interdisciplinary team offered same day urgent house visits for exacerbations of chronic illness in order to intervene early and prevent avoidable admissions to hospital (de Jonge et al., 2014). The team physicians were also involved in any hospital episodes to ensure continuity of care if patients were admitted. This model led to 17% lower total Medicare costs compared to matched controls over a mean of two years of follow-up. A quasi-experimental Catalan study of an early supported discharge programme for medical and orthopaedic patients, mean age 83.2 years, reported that the 244 patients receiving Hospital at Home had an average of six days shorter hospital stay and better functional outcomes compared to a propensity matched cohort managed in hospital (Mas et al., 2017).

In their updated Cochrane review of day hospitals, (Brown et al., 2015) considered 16 trials involving 3689 participants that compared day hospitals with alternatives. The systematic review reported low quality evidence that medical day hospitals appear effective compared to no comprehensive care for the combined outcome of death or poor outcome, and for deterioration in activities of daily living. There was no clear evidence for other outcomes, or benefit over other medical care options. In a recent scoping review of community hospitals, Pitchforth et al., (2017) noted that patient experience was frequently reported to be better at community hospitals, although there was limited evidence for cost-effectiveness.

CONCLUSIONS

The literature review identified few models of integrated care specifically designed to prevent and tackle frailty in the community and at the interface between primary care and secondary care. Most were small scale demonstration projects that have yet to spread across larger geographic areas, or population groups. Large scale integrated care models may require a favourable political and funding context and changes to existing legislation, policy, funding and delivery structures as evident in the [PAERPA pathway for people at risk of losing their autonomy](#) in France and Scotland's [Reshaping Care for Older People and Change Fund](#). Economic benefits of implementing system-level changes at scale are described in the Program of Research to Integrate the Services for the Maintenance of Autonomy (PRISMA) in Quebec (MacAdam, 2015). However the positive results were not reached until year three when implementation approached 80% and physician participation was 73%.

The overview by (Béland et al., 2011), and the recent empirical studies from Europe, illustrate the key components of an effective model of integrated care for frailty: a single entry point, individualised assessment and care plans, case management, coordination of home and community services across the continuum of care, effective management of care transitions,

enabled by an electronic information tool and clear policies and procedures for eligibility and care processes. These components reflect the [Multimorbidity Care Model](#) developed by the Joint Action on Chronic Diseases and Promoting Healthy Ageing across the Life Cycle (www.chrodis.eu) and support [NICE guidance on pathways for multimorbidity and frailty](#) and recommendations from the King's Fund for making our systems fit for an ageing population (Oliver et al., 2014). They also echo the findings of a recent thematic analysis on factors associated with implementing integrated care for frail older adults (Threapleton et al., 2017).

Based on this evidence and on the emerging experience in Europe, the state of the art principles for building an effective model of integrated care for frailty are:

1. Target Frailty:

The construct of frailty used in empirical studies was often ill-defined and based on a presumption of complex care needs rather than using a recognised frailty screening and assessment scale. Future models should improve the targeting of interventions towards high-risk frail community-dwelling older adults. This may require a two-step process using a brief frailty-specific screening tool in primary care and community settings, followed by CGA delivered by suitably trained practitioners to identify and target the appropriate frail cohort.

2. Promote ethos of enablement:

Ryburn et al., (2009) suggest that a restorative approach to care for frail older people living at home has significant advantages over the traditional model of home care maintenance and support. Timely interventions, education and assistive technologies specifically designed to encourage frail older people to resume activity and regain independence may be cost-effective by reducing future demand for services. Therefore the frailty prevention approach should incorporate a behavioural health, education and enablement ethos and include interventions that enable the individual to participate in a home exercise programme, to regain skills such as cooking or dressing, and support to build social networks that reduce isolation, depression and anxiety.

3. Support Self Management:

Harrison et al., (2015) advocate that a shift from a predominantly biomedical model may be facilitated by framing frailty as a chronic condition and adopting chronic care strategies to provide accessible information, advice, education and support for self management to promote participation, independence and wellbeing in later life. An effective holistic and salutogenic approach to frailty would include health education, enablement, rehabilitation

and support for the individual to manage their conditions and maintain optimal function, and support for the caregiver to remain well and continue in their caring role.

4. Provide continuity and co-ordination of care:

Fragmented, reactive and poorly coordinated care for frailty results in poor functional outcomes, creating dependency and further escalating demand and costs (MacAdam M., 2015). Proactive and coordinated care at home by a continuous partnership between the case manager and family physician is more likely to anticipate events and trigger earlier interdisciplinary interventions to maintain function and delay escalation of dependency. An essential factor for coordination of care is the level of cooperation, collaboration, and trusting relationships between care professionals and across the networks of provider organizations. This is particularly important for managing transitions and anticipating need for urgent advice and support after hours.

5. Tailor multidimensional interventions:

For each individual, multiple physical, cognitive, social and functional interventions may be needed to address different dimensions of the frailty syndrome. Selection of interventions should be based on assessment of risk factors for frailty and functional decline (including falls, stroke, depression, physical inactivity, unhealthy diet, social isolation, cognitive impairment), and tailored to the individual's health conditions, stage of frailty, trajectory of needs, carer support, housing, social circumstances and personal goals. The bundle of interventions should be prioritised to avoid the risk of overtreatment and adverse events.

6. Explore new models of CGA in hospital and in intermediate care alternatives to admission:

Ward based specialist led CGA remains the gold standard but where demand exceeds capacity, emerging workforce innovations (e.g. advanced practitioners with specialist skills in assessment and management of frailty) and shared care models as described in the [review of models of inpatient CGA](#) in Belgium) should be evaluated against this evidence based model. Hospital at home alternatives to admission appear to be a promising element of a whole system model of care for selected individuals who can be safely managed at home with specialist advice and support. However we require further well-designed trials of CGA for frail older people within more general intermediate care services that operate at the interface between hospital and community.

7. Develop workforce skills and competencies on frailty:

Many studies established separate, intensive, time-limited services requiring a long lead time for new staff to develop their skills. To be affordable and sustainable, integrated care for frailty must be able to be adopted across the whole community health and care workforce. This will require effective and comprehensive workforce education and training strategies for frailty in all curricula, including assessment and case management skills, interdisciplinary practice, and collaboration between general practitioners, nurses, geriatricians, psychiatrists, pharmacists, allied health professionals, hospital specialists and partners from other sectors.

8. Support adoption and assure implementation:

The degree to which a care programme is implemented as intended can influence the impact, as acknowledged by several of the papers reviewed. As adherence to CGA and care plans tends to diminish over time, support for adoption and continuous quality monitoring of models of care for frailty will be critical to guarantee fidelity of implementation and success. A wide range of technological solutions have been developed to enable older people to remain independent at home, support caregivers, facilitate remote monitoring and self management, provide decision support, and improve Information sharing and coordination of services. Examples include the [CAREWELL](#) and [SMARTCARE](#) European projects.

9. Improve outcomes for people:

The studies reviewed have generally focused on traditional healthcare outcomes. Future models of care should be designed around outcomes that matter for individuals and their caregivers as well as health and care system and societal impact. A focus on patient, client or user-defined goals and outcomes should capture care experience, quality of life and participation outcomes in addition to function and traditional health and social care metrics.

10. Undertake further research and evaluation:

Analysis of the various studies highlights the need for research to address current knowledge gaps around implementation and benefits of new models of care. Examples include:

Complex multicomponent interventions:

Studies of restorative interventions varied widely and 'real world' outcomes remain somewhat uncertain as the number of evaluations is low and are limited by small sample sizes and short duration of interventions. More work is needed to evaluate the most effective types of enablement programmes, to understand which client groups are most likely to benefit, and

the most effective timing, duration and frequency of restorative interventions. Further research is required to identify the most effective combinations of community health and social care interventions for frailty and to understand the stages in which people benefit most from these approaches. Parallel cluster randomised controlled trials may enable useful comparisons of different combinations of interventions.

Evaluation of cost-effectiveness:

The varying results of the European studies on frailty may be due to different sample size, casemix, fidelity, staff expertise, care out of hours and duration of study and follow up. Evidence of cost effectiveness from well executed economic evaluations of models of care is limited. More large-scale studies with longer intervention and follow up periods are needed to evaluate system outcomes and costs.

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Models of Care for Frailty: A Systematic Review

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Models of Care for Frailty: A Systematic Review

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ANNEX 1

Details of Search - The query translation was as follows:

(frail[Title] OR frailty[Title]) AND (models of care[Title] OR model of care[Title] OR care model[Title] OR care models[Title] OR integrated care[Title] OR health and social care[Title] OR managed care[title] OR coordinated care[title] OR comprehensive care[title]) AND ("2002/01/01"[PDAT] : "3000"[PDAT]);(frail[Title] OR frailty[Title]) AND (primary care[Title] OR community care[Title] OR (community dwelling[Title] AND care[Title]) OR community based care[Title] OR home based care[Title] OR home care[Title]) AND ("2002/01/01"[PDAT] : "3000"[PDAT])

ANNEX 2. International Examples of Integrated Primary Care for Frailty - adapted from Béland et al 2011

	PACE	SIPA	PRISMA	Ilawarra	High Intensity Care Management	Rovereto	Hong Kong Model	British Columbia	Arizona
Country / region Intervention cohort	USA 651	Montreal	Quebec 272	Australia 600	USA 156	Italy 100	Hong Kong 130	BC Canada Victoria city	USA State wide
Single entry point and Case manager	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Multidisciplinary Team (MDT)	Yes	Yes	Yes	Link to General Practitioners	Periodic MDT meetings	Geriatrics MDT	No	No	Variable
Assessment and Personal Care Plan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Care coordination across providers	Yes	Yes	Yes	Stand alone service	Integrated home care and hospital	Yes	Yes	Single integrated structure	Single integrated structure
Physician involved in team	Yes	Yes	In Care Planning	To support care coordinators	Geriatricians	Yes	Back up if required	Not routinely	Variable
Electronic records	Clinical and financial Information	Yes	Cross agency records	Development of a linked record	Research purpose only	Research purposes only	Yes	Yes	Cost and function Information
Funding	Capitation - acute and long term	Capitation	Negotiations between providers	Pooled budgets	No financial levers	Research funds	Research funds	Single funding	Capitation – single fixed fund
Impact	Reduced Emergency Department and Hospital activity	Reduced hospital and institutional care costs	Reduced hospital readmissions, institutionalization, functional decline.	Increased rate of residential care	No meaningful differences	Reduced costs Emergency Department visits, days in hospital or long term care	Reduced days in hospital and costs	Reduced hospital admissions and long-term care for low needs	Nursing home admissions and costs avoided