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Effectiveness and cost-effectiveness of integrated care models for elderly, complex patients: A narrative review. Don't we need a value-based approach?

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Abstract

Introduction: The management of patients with complex health and social needs is one of the main challenges for healthcare systems. Integrated care seems to respond to this issue, with collaborative working and integration efforts of the care system components professionals and service providers aimed at improving efficiency, appropriateness and person centeredness of care. We conducted a narrative review to analyse the available evidences published on effectiveness and cost-effectiveness of integrated care models targeted on the management of such elderly patients.

Methods: MEDLINE, Scopus and EBSCO were searched. We reported this narrative review according to the PRISMA Checklist. For studies to be included, they had to: (i) refer to integrated care models through implemented experimental or demonstration projects; (ii) focus on frail elderly $\geq$65 years old, with complex health and social needs, not disease-specific; (iii) evaluate effectiveness and/or cost and/or cost-effectiveness; (iv) report quantitative data (e.g. health outcomes, utilization outcomes, cost and cost-effectiveness).

Results: Thirty articles were included, identifying 13 integrated care models. Common features were identified in case management, geriatric assessment and multidisciplinary team. Favourable impacts on healthcare facilities utilization rates, though with mixed results on costs, were found. The development of community-based and cost-effective integrated systems of care for the elderly is possible, thanks to the cooperation across care professionals and providers, to achieving a relevant impact on healthcare and efficient resource management. The elements of success or failure are not always unique and identifiable, but the potential clearly exists for these models to be successful and generalized on a large scale.

Discussion: We found out a favourable impact of integrated care models/methods on health outcomes, care utilization and costs. The selected interventions are likely to be implemented at community level, focused on the patient management in terms of continuity of care. Thus, we propose a value-based framework for the evaluation of these services.

Keywords

Delivery of health care, patient-centred care, programme evaluation, integrated care

Introduction

The future scenario of care is characterized by the management of patients with complex health and social needs. This requires the identification of new pathways of care and the integration of health and social interventions.[1] There is no single definition of such a "complexity." The one adopted by the Agency for Healthcare Research and Quality (AHRQ) refers to a person with two or more chronic conditions/diseases,

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in which each of the single condition is able to interfere with the management of the others, by limiting life expectancy, increasing morbidity, interacting with drug therapies, etc.[2] A recent narrative review, conducted by Le Reste et al.[3] analyses a further definition of "multimorbidity" that, according to the European General Practice Research Network, is "any combination of chronic disease with at least one other disease (acute or chronic) or biopsychosocial factor (associated or not) or somatic risk factor," adding that it "may modify the health outcomes and lead to an increased disability or a decreased quality of life or frailty."

Nevertheless, due to changing and continuously evolving patients with complex health and their social needs, especially when they are frail and/or elderly, there is a need for a wider supply of services over a longer period of time. Such circumstances require treatment with multiple medications and high-level effective procedures, applied both for diagnosis and treatment. However, multimorbidity and polypharmacy are per se only one face of patient complexity, which is determined also by other than biological factors such as demographic (longevity), socioeconomic, cultural, functional (fragility) and environmental factors and patient behaviours.[4]

As patient complexity can be challenging when addressing treatment goals for one condition, it is likely to become even more difficult when attempting to prioritize treatment targets for multiple conditions.[5] The current supply-oriented healthcare is characterized by a lack of continuity and coordination and is hardly able to provide an adequate solution for care and treatment of complex health and social needs in many countries. In fact, although patients with the most composite health profiles nowadays consume a disproportionate percentage of healthcare expenditures, they often receive fragmented and suboptimal care.[6]

The integrated care approach has the potential to provide solutions for the aforementioned challenging issues. According to the World Health Organization European Office for Integrated Health Care Services, integrated care is "a concept bringing together inputs, delivery, management and organization of services related to diagnosis, treatment, care, rehabilitation and health promotion." The final goal is "to improve the services in relation to access, quality, user satisfaction and efficiency."[7]

Several reviews of existing models of integrated care, applied in different countries on the elderly population, provided substantial contributions in setting the foundations of integrated care and demonstrated how integrated care intrinsically relates to multidisciplinary components, objectives and varying perspectives.[8] Among them, Béland and Hollander[9] and Johri et al.[10] describe in detail the main features of different models, analysing where possible health outcomes and costs occur. More recently, studies tried to describe and summarize all treatments both for ICP model and usual care. In particular, Briggs[11] did not seek to synthesize outcomes of integrated care approaches, but rather to identify and appraise the types of integrated care approaches reported in the literature and their intrinsic elements. Briggs' study focuses on aged people ($\geq$60 years) in any setting or level of the health and long-term care system. A similar approach has been identified from Looman.[12] This study aims to systematically review the empirical evidence for the effectiveness and cost-effectiveness of preventive, integrated care for community-dwelling, frail and older people. Close attention is paid to the elements and levels of integration of the interventions. Generally, the study shows no significant differences in total cost between the preventive, integrated care interventions and care as usual. This systematic review indicates a need to shift focus from effectiveness in terms of clinical outcomes to the process of integrated care. However, it shows that the focus of research is mainly on health and healthcare utilization outcomes rather than on the care process.

A different approach has been identified from Threapleton.[13] The study summarizes common features of integrated service models, rather than providing detailed descriptions of existing ones. The review draws together the important elements for integrating healthcare services for older populations and also focuses on practical implementation features that can facilitate or hinder success. Most of these authors highlight the necessity to analyse such coordinated efforts across the different levels and sites of care according through a new tool, which would encompass outcomes and costs according to the user's perspective.

We conducted a narrative review to analyse the available evidences published on effectiveness and cost-effectiveness of integrated care models targeted on the management of elderly patients with complex health and social needs. We aimed to analyse evidence published on effectiveness and cost-effectiveness of integrated care models targets on the management of elders with those complex needs.

Methods

A narrative review was conducted[14] by defining a search strategy, inclusion and exclusion criteria and data extraction and outcomes. Unlike systematic reviews that benefit from guidelines such as PRISMA, there are no acknowledged guidelines for narrative reviews. Nevertheless, we decided to benefit PRISMA statement. We applied the PRISMA Checklist for extracting and/or analysis of data.[15]

Search strategy

We conducted a comprehensive literature search of MEDLINE, Scopus and EBSCO (CINAHL Plus, Cochrane Central Register of Controlled Trials, EconLit, NHS Economic Evaluation Database) databases using following search Mesh Terms and Free text Words: elderly, frail elderly, comorbidity, complex patient, patient with complex needs, integrated care, delivery of health care, programme evaluation, effectiveness, costs, and cost analysis. The Boolean search algorithm was modified according to each database dictionary (see Appendix 1 for specific search strategies). The search was limited to English-written articles published until 20 June 2018. The snowball strategy, including manual search of the references listed by studies retrieved from the online databases and from previously published narrative reviews, was also performed to identify potential additional studies. Abstracts, narrative reviews, editorials and case reports were not included.

Inclusion and exclusion criteria

The eligibility criteria for inclusion in the review implied that: (i) study referred to integrated care models through implemented experimental or demonstration projects, evaluated using a comparison group; (ii) target population was with complex social and health needs and/or comorbid frail elderly $\geq$65 years old, not disease-specific; (iii) effectiveness and/or cost and/or cost-effectiveness of integrated care models was evaluated; (iv) quantitative data (e.g. health outcomes; utilization outcome – rates of hospitalization, health care services utilization rate; cost and cost-effectiveness) were reported.

Data extraction and outcome definition

Data from the included studies were independently extracted by two investigators and processed using Office Package Excel 2010 (Microsoft Corp. Redmond, WA, USA). Any discrepancies regarding individual study inclusion, data extraction and interpretation were resolved by consulting a third investigator. For each study, we extracted the following data: study type and length, participants, case manager, general description of the intervention, team participants, entry assessment, information system, financing (sponsor). According to the key constructs of Integrated Care,[8] we classified the selected studies into four categories: care integration, care continuity/comprehensive care, care coordination/case management, patient-centred care. We compared the results in terms of effectiveness and efficacy (outcome/procedural endpoints; utilization impact), cost impact, cost-effectiveness. The methodological quality of all included studies was evaluated using the Cochrane Collaboration's tool for assessing risk of bias (adapted using Effective Practice and Organisation of Care's criteria for studies other than RCTs).[16]

Results

Study selection

The selection process is illustrated in Figure 1. A total of 30 articles were included, that identified 13 integrated care models. More than one paper reported on the same model (see later).

Namely, the models were: Dutch Easy-care Study Geriatric Intervention Programme (DGIP)[17–19]; Geriatric Resources for Assessment and Care of Elders (GRACE)[20,21]; The Walcheren Integrated Care Model (WICM),[22–26], On Lok Senior Health Services, Community Care Organization for Dependent Adults (ON LOK CCODA),[27–29] Program of All-inclusive Care for the Elderly (PACE),[28–33] Wisconsin Partnership Program (PACE-WPP),[34] prevention of care (PoC),[35,36] CO-ordination Personnes Agées (COPA),[37] System of Integrated Care for Older Persons (SIPA),[38,39] The Silver Network project,[40] Rovereto,[41] Lanzeta,[42] Pone.[43]

Risk of bias within studies

Among 30 retrieved articles included in the narrative review, 19 were eligible to be evaluated according to the Cochrane Collaboration's tool for assessing risk of bias.[16] Studies were classified according to six quality items: sequence generation, allocation concealment, blinding of participants-personnel-outcome, incomplete outcome data, selective outcome reporting and other sources of bias.[16] Among the 19, 7 RCTs were evaluated according to the Cochrane Collaboration's tool for assessing risk of bias.[16] Twelve papers, other than randomized controlled trials (RCTs), were evaluated accordingly.[16] In RCT studies, there are five low-risk studies, of which two are significantly low, and two merely moderate bias risks. Otherwise, in other than RCT studies, there are no low-risk cases: four are high risk, seven are moderate risk and the other one is unclear (insignificant). The results are listed in Table 2.

Study characteristics

The main characteristics of the 13 models are synthesized in Table 1.

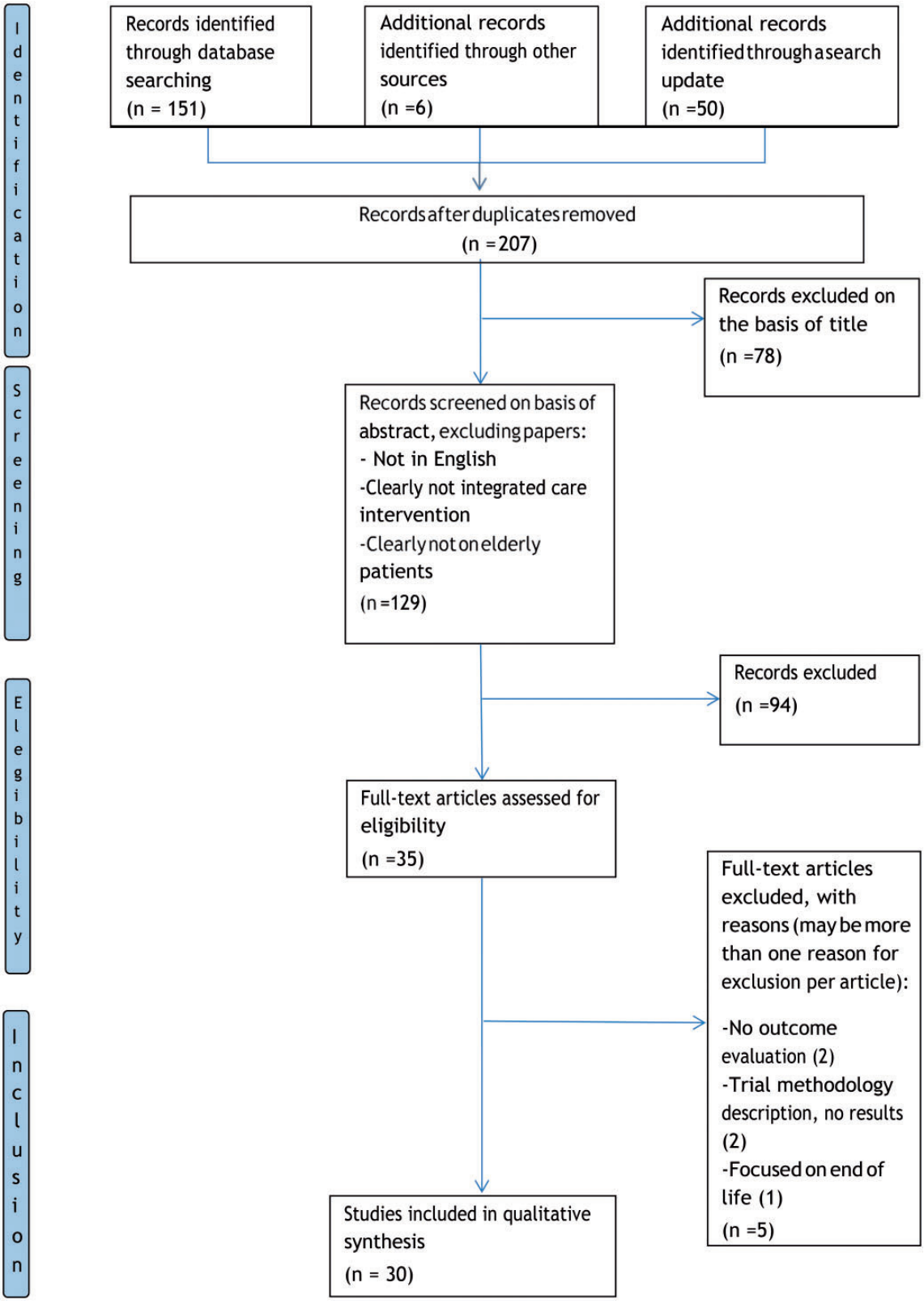

Figure 1. Flow diagram of the narrative review.

Table 1. Main characteristics of the 13 integrated-care models included in the narrative review.

	DGIP[13–15]	GRACE[16,17]	WICM[18–20,44,45]	ON LOK CCODA[21–23]
Study type and length	RCT, 6 months	RCT, 24 months	Quasi-experimental (before-after), three months; quasi-experimental, 12 months	Quasi-experimental (pre-multiple/post matched-pair design), 24 months
Participants	85 IG 66 CG	474 IG 477 CG	222 IG 224 CG 184 IG 193 CG	70 IG 70 CG
Case manager	Geriatric specialized nurse	n. a.	Geriatric nurse supervised by general practitioner	Whole team coordinated by the social worker
General description of the intervention	Individualized, community-based integrated treatment plan after a multidimensional assessment and interdisciplinary consultations	Home based care management, using 12 specific care protocols for geriatric conditions. Integration with community services	Detection and assessment of needs, treatment plan with periodical evaluation and monitoring. Implementation of the WICM model, the focus is if the model is cost-effective from a societal perspective after 12 months	Evaluation of medical, functional, and psychosocial status with three- or six-month regular reassessment. Community, home and hospital-based services provision
Team participants	Nurse, geriatrician, primary care physician	Nurse, social worker, collaborating with the primary care physician and a geriatrics interdisciplinary team	General practitioner, nurse and other professionals	Physician, nurse, social worker, physical-occupational therapist
Entry assessment	EASYcare	n.a	Groningen Frailty Indicator, EASYcare	n.a
Information system	Outlook agenda	Integrated electronic medical record and web-based care management tracking tool	Electronic patient record web-based patients file; questionnaires, GP files, time registrations and reports from multidisciplinary meetings, multidisciplinary protocols	Online computerized information system
Financing (payer)	ZonMW and Radboud University Nijmegen Medical Centre	Grant from the National Institute on Aging, National Institutes of Health. Support by a Charitable Trust	Grant from the Netherlands Organization for Health Research and Development. Health insurer	Medicare

	PACE[24,27,28,46–48]	PACE-WPP[29]	PoC[30,31]	COPA[32]
Study type and length	Retrospective/cross-sectional,[24] Cross-sectional,[46] Cohort, five-year follow-up[47]	Quasi-experimental longitudinal cohort, 36 months	RCT, 24 months	Quasi experimental, one year

(continued)

Table 1. Continued

	PACE[24,27,28,46–48]	PACE-WPP[29]	PoC[30,31]	COPA[32]
	Quasi-experimental, 26 months,[48] Cohort, one year follow-up[27]			
Participants	23,241 IG Previously published data on Medicare FFS population, beneficiaries receiving Medicaid NH services, people enrolled in HCBS ADW programmes as CG[24] 1297 CG 1382 IG[46] 1018 waiver CG 468 NHs CG 554 IG[47] 7847 IG 32,716 CG[48] 1683 waiver CG 1357 NHs CG 948 IG[27]	Direct cohort: 213 IG, 220 control-in, 219 control-out. Transfer cohort: 70 for each group	193 IG 153 CG	105 IG 323 CG
Case manager	Team	Team	Nurse	Nurse
General description of the intervention	Community-based model, day centre – based interdisciplinary teams[27] responsible for primary, acute, long-term care. Weekly team meetings	Multilevel-based programme. The team implements, monitors and coordinates the care plan by providing services directly to members and by overseeing and coordinating the delivery of services by contract providers (Medicare and Medicaid services)	Six steps: initial postal screening of frail older people; comprehensive multidimensional assessment (PN+GP) on daily activities and risk factors for disability; action plan development; final action plan (goals, strategies and actions); flexible toolbox of interventions; PN evaluation (achievement of goals, implementation of strategies and need for further support)	Home-based geriatric, individualized care plan development and required services coordination. If needed, hospital admissions (without an ED visit)
Team participants	Primary care physicians, registered nurses, social workers, physical and occupational therapists, recreational	Nurse, nurse practitioner (liaison to the WPP client's physician), social worker or social services coordinator	GP, nursing home physician, geriatrician, PN, home nurse, nurse specialist, PT, OT,	Case manager, GP, COPA geriatricians

(continued)

Table 1. Continued

	PACE[24,27,28,46–48]	PACE-WPP[29]	PoC[30,31]	COPA[32]
	therapists or activity coordinators, dieticians, PACE day centre coordinators, home care coordinators, personal care attendants and drivers		expert in technology, researcher	
Entry assessment	Eligibility according to each state's criteria	n.a	GFI	RAI-HC (home-based comprehensive geriatric assessment)
Information system	PACE sites provided programme enrolment and hospital inpatient usage data[24] PACE national data set, OASIS[46] Form 1718 assessments, Data PACE 0.1.[47] Data PACE, MCBS[48] South Carolina's Medicaid Management Information System[27]	Individual enrolment files with records from Medicare claims data, State of Wisconsin Medicaid and COP-W claims data, and site claims data	Postal questionnaires, telephone interviews, volumes of healthcare utilisation, medication costs (health insurance agencies databases)	Entry database
Financing (payer)	The Balanced Budget Act of 1997 made PACE a permanent provider type under Medicare and Medicaid	Medicaid and Medicare	Dutch National Care for the Elderly Programme (The Netherlands Organisation for Health Research and Development)	Non-profit consortium (public funding from France's Medicare programme)
	SIPA[33,34]	**The Silver Network project[35]**	**Rovereto[36]**	**Lanzeta[49]**
Study type and length	RCT, 22 months	Quasi experimental before-after, 12 months	Randomized trial, one-year follow-up	RCT, one year
Participants	656 IG 653 CG	CG 1204 IG 1204	100 IG 100 CG	70 IG 70 CG
Case manager	Nurses or social workers or occupational therapist	Geriatric nurses	Trainees of a course on case management and comprehensive geriatric assessment	Reference internist
General description of the intervention	Delivering integrated care at multiple level (home, day centre, day hospital, hospital)	Community-based services provided either by the health agency or by the municipality. The case managers perform the initial and follow-up assessments and coordinates	Case management and care planning (all the services considered necessary). Home visits and weekly meetings	Implementation of an integrated healthcare model for multimorbid patients based on improving communication between primary

(continued)

Table 1. Continued

	SIPA[33,34]	The Silver Network project[35]	Rovereto[36]	Lanzeta[49]
		services delivery among the agencies		care and hospital professionals
Team participants	Health and social service professionals, including the GP	Community Geriatric Evaluation Unit (geriatrician, social worker, physiotherapist and nurses) and GP	By the Community Geriatric Evaluation Unit (geriatrician, social worker, physiotherapist and nurses) and general practitioners	Reference internist, liaison nurse, general practitioner, nurse
Entry assessment	Functional Autonomy Measurement System(SMAF) scale, including ADL, IADL, communication and cognition	Minimum Data Set for Home Care	British Columbia long term care programme application and assessment form10	n.a.
Information system	Administrative records from the Quebec Ministry of Health and Social Service (MSSS), the Régie d'assurance maladie du Québec (RAMQ), and the La Régie régionale de la Santé et des Services sociaux de Montréal-Centre (RRSSSM-C). Institutions' patients' records and information systems	Entry database	Entry database. National death registry	Electronic medical records, questionnaires
Financing (payer)	Canadian Health Services Research Foundation, the Canadian Institute for Health Research, the Health Canada Health Transition Funds, the Ministére de la Santé et des Services sociaux du Québec, the Régie de la santé et des-services sociaux de Montréal-Centre, and the CLSC Bordeaux-Cartierville	Grants from the "Progetto Finalizzato Invecchiamento" of the National Research Council and Pfizer-Italy Silver Network Project	Grants from the "Progetto Finalizzato Invecchiamento" of the National Research Council and Pfizer-Italy Silver Network Project	n.a.
	Pone[50]			
Study type and length	Prospective cohort study, nine months			
Participants	43 in the care as usual cohort CG 106 in the care pathway cohort IG			

(continued)

Table 1. Continued

	Pone[50]
Case manager	n.a.
General description of the intervention	The cohorts were measured over nine months, during which intervention costs, healthcare costs, patient and family costs were identified, from a societal perspective. The authors evaluate an integrated care pathway designed for patients with complex health problems transferring from the hospital A geriatric rehabilitation facility and primary care.
Team participants	n.a.
Entry assessment	Consolidated Health Economic Evaluation Reporting Standards (CHEERS) Statement, Dutch manual for cost research and reference prices in health care
Information system	structured face-to-face interviews, questionnaire
Financing (payer)	Dutch National Care for the Elderly Programme (Dutch Organization for Health Research and Development)

ADLs: activities of daily living; ADW: aged or disabled waiver; CG: control group; CLSCs: Centres Locaux de Services Communautaires; CM: case manager; COPA: co-ordination Personnes Agées; COP-W: Community Options Waiver Programme; DGIP: Dutch EASYCare Study Geriatric Intervention Programme; ED: emergency department; FFS: fee-for-service; GFI: Groningen Frailty Indicator; GP: general practitioner; GRACE: Geriatric Resources for Assessment and Care of Elders; HCBS: home- and community-based services; IADL: instrumental activities of daily living; IG: intervention group; MCBS: Medicare Current Beneficiary Survey; MSSS: Quebec Ministry of Health and Social Service; n.a.: not available; NHs: nursing homes; Outcome and Assessment Information Set; ON LOCK CCODA: On Lock Senior Health Services; Community Care Organization for Dependent Adults; OT: occupational therapist; PACE: Programme of All-inclusive Care for the Elderly; PACE-WPP: Wisconsin Partnership Programme; PN: practice nurse; PoC: Prevention of Care; PT: physical therapist; RAI-HC: Resident Assessment Instruments – Home Care; RAMQ: Régie d'Assurance Maladie du Québec; RCT randomized control trial; RRSSSM-C: La Régie Régionale de la Santé et des Services Sociaux de Montréal-Centre; SIPA: Système de services intégrés pour personnes âgées en perte d'antonomie -System of Integrated Care for Older Persons; SMAF: Functional Autonomy Measurement System; WICM: The Walcheren Integrated Care Model; ZonMW: ZorgOnderzoek Nederland en het gebied Medische wetenschappen (Netherlands Organization for health research and development).

Main results

The main results of each model, in terms of outcome and procedural endpoints, utilization impact, cost impact and cost-effectiveness, are listed below.

DGIP

After three months, treatment arm shows statistically significant differences in favour of the new intervention specifically: functional abilities improved 2.2 points (95% CI, 0.3–4.2) and well-being improved 5.8 points (95% CI, 0.1–11.4), with respect to a control group treated by usual care. After six months, the favourable effect of the intervention increases for well-being (9.1; 95% CI, 2.4–15.9), but the effect on functional abilities was no longer statistically significant (1.6; 95% CI, –0.7 to 3.9). The statistically significant difference in proportions of successful treatments is 22.3% (95% CI, 4.3–41.4). The cost of the intervention averages at €998 per patient (95% CI, 888–1108) with an incremental cost of the nursing programme of €761. Hospitalization (€–675) and institutionalization in homes for the elderly and nursing homes' (NH) (€–841) costs decrease in the Intervention Group (IG), while the cost of home care (€+952), day care (€+241) and meals-on-wheels (€+91) was higher with respect to usual care. There is a statistically significant difference in proportions of successful treatments (proportions of patients with prevented functional decline accompanied by improved well-being) of 22.3% (95% CI, 4.3–41.4). The incremental cost-effectiveness ratio results to be more than €3400 per successful treatment (95% CI, –21,458 to 45,362), indicating that the new treatment is cost-effective at a willingness to pay of €34,000. All prices were indexed at the price level of 2005, using the Dutch consumer price index figures for healthcare costs. The authors conclude that DGIP is an effective addition to primary care for frail older people at a reasonable cost.[17–19]

DGIP is a community intervention model for frail elderly individuals, in which the GP refers elderly patients with a problem in cognition, mood, behaviour, mobility and nutrition. The intervention starts with the application of the EASYcare instrument for geriatric screening. The EASYcare instrument assesses (instrumental) activities of daily life, cognition, mood and includes a goal setting item.

GRACE

At the end of follow-up, statistically significant improvements for intervention patients compared with usual care at 24 months were registered in four out of eight SF-36 scales (Medical Outcomes 36-Item Short-Form): general health (0.2 vs. −2.3, $p = 0.045$), vitality (2.6 vs. −2.6, $p < 0.001$), social functioning (3.0 vs. −2.3, $p = 0.008$), mental health (3.6 vs. −0.3, $p = 0.001$) and in the Mental Component Summary score (2.1 vs. −0.3, $p<.001$). No differences were found between groups for activities of daily living (ADLs), mortality at 24 months and time to death. The cumulative two-year emergency department (ED) visit rate per 1000 results lower in the IG (1445 (n = 474) vs. 1748 (n = 477), $p = 0.03$), while hospital admission rates per 1000 are not statistically significant different between groups (700 (n = 474) vs. 740 (n = 477), $p = 0.66$) nor hospital days (3759 (n = 474) vs. 4069 (n = 477); $p = 0.66$). In a predefined group at high risk of hospitalization (comprising 112 intervention and 114 usual-care patients), ED visit and hospital admission rates were lower for intervention patients in the second year (848 (n = 106) vs. 1314 (n = 105); $p = 0.03$ and 396 (n = 106) vs. 705 (n = 105); $p = 0.03$, respectively).

In terms of cost, the average two-year total cost for intervention does not statistically significant differ from usual care in the full sample ($14,348 vs. $11,834; $p = 0.20$) and high-risk group ($17,713 vs. $18,776; p = 0.38). In the high-risk group, increases in chronic and preventive care costs are offset by reductions in acute care costs, and the intervention is cost saving during the post-intervention period ($5088 vs. $6575; $p < 0.001$). Conversely, average two-year total costs result higher in the low-risk group ($13,307 vs. $9654; $p = 0.01$). The authors conclude that in patients at high risk of hospitalization, the GRACE intervention is cost neutral from the healthcare delivery system perspective.[20,21]

GRACE model is an RCT with physicians as the unit of randomization to provide, from the healthcare delivery system perspective, a cost analysis. The analysis is effective in improving quality of care and outcomes.

WICM

A total of 184 frail elderly patients from three GP practices were compared with 193 frail elderly patients of five GP practices that provided care as usual. In the short-term of follow-up after the implementation, the model seemed to have impact only on one aspect (i.e. attachment, a dimension of quality of life, which is the capability of the frail elderly to receive love and friendship). The use of care and health and quality of life outcomes have not been affected by the implementation of the model, nor the satisfaction with care. This result is probably largely due to the three months' time of follow-up, a too short period for an integrated model to influence changes in health. In terms of

costs, they do not statistically significantly differ between the intervention and control groups; for cost-effectiveness analysis, not statistically significant difference is found in quality adjusted life year (QALY) between the intervention and the control groups both in terms of capability and health QALYs. The authors stated that based on these results, widespread implementation of WICM would be premature. Moreover, in the study regarding the outcomes for frail elderly (63), future research is recommended by authors to deeply explore the specific outcomes. Furthermore, they suggest how these outcomes could be accurately detected in evaluation research. Namely, frailty is a gradual process of deterioration and it might not be realistic to expect improvement or even preservation in all three domains (i.e. health, functional abilities and quality of life).

However, this issue does not provide insight into the specific content of these care processes. Reorganization of care for frail older people might not be sufficient to achieve effectiveness in terms of health outcomes and functional abilities.[22–24,26,46]

The WICM study was assessed in 2016, by applying an economic evaluation. Effects were determined to health-related quality of life (EQ-5D questionnaire). Neither the WICM nor usual care succeeded in an improvement in health-related quality of life. The average total costs of the WICM were higher than usual care (€17,089 vs. €15,189). The incremental effects were 0.00, whereas the incremental costs were €1970, indicating an ICER of €412,450. The primary outcome of the intervention was quality of life, which was operationalized with health-related quality of life measured with the EQ-5D instrument. The weights obtained in this research were used to calculate the utility scores among the frail elderly. Measurements of these utility scores were obtained at baseline, 3 and 12 months and were used to calculate QALYs for each respondent. The cost-effectiveness of the WICM was determined to calculate the ICER. The main conclusion is that the WICM was not cost-effective from a societal perspective over a 12-month period, as the costs did not outweigh the effects, and the costs per QALY were higher. The intervention did not achieve incremental effects. Furthermore, as the incremental costs of the intervention were €1970, the WICM resulted more expensive than usual care. The authors found out an ICER of €412,450. Thus, these results contradict previous studies on the cost-effectiveness of integrated care.[25]

The aim of this WICM is twofold: (1) to evaluate the cost-effectiveness using a short run time frame for an integrated care model for frail elderly and (2) to investigate whether using a broader measure of (capability) well-being in an economic evaluation leads to a different outcome in terms of cost-effectiveness.

In the short term, the integrated care model had a significant effect on the attachment aspect of quality of life, by implementing and evaluating a preventive integrated care model for the frail elderly. Otherwise, The WICM is not cost-effective, and the costs per quality-adjusted life year are high. It had a positive effect on love and friendship and a moderately positive effect on general quality of life.

ON LOK CCODA

With the implementation of CCODA, statistically significant differences emerged in favour of IG on improving homemaking skills. Psychosocial and physical requirements of living indices (one-year assessment), psychosocial and illness compensation (two-year assessment) were applied. Slightly lower mortality rate than the Control Group (CG – 2.9 vs. 3.2 per 1000 days). Lower but not statistically significant hospital utilization for IG (48.6% vs. 55.7%) and shorter length of hospital stay per episode (2.1% days spent in acute care facilities vs. 2.7%) were found. IG had considerably less use of skilled nursing facility than CG (20.0% vs. 57.1%). IG received more outpatient services for medical, therapeutic and supportive needs. CG received more in-home services. In terms of costs, long-term care service costs were lower for IG by 21.0% per participant per day (a cost saving of $9.75 per day). Costs of inpatient care (hospital and skilled nursing facility) consumed 35.3% of the IG service costs compared to 81.4% of the CG. The amount public sector cost spent per person in one year is $15,191 in IG and $17,608 in CG. Total long-term care (private and public sector costs for services and housing combined) costs per day were lower for the IG group ($50.55) than for the CG ($56.91).[27,47,48]

The ON LOK CCODA model differs from traditional long-term care in that (1) the full range of social and medical services is integrated into a single health programme, (2) services are delivered by the same professionals who plan them, (3) all services are funded through a single source (Medicare) and (4) implicit financial incentive is present to control costs.

PACE

There are over 60 PACE sites around the USA (AHRQ, 2007), different in size (from the smallest, with 87 participants, to the largest, with 877), location (National PACE Association) and service-delivery characteristics.[30] Four studies evaluating PACE model were selected,[30–33] each one enrolling a different amount of subject in one or more PACE sites (Table 2).

Table 2. Results of the risk of bias in individual studies assessed with the Cochrane Collaboration's tool for assessing risk of bias (adapted using Effective Practice and Organisation of Care's criteria for studies other than RCTs).

Study design	Reference	Random sequence generation	Allocation concealment	Blinding of participants and personnel	Blinding of outcome assessment	Incomplete outcome data	Selective reporting	Other sources of bias
RCTs	Metzelthin et al.[30]	Low risk	High risk	High risk	Low risk	Low risk	Low risk	Low risk
	Metzelthin et al.[31]	Low risk	High risk	High risk	Low risk	Low risk	Low risk	Low risk
	Béland et al.[33]	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
	Bernabei et al.[36]	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
	Melis et al.,[13]	Low risk	Low risk	High risk	Low risk	Low risk	Low risk	Low risk
	Counsell et al.[17]	Low risk	Low risk	High risk	Low risk	Low risk	Low risk	Low risk
	Lanzeta[49]	Low risk	Low risk	High risk	Low risk	Low risk	Low risk	Low risk
Other than RCTs	Yordi and Waldman[23]	High risk	High risk	Low risk	Low risk	Unclear	Low risk	Low risk
	Nadash[24]	High risk	High risk	Low risk	Low risk	Low risk	Low risk	Low risk
	Fabbricotti et al.[20]	High risk	High risk	High risk	High risk	Unclear	Low risk	Low risk
	Wieland et al.[28]	High risk	High risk	Low risk	Low risk	Low risk	Low risk	Low risk
	Meret-Hanke[27]	High risk	High risk	Low risk	Low risk	Low risk	Low risk	Unclear
	Wieland et al.[48]	High risk	High risk	Low risk	Low risk	Low risk	Unclear	High risk
	Kane et al.[29]	High risk	High risk	Low risk	Low risk	Low risk	Low risk	High risk
	de Stampa et al.[31]	High risk	High risk	Low risk	Low risk	Low risk	Low risk	Low risk
	Landi et al.[35]	High risk	High risk	Low risk	Low risk	Unclear	Unclear	Unclear
	Segelman et al.[46]	High risk	High risk	Low risk	Low risk	Low risk	Low risk	Low risk
	Looman[44]	High risk	High risk	Low risk	Low risk	Low risk	Low risk	Low risk
	Pone[50]	High risk	High risk	Low risk	Low risk	Low risk	High risk	High risk

Adapted from: Higgins and Green.[16]

Wieland et al.[30] showed an increased survival rate (PACE survival was 4.2 years vs. 3.5 in waiver and 2.3 years in NH). Mortality risk among PACE participants (72.6%) was greater than in waiver (58.8%) and similar to NH (71.6%). Total hospital utilization during the first year of enrolment was higher among Plan members than it was among PACE participants.[30] The results suggest that PACE effectively controls hospital use among community-dwelling frail elderly persons. PACE enrolees spent an average of 0.2 days in the hospital per month alive compared with an estimated average of 0.8 days in the hospital per month alive by comparison.[32] A recent retrospective study found PACE enrolees experienced lower rates of hospitalization, readmission and potentially avoidable hospitalization than similar populations.[29] Wieland et al.[33] estimates savings of more than $8.5 million, in $FY05, in the first year for patients admitted to PACE over a period of 11 years. Based on an average reduction of 0.6 hospital days per month alive, the potential total savings per PACE enrolee is approximately $520, in inflation adjusted to Year 2000 constant $, per month alive in hospital costs. The potential savings would be shared by Medicare ($450), Medicaid ($10) and private sources ($60).[32]

The PACE is a long-term care delivery and financing innovation. A major goal of PACE is prevention of unnecessary use of hospital and nursing home care. It aims to measure the rates of hospitalization, readmission and potentially avoidable hospitalization. All PACEs are different among size and location.

PACE-WPP

Concerning the effectiveness of the PACE-WPP model, no statistically significant differences in death rate were found between groups. There were no major or consistent differences in the use of hospital care between the WPP group and the two controls. The control-out group had statistically significant more hospital days than the WPP group in the first 12 months of enrolment (unadjusted mean monthly rate 344 vs. 468 hospital days per 1000 enrolees, regression coefficient = 0.23, $p < 0.05$). The control-in cohort had more preventable hospital admissions than the WPP group (unadjusted mean monthly rate 12 vs. 26 preventable admissions per 1000 enrolees, OR = 3.7, $p < 0.001$). There were no differences in the use of hospital care between the WPP group and the two control groups in the transfer cohort analysis. The rates of hospital admissions, hospital length of stays, preventable hospital admissions and use of EDs were comparable. The unadjusted percentage of persons with a face-to-face visit was 52% for WPP and 41% for

control-out persons (OR = 0.58, $p < 0.001$). There were no differences in the number of provider visits per month or the number of persons having a provider visit compared to either control group in the transfer analyses. No statistically significant differences in hospital utilization, ED visits, preventable hospitalizations, risk of entry into NHs or mortality were found. WPP enrolees had more contact with care providers than did controls.[34]

In PACE-WPP, no significant differences in hospital utilization, ED visits, preventable hospitalizations, risk of entry into nursing homes or mortality were found. WPP enrolees had more contact with care providers than did controls.

PoC

The analysis showed no statistically significant differences between the groups regarding disability and health-related quality of life after 24 months. Both groups increased statistically significant ($p < .05$) in disability over a period of 24 months but no statistically significant differences between the groups with respect to their increase existed. No statistically significant differences with respect to secondary outcome (depressive symptomatology, social support interactions, fear of falling and social participation) were found. People in the IG used, as expected, more primary care services, but there was no decline in more expensive hospital and long-term care. Volumes of hospital care (including outpatient medical services), long-term care, informal care and helping aids/in-home modifications were comparable between the groups over a period of 24 months.[35,36] Total healthcare costs over 24 months tended to be higher in the IG than in the CG (€26,503 vs. €20,550, $p = 0.08$). The probability of the PoC approach being cost-effective compared with usual care is 2%. Costs are presented in €for the year 2010, and if needed, prices were indexed to the reference year using a consumer price index.[35]

To evaluate the PoC models, disability scores were applied as main outcome. Secondary outcomes were depressive symptomatology, social support interactions, fear of falling and social participation. The intervention under study led to an increase in healthcare utilization and related costs without providing any beneficial effects.

COPA

Some health parameters are better in the IG: lower risks of depression (OR = 0.42, 95% CI = 0.20–0.90) and dyspnoea (OR = 0.26, 95% CI = 0.09–0.77). No changes were found in other health parameters or in one-year mortality rates. Functional disabilities (Instrumental Activities of Daily Living – IADL and ADL) and decline in cognitive status at one year are similar in the two groups. Results show that the risk of having at least one unplanned hospital admission is lower in the IG (OR = 0.39; 95% CI = 0.16–0.98), in which patients are more likely to have only planned hospital admissions (OR = 3.59, 95% CI = 1.02–12.70). The authors registered a decrease in total hospital admissions in the IG, not-statistically significant (OR = 0.75, 95% CI = 0.36–1.58).[37]

The COPA model provides integrated primary care interventions with intensive case management for community-dwelling, very frail elderly patients. The primary outcome measures were the presence of any unplanned hospitalization, any planned hospitalizations and any hospitalization overall. Secondary outcome measures included health parameters.

Système de services intégrés pour personnes âgées en perte d'antonomie – SIPA

This study was implemented in a Canadian population, by measuring outcomes taken from administrative health data. By analysing access to care, the authors found out that the number of hospitals waits for NH placement was reduced by half in the IG (5% as opposed to 10%). Length of stay for short-term hospitalizations and NH stays and waiting in acute-care hospitals for an NH placement did not show statistically significant differences. Average community costs per person were Canadian $3390 higher in the SIPA group, but institutional costs were Canadian $3770 lower (nearly 20%) with no difference in total overall costs per person between groups.[38,39]

The SIPA group accessed home care services and general practitioners' services more frequently, while access to specialists and medication was equivalent in both groups. Referring to the study results, no difference in health outcomes was found when comparing IG and CG.

The Silver Network project

The results show a statistically significant reduction of the number of hospitalizations (pre- 44% vs. post-implementation 26%, respectively, $p < 0.001$), associated with a reduction of hospital days, both at the individual patient level and for each admission. This resulted in a 27% cost reduction with an estimated saving of $1200 for each patient.[40] The objective of the present study was to examine the effect of a home care programme based on comprehensive geriatric assessment (Minimum Data Set for Home Care) and

case management on hospital use/cost of frail elderly individuals.

In conclusion, integrated home care programme based on the implementation of a comprehensive geriatric assessment instrument guided by a case manager has a significant impact on hospitalization and is cost-effective.

Rovereto

The results show that all functional indices deteriorated in CG and less consistently in the IG (CG: ADL – 13.0%, IADL – 6.9%, mental status – 9.4% and depression – 11.8%; IG: 5.1%; unchanged; – 3.8% and – 4.0% respectively). Differences between intervention and control groups were all statistically significant. The adjusted average number of medications was reduced in the IG (4.7 (0.2) vs. 5.4 (0.2); $p<0.05$), and more home visits by general practitioners were needed in the CG (10.2 (1.1) vs. 13.1 (0.8); $p = 0.04$). Thirty-six subjects in the IG and 51 in the CG were admitted at least once to acute hospital care ($p<0.05$). The cumulative number of days per year spent in either NH (1087 vs. 2121) or acute hospital care (894 v 1376) was reduced by up to half in the IG. The total per capita health care costs over the follow-up period was 23% less in the IG than the CG. The overall saving, after addition of salaries of case managers, was estimated at around Italian Liras1125 per person per year. Apart from reductions in community health services costs (Italian Liras744 vs. Italian Liras919; –19%), IG savings resulted mainly from substantial decreases in NH (Italian Liras644 vs. Italian Liras1244; –48%) and hospital expenses (Italian Liras1763 vs. Italian Liras2688; –34%).[41]

The Rovereto's study is useful to evaluate the impact of a programme of integrated social and medical care among frail elderly people living in the community. Integrated social and medical care with case management programmes may provide a cost-effective approach to reduce admission to institutions and functional decline in older people living in the community.

Lanzeta

The analysis found an incremental cost of $1035.90 and an incremental benefit of −0.0762 QALYs for the initiative compared to standard care after adjusting for the main variables. However, the subgroup of patients under 80 years with three or more clinical categories resulted in an 89% cost saving in the simulations. Between April 2011 and February 2012, a total of 140 patients with multimorbidity were recruited, with a mean age of 78.2 years. From them, 72% completed an entire year, 25% died, and in the remaining cases (3%), follow-up was stopped as they were admitted to residential care homes. There were no statistically significant differences between the two groups prior to the intervention. The crude values indicated that the intervention increased the average cost per patient by $1093.1, if compared to the controls. Moreover, a 0.0553 lower QALY has been found in the IG. In the joint multivariate statistical analysis, the authors found an incremental cost of $1035.9 and an incremental benefit of −0.0762 QALYs if compared to usual care, after adjusting for gender, patient age, number of clinical categories and EQ-5D utility score at the beginning of the study.

The evaluated integrated healthcare intervention for patients with multimorbidity was also not found to be efficient. However, the statistical analysis revealed that in the patients below 80 years with a high level of comorbidities, the intervention decreased costs by 89% according to the simulations, although the difference was not statistically significant. A lack of efficiency was observed across all the subgroups analysed, given frailty and other risk factors, in the target population.[42] In Lanzeta' study, a cost-utility analysis is conducted on an integrated healthcare model by comprising an assigned internist and a hospital liaison nurse for patients with multimorbidity, if compared to a conventional reactive healthcare system. This article achieved its aim at improving coordination and communication between levels and to enhance continuity of care after hospitalization.

Pone

Both cohorts were measured over nine months, during which intervention costs, healthcare costs, patient and family costs were identified. After nine months, the average societal costs were statistically significantly lower for patients in the care pathway cohort (€50,791) versus patients in the care as usual cohort (€62,170). Patients in the care pathway cohort had better scores on the KATZ-15 (1.04), indicating cost-effectiveness. No statistically significant differences were found between the two groups on QALY scores ($p < 0.01$). Intervention costs of the integrated care pathway were on average, €77.60 per patient. During the nine months follow-up period for the care as usual cohort, total societal costs were €62,170 on average, whereas for the care pathway cohort, they were €50,791. These lower costs were mainly due to shorter hospital stays (39.2 vs. 27.0 days) and shorter stays in the geriatric rehabilitation facility (79.1 vs. 55.4 days). Furthermore, the number of contacts with the GP increased in the care pathway cohort (3.3 visits vs. 4.9) and the number of visits to a day care centre

also statistically significantly decreased (on average, 0.5 half days per week in the care as usual cohort and 0.1 half days per week in the care pathway cohort). The total healthcare costs in the care pathway cohort were also statistically significantly lower (57,350 vs. 42,516). Patient and family costs did not statistically significant differ between the two cohorts.

With regard to the incremental cost-effectiveness and cost-utility, the implementation of the integrated care pathway resulted in less dependence in ADLs (1.04) and lower costs (€–11,605), respectively. As the pathway results in more effects and cost saving, this curve shows that the probability of the integrated care pathway being cost-effective (when compared to care as usual) remained 99% or higher for a range of willingness-to-pay. The probability of the integrated care pathway being cost-effective, compared to care as usual at WTP of €50,000 (moderate burden of illness), was 98%. Thus, the integrated care pathway was more cost-effective, less dependence inducing and also less costly. Furthermore, this research also remarked the necessity to include patients' mental status assessment and social participation on the evaluation of care effectiveness.[43]

This study is an integrated care pathway with a social perspective and covers multiple care settings. Several tools have been applied to analyse its success to structure care, enhance coordination and improve transitions between care settings. However, little is known about their economic impact.

The objective of this study is to determine the cost-effectiveness and cost-utility of an integrated care pathway designed for patients with complex health needs transferring from the hospital, a geriatric rehabilitation facility and primary care.

According to Key Constructs of Integrated Care,[8] we classified the selected studies into four categories: care integration, care continuity/comprehensive care, care coordination/case management and patient-centred care. Domains of care integration and care coordination are the most considered, respectively, six and eight studies take into account these spheres. The care continuity and the patient-care coordination are taken into account by three studies for each domain. The studies show a quite large heterogeneity: the smallest IG is about 70 patients[27,42,47,48]; the highest IG includes 23,241 patients.[31] Favourable results in terms of health outcome mainly focused on general health, functional abilities and mental status (Table 2).[17–21,35–37,47] The impact of the analysed models appears in some cases favourable in terms of institutionalization and costs. Thus, a statistically significant lower rate in hospital utilization,[20,21,27,37,40,41,43,47,48] through a greater use of primary care services was experienced.[35,36,38,39,43] Cost savings to public and private payers of care seems to derive from integrated care models implementation. Referring to cost-effectiveness, some positive results were registered in DGIP,[18] PoC[35] and Pone,[43] though few evidences are available. Among the retrieved studies, all the studies are consistent in terms of (cost-)effectiveness and quality of care. Therefore, these issues are always considered based on social perspective (five models), the accessibility of care (three models) and the unplanned hospitalization (six models).

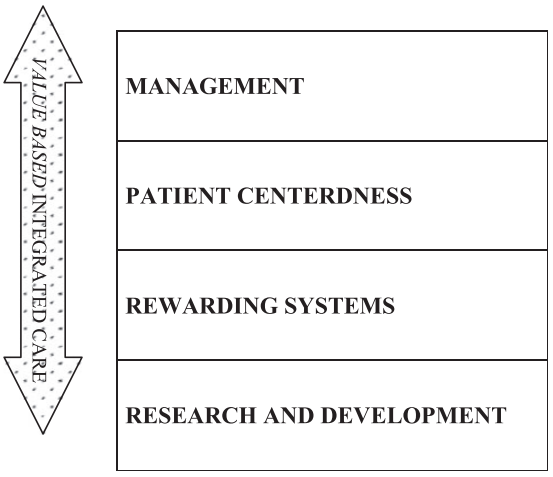

Figure 2. A *value-based* framework to assess **Integrated models for elderly patients with complex health and social needs.

Discussion

A favourable impact of integrated care models targeting elderly people was found in terms of health outcomes, care utilization, and costs, by systematically updating evidence on cost-effectiveness of integrated care models dedicated to such patients.

Developing integrated care models for an increasing older population seems to reach healthcare systems sustainability, but further economic evaluations are needed to guarantee the cost-effectiveness of the implemented interventions.

The improvement of social and health conditions and increased survival of the population have led progressively to a change of population care.

On the other hand, the on-going transition towards an integrated care approach is also enhanced by the need for generating efficiencies and the paradigm change in understanding the underlying mechanisms of chronic diseases.

In fact, by realizing that "health" is not only the identification and treatment of a disease and that patients have "complex" needs, the challenge of the "systemic medicine" approach comes, aiming to find the most appropriate tools to evaluate the patient in

a holistic perspective, allowing all the determinants, including non-disease-specific ones,[25] to become part of the diagnosis and treatment process according to a person-centred perspective. A single service provider is usually unable to respond to all the needs, prohibiting efficiency in the delivery process. To meet the frail elderly multiple needs in an efficient and effective manner, some authors claim that several service providers will need to combine their efforts in a coordinated way.[51–53]

However, responsibility for the whole continuum of care is somehow absent and results in ineffective and inefficient care.[42,54,55] Frail elderly individuals and their caregivers' specific needs', patient-centred views and budget restraints are the base for new and more effective organizational structures. This is the reason why the integration of health and social services for the frail elderly has gained huge attention as a means to accomplish this. There is a general belief that the integration of these will improve efficiency, health outcomes, satisfaction, quality of life and will also decrease costs.[56–59] The results of our review are not univocal, however. First of all, some studies show that ICM did not decrease costs of hospitalizations, quality of life and effectiveness.[25,26,42,43]

Furthermore, some authors conclude that, in the evaluation of the effectiveness of ICMs, the interactions between single dimensions (e.g. health, functional skills, social participation and other dimensions of quality of life) should be taken into account, from the study design to its overall assessment, alongside the analysis of each single contribution. In addition, it would be necessary to define other methodologies than the actual economic evaluations, to encompass the characteristics of the sampled populations, the expected outcomes and their evolution over time. This is particularly relevant if we deal with frail, elderly people.[25,26,43]

Our findings are likely to confirm the utility of integrated care approach, in terms of clinical and therapeutic efficacy, social and economic resources use, both in terms of direct and indirect costs.[10,41,44,45,49,50,60–62] Our study also is likely to confirm other, more recent findings on the evaluation of the impact of integrated models, though these researches are focused on specific diseases[63] or applied other methodological tools.[64]

Key findings show that the interventions are implemented mainly at community level, concerning the management of the patient in terms of continuity of care, mainly through interventions focused on the management of home care. In fact, greater attention emerged on costs not associated with outcome evaluation.

An overall evaluation of our results confirms that the implementation and evaluation of integrated services for the frail elderly has not reached its full potential,[26,46] leaving other questions about how services can be integrated and the effects of integration, yet.

Even if several differences can be found in the particular healthcare system within which each model is introduced, where social, organizational and financing characteristics interact with designed model features, this analysis reveals some key elements common to successful models (Table 2), such as the use of the case manager, the geriatric assessment and periodic multidimensional evaluation, the multidisciplinary team. The case manager works as a connecting point between the health and the social sector, allowing the management of the patient in the long run.[10,42] Another element not present in all models, but still found in many of them, is the "single entry point" (a system that provides access to long-term care and support services through an agency or organization), which ensures, among other things, the use of resources actually based on the needs of the subject.

On the other hand, we did not found any mentioning to the application of IT, information technologies, on the implementation of such models. This limit was also underlined by previous studies.[65]

The presence of funding through additional resources is a common element. The selected experiences would confirm that integrated care services for chronic patients would combine health outcomes enhancement with cost-containment, as they mostly required investments for innovation of health care services (i.e. IT) without increasing overall health costs. Alongside change management and legal issues, technological approach is a relevant factor to guarantee sustainability of integrated care in large scale.[66]

The major limitations of our review must be acknowledged. Included studies differ by study design (RCT vs. other than RCT), methodology and risk of bias. Other important factors include services offered, populations targeted, patients studied and impacts assessed. Each demonstration is situated within a particular healthcare system, with its own social, organizational and economic features. In addition, the overall quality of results is likely to be influenced by the scarce comparability in terms of outcome measures (e.g. different evaluation scales).

In our narrative review, eligible studies were analysed and summarized. Furthermore, the relatively poor availability of comparable evidence did not let us perform a meta-analysis. The character of a narrative review limits the evaluated system. Therefore, we think that in the future a value-based approach should be conducted. A value-based approach can further emphasize the potential of the models, describing who actually offers management based on the value-based approach.

Although with no great proofs of effectiveness in some aspects, the evidence shows that the development of a model of integrated care for the frail elderly patient is possible and somehow cost-effective. Each analysed model therefore has the potential to gain positive results, but the large-scale application has been performed only in some areas.

Cooperation, coordination and continuity across different types of services for the elderly frail are, then, key elements, regardless of the model of adopted integrated care.

The main goals of integrated care should be to improve the value of healthcare, to standardize the processes of service delivery in terms of reduction of duplication of tests and information, to deliver high-quality and safe person-centred health- and social care by collaborating healthcare organizations including the input of skilled, accountable and responsible teams of care providers. Policy makers should support the development of integrated care programmes, to further improve resource management and to make impact on hospitalization rates. Furthermore, research and evaluation should focus on a wider range of quality of life and on their interaction with other outcomes.

Our results are likely to introduce a number of areas for discussion and research into the full potential of integrated care models. Alongside the scarce availability of robust studies, we suspect that the effects of the models are weakened by the quality of the monitoring and evaluation tools as well as the poor ability to match users and customers' high expectations with the services delivered. Further, the results of our narrative review points out for an agenda to evaluate social and health needs.

Value-based healthcare (VHBC)[67] see 'value' as outcomes to the patient in relation to the costs of delivering care to overcome fragmented, inefficient and lacking accountability of services for patients. VHBC is considered an advocate for the improvement of service delivery towards more coherent and integrated care. Thus, we proposed a value-based framework to assess patients with complex health and social needs. Such a framework should include different dimensions, as illustrated in Figure 2.

1. Management
   - Organize care into integrated practice units and team-based care;
   - Integrate care across different facilities and settings.
2. Patient centeredness
   - Enhance prevention and help people to meet personalized medical and behavioural goals;
   - Measure outcomes (divided intro: survival, degree of recovery, time to recovery and capacity to attend everyday activities; treatment related discomfort and complications, diagnostic errors, therapeutic errors) for every patient, thus applying patient-related outcomes and experience measures (PROMS and PREMS, respectively).
3. Rewarding systems
   - Pay providers not for the volumes of treatment but reimburse through bundled payments for full care cycles (according to a holistic approach: from onset to end-stage);
   - Costs, charges and reimbursements for the entire cycle of care.
4. Research and development
   - Benchmark and expand services with the best outcomes;
   - Improve research to: achieve positive outcomes with lower costs, deliver decision support tools.

Our narrative review reported interesting implications on the issue of management of patients with complex health and social needs.

By analysing the costs and the cost-effectiveness between ICP models and usual care, differences were identified. Several studies indicate that ICP models show better results in terms of effectiveness, especially if quality variables are considered (e.g. health, functional abilities and quality of life, well-being and social relations).

Nevertheless, the evaluation of care reorganization for frail elderly people with complex health and social needs might not be sufficient to achieve clear evidence if it is not related through a value-based healthcare approach and analysis.

European governments, like those in other parts of the world, are feeling the strain on their health budgets caused by an ageing population, a rise in the prevalence of chronic conditions and the acceleration of medical innovations that have increased demand for state-of-the-art treatment. As a result, governments are looking to make their money stretch further.

Traditionally, efficiency in healthcare has been interpreted largely in terms of cost reductions. More recently, healthcare policymakers in developed economies have interpreted the notion of value according to the willingness of health systems or individual health providers to follow best clinical practice. Increasingly, however, practitioners are promoting a more holistic, patient-centred understanding of value – one championed by the academics Michael Porter and Elizabeth Olmsted Teisberg, who first coined the term "value-based healthcare" (VBH) to describe outcomes of health treatment relative to cost.[67]

The effort to assess more accurately the value of healthcare investment has extensive implications for patient access, reimbursement of healthcare providers and health outcomes. Yet, the adoption of VBH

assumptions in Europe has been piecemeal so far, with large variations in the extent to which European health systems measure patient outcomes, the ways in which they define value and the metrics that they use to do so. Equally, despite the demand for better access to healthcare innovations, the impact of public opinion on health policy varies across the continent.

Efforts to extend the use of VBH models in Europe have fallen short because of a lack of consensus so far about what performance indicators should be used, who to reward and how to quantify the value of incentives to motivate further efficiency. The absence of data on activity, cost and outcomes is particularly lacking in the area of ambulatory and primary care-based interventions.[68] A more extensive and standardized approach to VBH will require stronger evidence to support treatment and better coordination of care.

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References

1. Italian Ministry of Health. Il paziente complesso (pp. 133-138). In Italian Ministry of Health, Report on the Health Status in Italy during the years 2009-2010. Istituto Poligrafico e Zecca dello Stato SpA, www.salute.gov.it/imgs/C_17_pubblicazioni_1655_allegato.pdf (2011, accessed 10 November 2018).
2. Agency for Healthcare Research and Quality. Optimizing prevention and healthcare management for the complex patient. Technical assistance conference Call, http://archive.ahrq.gov/fund/trans101507.htm (2007, accessed 10 November 2018).
3. Le Reste J, Nabbe Y, Manceau P, et al. The European General Practice Research Network presents a comprehensive definition of multimorbidity in family medicine and long term care, following a systematic review of relevant literature. *J Am Med Directors Assoc* 2013; 14: 319–325.
4. Safford M, Allison J and Kiefe C. Patient complexity: more than comorbidity. The vector model of complexity. *J Gen Intern Med* 2007; 22: 382–390.
5. Ritchie C. Health care quality and multimorbidity: the jury is still out. *Med Care* 2007; 45: 477–479.
6. Berry L, Rock B, Smith Houskamp B, et al. Care coordination for patients with complex health profiles in inpatient and outpatient settings. *Mayo Clinic Proc* 2013; 88: 184–194.
7. Gröne O and Garcia-Barbero M. *Trends in integrated care reflections on conceptual issues (EUR/02/5037864)*. Copenhagen, Denmark: World Health Organization, 2002.
8. Bautista M, Nurjono M, Lim YV, et al. Instruments measuring integrated care: a systematic review of measurement properties. *Milbank Q* 2016; 94: 862–917.
9. Béland F and Hollander M. Integrated models of care delivery for the frail elderly: international perspectives. *Gaceta Sanitaria* 2011; 25: 138–146.
10. Johri M, Beland F and Bergman H. International experiments in integrated care for the elderly: a synthesis of the evidence. *Int J Geriat Psychiatry* 2003; 18: 222–235.
11. Briggs A, Valentijn P, Thiyagarajan J, et al. Elements of integrated care approaches for older people: a review of reviews. *BMJ Open* 2018; 8: e021194.
12. Looman W, Huijsman R and Fabbricotti I. The (cost-) effectiveness of preventive, integrated care for community-dwelling frail older people: a systematic review. *Health Soc Care Community*. Epub ahead of print 17 April 2018. DOI: 10.1111/hsc.12571
13. Threapleton D, Chung R, Wong S, et al. Integrated care for older populations and its implementation facilitators and barriers: a rapid scoping review. *Int J Qual Health Care* 2017; 29: 327–334.
14. Pautasso M.Ten simple rules for writing a literature review. *PLoS Comput Biol* 2013; 9: e1003149.
15. Panic N, Leoncini E, de Belvis G, et al. Evaluation of the endorsement of the preferred reporting items for systematic reviews and meta-analysis (PRISMA) statement on the quality of published systematic review and meta-analyses. *PLoS One* 2013; 8: e83138. doi: 10.1371/journal.pone.0083138
16. Higgins J and Green S. Cochrane handbook for systematic reviews of interventions (Version 5.1.0). The Cochrane Collaboration, www.cochrane- handbook.org (2011, accessed 10 November 2018).
17. Melis R, van Eijken M, Borm G, et al. The design of the Dutch EASYcare study: a randomised controlled trial on the effectiveness of a problem-based community intervention model for frail elderly people. *BioMed Central Health Services Research* 2005; 5: 65.
18. Melis R, Adang E, Teerenstra S, et al. Cost-effectiveness of a multidisciplinary intervention model for community-dwelling frail older people. *J Gerontol* 2008; 63: 275–282.
19. Melis R, van Eijken M, Teerenstra S, et al. A randomized study of a multidisciplinary program to intervene on geriatric syndromes in vulnerable older people who live at

home (Dutch EASYcare Study). *J Gerontol* 2008; 63: 283–290.
20. Counsell S, Callahan C, Tu W, et al. Cost analysis of the geriatric resources for assessment and care of elders care management intervention. *J Am Geriatr Soc* 2009; 57: 1420–1426.
21. Counsell S, Callahan C, Clark D, et al. Geriatric care management for low-income seniors: a randomized controlled trial. *J Am Med Assoc* 2007; 298: 2623–2633.
22. Makai P, Looman W, Adang E, et al. Cost-effectiveness of integrated care in frail elderly using the ICECAP-O and EQ-5D: does choice of instrument matter? *Eur J Health Econ* 2015; 16: 437–450.
23. Looman W, Fabbricotti I and Huijsman R. The short-term effects of an integrated care model for the frail elderly on health, quality of life, health care use and satisfaction with care. *Int J Integr Care* 2014; 14: e034.
24. Fabbricotti I, Janse B, Looman W, et al. Integrated care for frail elderly compared to usual care: a study protocol of a quasi-experiment on the effects on the frail elderly, their caregivers, health professionals and health care costs. *BioMed Central Geriatrics*. 2013;
25. Everink I, van Haastregt J, Evers S, et al. An economic evaluation of an integrated care pathway in geriatric rehabilitation for older patients with complex health problems. *PLoS One* 2018; 13: e0191851.
26. Shakib S, Dundon B, Maddison J, et al. Effect of a multidisciplinary outpatient model of care on health outcomes in older patients with multimorbidity: a retrospective case control study. *PLoS One* 2016; 11: e0161382.
27. Eng C, Pedulla J, Eleazer G, et al. Program of All-inclusive Care for the Elderly (PACE): an innovative model of integrated geriatric care and financing. *J Am Geriatr Soc* 1997; 45: 223–232.
28. Segelman M, Szydlowski J, Kinosian B, et al. Hospitalizations in the program of all-inclusive care for the elderly. *J Am Geriatr Soc* 2014; 62: 320–324.
29. Nadash P. Two models of managed long-term care: comparing PACE with a Medicaid-only plan. *Gerontologist* 2004; 44: 644–654.
30. Wieland D, Boland R, Baskins J, et al. Five-year survival in a program of all-inclusive care for elderly compared with alternative institutional and home- and community-based care. *J Gerontol* 2010; 65: 721–726.
31. Meret-Hanke L. Effects of the Program of all-inclusive care for the elderly on hospital use. *Gerontologist* 2011; 51: 774–785.
32. Wieland D, Kinosian B, Stallard E, et al. Does Medicaid pay more to a program of all-inclusive care for the elderly (PACE) than for fee-for-service long-term care? *J Gerontol* 2013; 68: 47–55.
33. Kane R, Homyak P, Bershadsky B, et al. The effects of a variant of the program for all-inclusive care of the elderly on hospital utilization and outcomes. *J Am Geriatr Soc* 2006; 54: 276–283.
34. Metzelthin S, van Rossum E, de Witte L, et al. Effectiveness of interdisciplinary primary care approach to reduce disability in community dwelling frail older people: cluster randomised controlled trial. *Br Med J* 2013; 347: f5264.
35. Metzelthin S, van Rossum E, Hendriks M, et al. Reducing disability in community-dwelling frail older people: cost-effectiveness study alongside a cluster randomised controlled trial. *Age Ageing* 2015; 44: 390–396.
36. de Stampa M, Vedel I, Buyck J, et al. Impact on hospital admissions of an integrated primary care model for very frail elderly patients. *Arch Gerontol Geriatr* 2014; 58: 350–355.
37. Béland F, Bergman H, Lebel P, et al. A system of integrated care for older persons with disabilities in Canada: results from a randomized controlled trial. *J Gerontol* 2006; 61: 367–373.
38. Béland F, Bergman H, Lebel P, et al. Integrated services for frail elders (SIPA): a trial of a model for Canada. *Can J Aging* 2006; 25: 5–42.
39. Landi F, Onder G, Russo A, et al. A new model of integrated home care for the elderly: impact on hospital use. *J Clin Epidemiol* 2001; 54: 968–970.
40. Bernabei R, Landi F, Gambassi G, et al. Randomised trial of impact of model of integrated care and case management for older people living in the community. *Br Med J* 1998; 316: 1348–1351.
41. Glendinning C. Breaking down barriers: integrating health and care services for older people in England. *Health Policy* 2002; 65: 139–151.
42. Looman W, Huijsman R, Bouwmans-Frijters C, et al. Cost-effectiveness of the 'Walcheren Integrated Care Model' intervention for community-dwelling frail elderly. *FAMPRJ* 2016; 33: 154–160. No.
43. Looman W, Fabbricotti I, Kuyper R, et al. The effects of a pro-active integrated care intervention for frail community-dwelling older people: a quasi-experimental study with the GP-practice as single entry point. *BMC Geriatr* 2016; 16: 43.
44. Eklund K. Outcomes of coordinated and integrated interventions targeting frail elderly people: a systematic review of randomised controlled trials. *Health Soc Care Commun* 2009; 17: 447–458.
45. Hernández C, Alonso A, Garcia-Aymerich J, et al. Integrated care services: lessons learned from the deployment of the NEXES project. *Int J Integr Care* 2015; 15: e006.
46. Ansak M and Zawadski R. On Lok CCODA: a consolidated model. *Home Health Care Serv Q* 1983; 4: 147–170.
47. Zawadski R and Ansak M. Consolidating community-based long-term care: early returns from the On Lok demonstration. *Gerontologist* 1983; 23: 364–369.
48. Yordi C and Waldman J. A consolidated model of long-term care: service utilization and cost impacts. *Gerontologist* 1985; 25: 389–397.
49. Leveille S, Wagner E, Davis C, et al. Preventing disability and managing chronic illness in frail older adults: a randomized trial of a community-based partnership with primary care. *J Am Geriatr Soc* 1998; 46: 1191–1198.
50. Hebert R, Raiche M, Dubois M, et al. Impact of PRISMA, a coordination-type integrated service delivery

system for frail older people in Quebec (Canada): a quasi-experimental study. *J Gerontol* 2010; 65B: 107–118.
51. Hardy B, Mur-Veeman I, Steenbergen M, et al. Inter-agency services in England and The Netherlands; a comparative study of integrated care development and delivery. *Health Policy* 1999; 48: 87–105.
52. Fabbricotti I. *Taking care of integrated care: integration and fragmentation in the development of integrated care arrangements*. (Unpublished doctoral dissertation). Erasmus University Rotterdam, Institute of health policy and management, Rotterdam, 2007.
53. Bergman H, Beland F, Lebel P, et al. Care for Canada's frail elderly population: fragmentation or integration? *Can Med Assoc J* 1997; 157: 1116–1121.
54. Gröne O and Garcia-Barbero M. Integrated care: a positioning paper of the WHO European office for integrated health care services. *Int J Integr Care* 2001; 1: e21.
55. Ganz D, Fung C, Sinsky C, et al. Key elements of high-quality primary care for vulnerable elders. *J Gen Intern Med* 2008; 23: 2018–2023.
56. Hébert R, Durand P, Dubuc N, et al. PRISMA: a new model of integrated service delivery for the frail older people in Canada. *Int J Integr Care* 2003; 3: e08.
57. Kodner D. Fully integrated care for frail elderly: two American models. *Int J Integr Care* 2000; 1: e08.
58. Reed J, Cook G, Childs S, et al. A literature review to explore care for older people. *Int J Integr Care* 2005; 5: e17.
59. Elkan R, Kendrick D, Dewey M, et al. Effectiveness of home based support for older people: systematic review and meta-analysis. *Br Med J* 2001; 323: 719–725.
60. Kodner D. Integrated Care Networks for vulnerable elderly: North American prototypes, performance and lessons. *Int J Integr Care* 2008; 8: e27.
61. Van Hout H, Jansen A, van Marwijk H, et al. Prevention of adverse health trajectories in a vulnerable elderly population through nurse home visits: a randomized controlled trial. *J Gerontol* 2010; 65: 734–742.
62. Tourigny A. Quasi-experimental study of the effectiveness of an integrated service delivery network for the frail elderly. *Can J Aging* 2004; 23: 231–246.
63. Struckmann V, Leijten F, van Ginneken E, et al. Relevant models and elements of integrated care for multi-morbidity: results of a scoping review. *Health Policy* 2018; 122: 23–35.
64. Vrijhoef HJ, de Belvis AG, de la Calle, et al. IT-supported integrated care pathways for diabetes: a compilation and review of good practices. *Int J Care Coord* 2017; 20: 26–40.
65. Sriganesh K, Shanthanna H and Busse JW. A brief overview of systematic reviews and meta-analyses. *Indian J Anaesth* 2016; 60: 689–694.
66. Lanzeta I, Marb J and Arrospide A. Cost-utility analysis of an integrated care model for multimorbid patients based on a clinical trial. *Gac Sanit* 2016; 30: 352–358.
67. Porter M and Lee T. The strategy that will fix health care. *Harvard Business Review* 2013; 91: 50–70.
68. Desmedt M, Vertriest S, Hellings J, et al. Economic impact of integrated care models for patients with chronic diseases: a systematic review. *Value Health* 2016; 19: 892–902.

Appendix 1. Search strategies

PUBMED

((“Delivery of Health Care, Integrated”[Mesh]) AND ((((“Comorbidity”[Mesh]) OR “complex patient”[Title/Abstract]) OR “Frail Elderly”[Mesh])) AND ((((“Program Evaluation”[Mesh]) OR “Costs and Cost Analysis”[Mesh])) OR ((effectiveness[Title/Abstract]) OR comparative effectiveness research [Title/Abstract]))

SCOPUS

(TITLE-ABS-KEY(“integrated care”)) AND ((TITLE-ABS-KEY(comorbidity) OR TITLE-ABS-KEY (“complex patient”) OR TITLE-ABS-KEY(“Frail Elderly”))) AND ((TITLE-ABS-KEY(“Program Evaluation”) OR TITLE-ABS-KEY(“Cost Analysis”) OR TITLE-ABS-KEY(“effectiveness”))) AND (EXCLUDE(PUBYEAR, 1997) OR EXCLUDE (PUBYEAR, 1991) OR EXCLUDE(PUBYEAR, 1997) OR EXCLUDE(PUBYEAR, 1991)) AND (EXCLUDE(SUBJAREA, “ARTS”)) AND (EXCLUDE(DOCTYPE, “ch”)) AND (EXCLUDE (DOCTYPE, “no”) OR EXCLUDE(DOCTYPE, “sh”)) AND (EXCLUDE(LANGUAGE, “Dutch”) OR EXCLUDE(LANGUAGE, “German”))

EBSCO (CINAHL Plus with Full Text; Cochrane Central Register of Controlled Trials; MEDLINE; NHS Economic Evaluation Database (Note: not explored after November 2014); EconLit1)

(SU integrated delivery of health care) AND (SU comorbidity OR AB “complex patient*” OR SU frail elderly) AND (SU program evaluation OR SU cost effectiveness OR SU cost analysis OR AB effectiveness)