Health Policy xxx (2017) xxx–xxx

Contents lists available at ScienceDirect

Health Policy

journal homepage: www.elsevier.com/locate/healthpol

The SELFIE framework for integrated care for multi-morbidity: Development and description

Fenna R.M. Leijten[a,*,1], Verena Struckmann[b,1], Ewout van Ginneken[c], Thomas Czypionka[d], Markus Kraus[d], Miriam Reiss[d], Apostolos Tsiachristas[a,e], Melinde Boland[a], Antoinette de Bont[a], Roland Bal[a], Reinhard Busse[b], Maureen Rutten-van Mölken[a,f], on behalf of the SELFIE consortium

[a] Institute of Health Policy and Management, Erasmus University Rotterdam, the Netherlands
[b] Department of Health Care Management, Berlin University of Technology, Germany
[c] European Observatory on Health Systems and Policies, Berlin University of Technology, Department of Health Care Management, Germany
[d] Institute for Advanced Studies, Vienna, Austria
[e] Health Economics Research Centre, University of Oxford, UK
[f] Institute for Medical Technology Assessment, Erasmus University Rotterdam, the Netherlands

ARTICLE INFO

Article history:
Received 20 September 2016
Received in revised form 31 May 2017
Accepted 12 June 2017

Keywords:
Integrated care
Multi-morbidity
Framework
Conceptual
Model
Frail elderly
Chronic care
Comorbidity

ABSTRACT

Background: The rise of multi-morbidity constitutes a serious challenge in health and social care organisation that requires a shift from disease- towards person-centred integrated care. The aim of the current study was to develop a conceptual framework that can aid the development, implementation, description, and evaluation of integrated care programmes for multi-morbidity.
Methods: A scoping review and expert discussions were used to identify and structure concepts for integrated care for multi-morbidity. A search of scientific and grey literature was conducted.
Discussion: meetings were organised within the SELFIE research project with representatives of five stakeholder groups (5Ps): patients, partners, professionals, payers, and policy makers.
Results: In the scientific literature 11,641 publications were identified, 92 were included for data extraction. A draft framework was constructed that was adapted after discussion with SELFIE partners from 8 EU countries and 5P representatives. The core of the framework is the holistic understanding of the person with multi-morbidity in his or her environment. Around the core, concepts were grouped into adapted WHO components of health systems: service delivery, leadership & governance, workforce, financing, technologies & medical products, and information & research. Within each component micro, meso, and macro levels are distinguished.
Conclusion: The framework structures relevant concepts in integrated care for multi-morbidity and can be applied by different stakeholders to guide development, implementation, description, and evaluation.

1. Introduction

As Western populations are ageing, the prevalence of multi-morbidity is rapidly increasing. Persons with multi-morbidity, as compared to persons with a single chronic disease, have a lower quality of life [1], a higher age-adjusted mortality [2], greater healthcare utilization such as a greater likelihood to be admitted to hospital and longer length of hospital stay [3], greater absenteeism [4] and earlier exit from the workforce [5]. Although methods to measure multi-morbidity differ greatly between studies and countries, the prevalence in the population over 65 years is commonly estimated to be larger than 60% [6–9]. Multi-morbidity, however, is not solely a concern amongst older persons, as in absolute terms there are more younger persons with multi-morbidity [7].

In the current article multi-morbidity is defined as multiple (i.e., at least two) chronic conditions, physical or mental, occurring in one person at the same time, where one is not a known complication of the other. Persons with multi-morbidity often require care from multiple professionals within the healthcare- and social care sectors. In a fragmented care system, this creates conflicting, overly-demanding, treatment advices that may discourage

* Corresponding author.
E-mail address: leijten@bmg.eur.nl (F.R.M. Leijten).
[1] Shared first-author: these authors contributed equally to this publication.

http://dx.doi.org/10.1016/j.healthpol.2017.06.002

Box 1: About the SELFIE project.
SELFIE (Sustainable intEgrated chronic care modeLs for multi-morbidity: delivery, FInancing, and performancE) is a Horizon2020 funded EU project that aims to contribute to the improvement of person-centred care for persons with multi-morbidity by proposing evidence-based, economically sustainable, integrated care programmes that stimulate cooperation across health and social care and are supported by appropriate financing and payment schemes. More specifically, SELFIE aims to:

- Develop a taxonomy of promising integrated care programmes for persons with multi-morbidity;
- Provide evidence-based advice on matching financing/payment schemes with adequate incentives to implement integrated care;
- Provide empirical evidence of the impact of promising integrated care on a wide range of outcomes using Multi-Criteria Decision Analysis;
- Develop implementation and change strategies tailored to different care settings and contexts in Europe, especially Central and Eastern Europe.

The SELFIE consortium includes eight organisations in the following countries: the Netherlands (coordinator), Austria, Croatia, Germany, Hungary, Norway, Spain, and the UK. www.selfie2020.eu [Grant Agreement No 634288].

compliance. Thus persons with multi-morbidity, are likely to benefit from integrated care that is well coordinated and continuous [10]. In the current article integrated care is defined as structured efforts to provide coordinated, pro-active, person-centred, multidisciplinary care by two or more well-communicating and collaborating care providers either within or across sectors. In order to realize such integrated care, a paradigm shift from disease- to person-centeredness is necessary in service delivery, management, and funding [11].

Evidence on the effectiveness of integrated care for multi-morbidity is still limited [12–15]. Nonetheless, various innovative programmes have been identified in which integrated care is being provided for persons with multi-morbidity (Struckmann et al., submitted) [10]. These programmes vary greatly with regard to target group, involved care providers, implementation practices, and actual care delivery. In order to be able to compare integrated care programmes for multi-morbidity in different contexts it would be helpful to apply a general framework that structures relevant concepts. Currently, integrated care programmes often refer to elements of Wagner's Chronic Care Model [16]. This model, however, was not made specifically for multi-morbidity care. In the case of multi-morbidity, specific issues need to receive more attention, such as dealing with multiple care providers potentially working in different sectors, the risk of care fragmentation, payment forms that adequately account for multi-morbidity, treatment interaction, the need to prioritise treatments goals, and the applicability of single disease guidelines.

The aim of this study is to develop a conceptual framework that can be used to aid the development, implementation, description, and evaluation of integrated care for multi-morbidity. It can be used by different types of actors in the field, e.g. developers of integrated care programmes (clinicians, managers), policy makers, health insurers, and researchers.

The necessity for such a framework was acknowledged by the European Commission, which granted Horizon2020 funds to the SELFIE research project (see Box 1). The development of a conceptual framework for integrated care for multi-morbidity forms part of the initial work being conducted in the SELFIE project. The framework will be used to guide the description and evaluation of promising integrated care programmes for multi-morbidity in the eight SELFIE partner countries.

2. Methods

A scoping review of scientific and grey literature and expert discussions were used to identify and structure relevant concepts of integrated care for persons with multi-morbidity into a framework. A scoping review was chosen as an approach to review different aspects related to integrated care for multi-morbidity in the scientific and grey literature, as the strength of this method lies in producing broad and comprehensive results [17]. Discussions with experts were used to complement the findings from the literature and to ensure that the concepts and structure of the framework were recognized, understood, and could be used in the future.

2.1. Scoping review

A search for scientific literature was conducted in October 2015 in the following electronic databases: Cochrane, Embase, PubMed, PsycInfo, Scopus, Sociological Abstracts, Social Services Abstracts, and Web of Science. Articles were searched for that pertained to 1) models (e.g., concepts, frameworks, theories), 2) integrated chronic care (e.g., comprehensive care, managed care, collaborative care), and 3) multi-morbidity (e.g., multiple health problems, comorbidity, frail elderly). A comprehensive search strategy was developed with the assistance of a librarian. When possible standardized or indexed search terms were used. The following in- and exclusion criteria were used:

- Inclusion criteria: a model (i.e., framework, theory) or key elements of integrated care for multi-morbidity is described
- Exclusion criteria: single-disease focus, fundamental biomedical studies, conference abstracts, letters to the editor, editorials, or commentaries, no full text available, non-English language.

Reviewing was done in two steps, first on the basis of title and abstract, and hereafter on full text. Both steps were done by two independent reviewers. Hereafter, data was extracted by six reviewers working in pairs on: publication details, methods, key concepts pertaining to integrated care. Data extraction was done during the winter of 2015–2016. More details on the methods of the scoping review of the scientific literature including the search terms and a flowchart of in- and excluded publications can be found in Struckmann et al. (submitted).

Alongside the scoping review of the scientific literature, a targeted search was conducted in the [grey] literature. Key publications were identified that were related to integrated care in general or to specific themes in the framework. Furthermore, specific multi-morbidity reports, and findings from related research projects were included.

2.2. Expert discussion meetings

In the fall of 2015 a core group of SELFIE researchers responsible for the framework development held multiple brainstorm sessions to draft the initial conceptual framework. The expertise of this group covers the following fields: medicine, public health, health sciences, health policy and systems, health economics, psychology, sociology, and anthropology. This group structured initial concepts identified in the targeted [grey] literature into a framework that consisted of a micro, meso, and macro level. This framework was adapted and expanded upon by further findings from the scientific literature search.

Please cite this article in press as: Leijten FRM, et al. The SELFIE framework for integrated care for multi-morbidity: Development and description. Health Policy (2017), http://dx.doi.org/10.1016/j.healthpol.2017.06.002

A draft framework made by the core group of SELFIE researchers was presented in January 2016 to members of the SELFIE consortium and the SELFIE international stakeholder advisory board. Representatives of the SELFIE consortium are from academic institutions in the eight SELFIE partner countries. The international stakeholder advisory board is made up of representatives from five stakeholder groups (5Ps): Patients (e.g., patient forum representatives, persons with multi-morbidity), Partners (e.g., informal caregiver network representatives), Professionals (e.g., medical doctors, researchers, and experts in the field of integrated care/multi-morbidity), Payers (e.g., persons working for health insurers), and Policy makers (e.g., persons from international health policy organisations and guideline networks). These experts provided feedback on the framework from their different cultural, political, health system, professional, and personal perspectives. After the international meeting, the core group of SELFIE researchers held several more brainstorm sessions to use this feedback to create a revised version of the framework. Meanwhile, findings from the scoping review received a stronger presence in the framework and the description thereof.

A revised framework was developed that encompassed the micro, meso, and macro levels and grouped concepts into six components: service delivery, leadership & governance, workforce, financing, technologies & medical products, and information & research. These components stem from the WHO six key components used to describe, understand, and compare different health systems (i.e., leadership and governance, health information systems, health financing, human resources for health, essential medical products and technologies, and service delivery) [18]. The components were slightly adapted for the SELFIE framework to be applicable for integrated care for multi-morbidity. The use of these familiar and well-defined components will facilitate the use of the framework in different contexts.

In the spring-summer of 2016, national stakeholder meetings with representatives from the 5Ps were held in all SELFIE partner countries. During these national meetings, the revised framework was presented and discussed. SELFIE partners returned feedback from their meetings to the core group of SELFIE researchers who used this to further develop the framework.

The framework presented in this article thus comes forth from an iterative process – findings from the scoping review and the expert meetings were used to continuously update and optimize the framework.

The methods used to develop the framework are of a qualitative nature. Concepts were clustered and described that are likely to be relevant in the provision of integrated care for multi-morbidity, however, no weight or systematic comparison between the relevance of concepts has been made.

3. Results

3.1. Scoping review

The search in the scientific literature yielded 11,641 unique publications. After reviewing titles and abstracts, 270 publications remained. After full text reviewing, 92 publications were included in this study for the purpose of the framework development.

Most of the articles included (78%) were of a descriptive nature – describing focus group and interview studies, and study designs of integrated care programmes for multi-morbidity. As the search strategy was quite broad with regard to 'multi-morbidity', studies were included on specific multi-morbid combinations but also on more general complex patients and frail elderly (including palliative care studies) in which the majority consists of persons with multi-morbidity. The full results of the scoping review of the scientific literature are extensively described elsewhere (Struckmann et al., submitted).

The additional targeted search for relevant [grey] literature led to the inclusion of scientific literature pertaining to the Chronic Care Model [16], the Guided Care Model [19], and the Development Model for Integrated Care [20,21]. Additional scientific literature specifically on financing was included, as our search strategy did not capture this theme entirely but it was deemed as important for the framework development [22–28]. This literature was identified through a search for specific journals and experts known to publish in this field and through discussion with project partners and stakeholders. The Cochrane reviews on individualised care planning and shared decision-making were also included [29,30]. Furthermore, the WHO 'World Report on Ageing and Health'[31] and 'Global strategy on people-centred and integrated health services' [11] were used, as well as a report published by the King's Fund on 'Providing integrated care for older people with complex needs' [32]. Results from prior EU-funded projects were used: 'ICARE4EU', which aims to compare integrated care programmes for multi-morbidity [10,33–36], the Joint Action on Chronic Diseases (JA-CHRODIS), specifically results from the work focusing on multi-morbidity [37], and 'Advanced Care Coordination and TeleHealth Deployment' (ACT) [38]. In order to gain insight into guidelines for multi-morbidity, the UK NICE draft guideline was used as it is extensive and the most recent [39].

3.2. The SELFIE framework for integrated care for multi-morbidity

The conceptual framework is presented in Fig. 1. The framework is comprised of a core in which the individual with multi-morbidity and his or her environment is placed centrally. Concepts pertaining to integrated care for multi-morbidity are grouped at the micro, meso and macro levels. They are further split according to the six [WHO] components: service delivery, leadership & governance, workforce, financing, technologies & medical products, and information & research. Below, first the core of the framework is described, where after each component, starting at the top and moving clockwise, is described at the micro, meso, and macro level. Lastly, the role of monitoring is described.

3.2.1. Holistic understanding of the individual with multi-morbidity in his/her environment

The basis of person-centred integrated care for individuals with multi-morbidity is a holistic understanding of these individuals' health and well-being, capabilities, self-management abilities, needs, preferences, and the environment that they find themselves in. e.g. [31,40,41]. Often a holistic understanding of an individual with multi-morbidity and his or her environment is aided by formal assessments [19,31,32,37,39,42–51,60,67,73]. However, the word understanding is used in the framework instead of assessment in order to signify that an individual's situation is dynamic, not static, and thus requires regular monitoring.

The way health is construed is no longer only as physical, mental, and social well-being, but also includes the ability to adapt and self-manage, to restore, adapt, and cope [52–54]. This highlights the extent to which a person has the ability to achieve valuable functions [55]. Self-management abilities play an important role in integrated care [16,19,31,37,41,56–61]. An individual's self-management abilities are especially relevant in multi-morbidity, as persons need to deal with multiple problems and providers that may work in different sectors, simultaneously [58,59,62,63]. An individual with multi-morbidity often needs to make choices and to set priorities when it is too demanding to address multiple health problems simultaneously. Hence, professionals need to encourage people with multi-morbidity to clarify what their personal goals, preferences, and priorities are [60,64–66]. This should

Please cite this article in press as: Leijten FRM, et al. The SELFIE framework for integrated care for multi-morbidity: Development and description. Health Policy (2017), http://dx.doi.org/10.1016/j.healthpol.2017.06.002

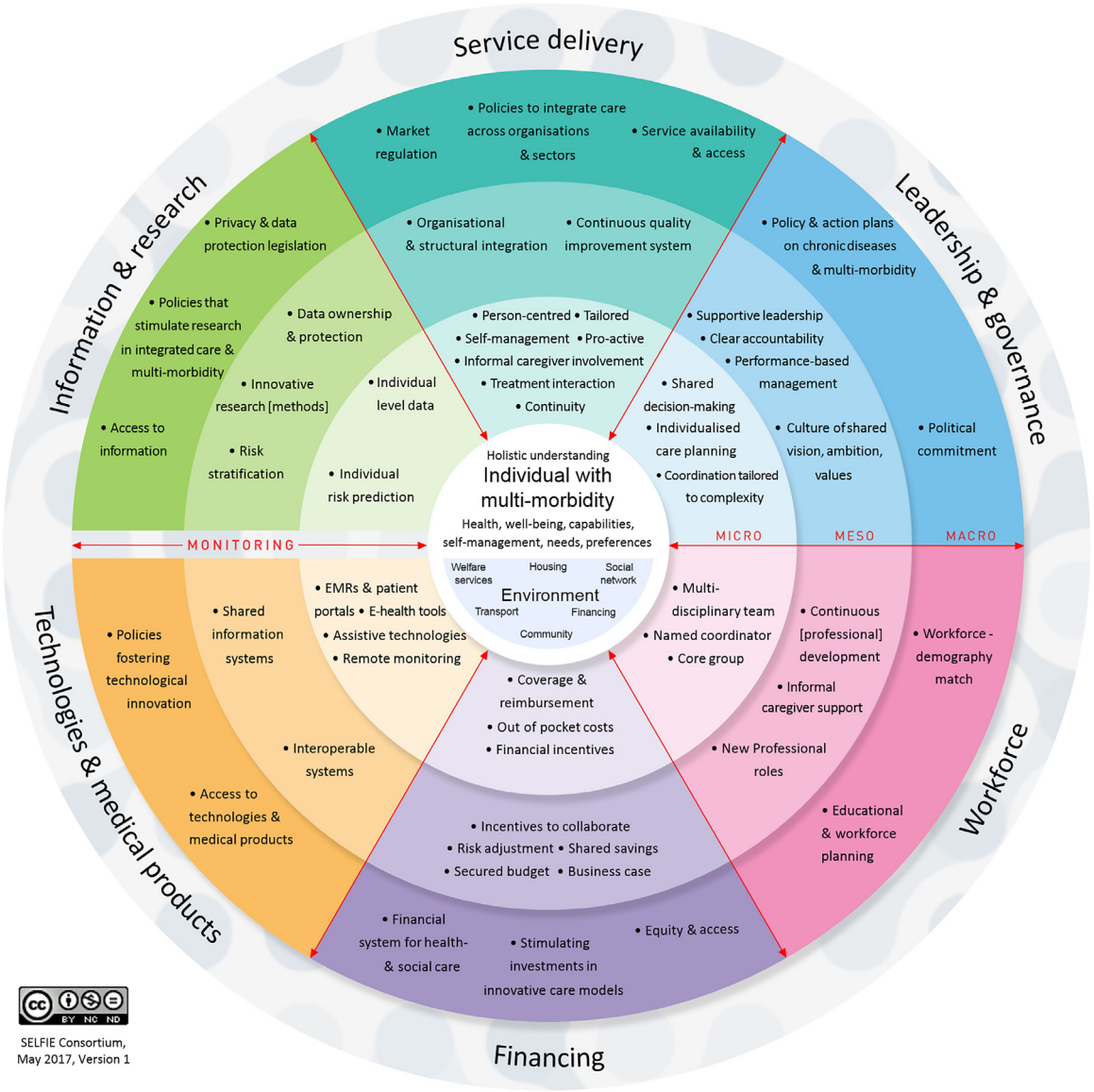

Fig. 1. The SELFIE Framework for Integrated Care for Multi-Morbidity.

always be done taking an individuals' capabilities and preferences into consideration and adapting [self-management] expectations accordingly. To this end, elements entangled in an individual's preferences should also be understood, such as their personality, religion, culture, ethnicity, illness perceptions, socio-financial position, and educational background.

A holistic understanding includes the individual's environment [31]. Environmental elements play a role in the relationship between the individual's situation and the process of integrated care. The social network is an important element to consider, such as the availability of family members, friends, and neighbours who can be involved as informal caregivers, as well as the burden of care that the informal caregivers may experience [31,39,57,67–70]. Other environmental elements to consider include: financial situation (e.g., is someone financially independent?) [60,71,72], housing (e.g., does someone live alone, are the bed- and bathroom on the ground floor?) [73], the physical surroundings (e.g. is it safe, proximity to services?), the availability of community services (e.g., self-help groups) [16,62,74], and transport (e.g., is accessible public transport available, parking costs?) [19,73,75].

3.2.2. Service delivery

3.2.2.1. Micro.

As persons with multi-morbidity need to deal with multiple health and/or social problems, it is especially important to offer a person-centred integrated care approach that is tailored to the individual and his or her environment [21,39,56,66,68,76]. Tailoring care can be done on the basis of a formal holistic assessment, as described in the previous section. As the situation of persons with multi-morbidity may change over time, flexibility is important [64,68,77,78] – flexible care can be continuously updated to match a person's needs [79,80,104].

Integrated care for multi-morbidity often includes promoting various self-management abilities [12,32,81] like behavioural/lifestyle changes [46,82], coping strategies [83], health literacy [37,38,84], navigation through the care system [75], medication adherence [46,50,82], communication skills [60,83], goal-setting [82], prioritizing [83], and planning [19,82,85,86]. Self-management can be seen as a means for persons with multi-morbidity (and their informal caregivers) to become more pro-active, motivated, and remain autonomous [61,63,87]. The care itself may also be pro-active, with appropriate follow-up and

Please cite this article in press as: Leijten FRM, et al. The SELFIE framework for integrated care for multi-morbidity: Development and description. Health Policy (2017), http://dx.doi.org/10.1016/j.healthpol.2017.06.002

monitoring to detect signs of progression and potential complications in an early phase [50,56,88]. Persons with multi-morbidity may find self-management very demanding, so education and coaching need to be tailored to an individual's 'starting point' [21,63,89].

As persons with multi-morbidity often deal with different professionals, organisations, and sectors, it is important to ensure smooth and monitored transitions throughout the care process [11,16,19,68,90,91]. Various integrated care programmes point to continuity as a critical element [43,44,75] that facilitates good relationship-building between persons with multi-morbidity, professionals, and informal caregivers [56,92].

Whenever possible, involving the informal caregiver in the decision-making process is desired [64,71,85,93], especially in multi-morbidity [37,65,87]. The informal caregiver can be involved in overall care planning [19,86], in setting priorities [94], and during transitions between sites (e.g., after hospital discharge) [84]. However, the informal caregiver's needs [56,95], quality of life, and burden of caregiving should be considered as they may have health problems themselves and be balancing a career as well [75,96].

For persons with multi-morbidity that take multiple medications, prescribed by multiple care providers [78], medication adherence, accumulation of side-effects, and drug-interactions may become an issue [10]. Because the evidence in guidelines is often based on studies in patients with a single disease [78,97], trying to follow multiple single-disease guidelines simultaneously has been critiqued [78,87]. Hence, attention is required for treatment interactions (i.e., polypharmacy [72,78,84] and guideline interactions [64,78,79]). Care providers may need the flexibility to tailor disease-specific guidelines [65,84,98]. However, providers may lack training to do so [99]. For this reason, person-centred guidelines for multi-morbidity are being developed, such as those by NICE [16,39,69,100]. An important element of these guidelines is the review of medications and treatments and their interactions [39,81,101], including a discussion about the relevance of certain medications prescribed with a long-term prevention perspective for people with a limited life expectancy [39].

3.2.2.2. Meso.

Organisational and structural integration can facilitate integrated care delivery and especially increase sustainability [102]. In the care provision of multi-morbidity this may be especially relevant, as integration across health- and social care sectors may be needed. Different types of organisational structures are possible, ranging from fully integrated formal alliances or mergers to informal cooperation agreements [32,71]. The need for organisational transparency and ongoing communication to ensure integrated care have been highlighted [103,104], as well as the need for health, social, and community services to be linked [16]. It is important to note that an integrated organisation does not necessarily mean that care delivery will be integrated [56], nor is organisational integration a goal in itself – it is a means of improving and integrating care [32]. It has been proposed that in creating collaborative and integrated care, this should be 'structured for flexibility', meaning that systems in place a priori expect the unexpected and are ready and able to truly personalize care [104].

Persons with multiple chronic conditions pose a challenge for effective continuous quality improvement systems, as current quality standards mostly address single-diseases [65]. Identifying and developing indicators in multi-morbidity is a challenge [105].

3.2.2.3. Macro.

Integrated care programmes for multi-morbidity would benefit from macro level policies that stimulate the integration of care across organisations and sectors, such as through close links between Ministries of Health and of Social Affairs [106]. In parallel, in competitive environments, market regulation is needed that allows for collaboration between providers but protects consumer choice, such as more flexible anti-trust laws. Lastly, policies that ensure service availability and access need to be in place. This pertains to the availability of community and public health resources and timely (e.g., acceptable waiting times), geographical (e.g., reasonable travel times) and physical (e.g., wheelchair accessible) access. Service access should protect vulnerable groups, such as those with multi-morbidity.

3.2.3. Leadership & governance

3.2.3.1. Micro.

In the case of multi-morbidity, prioritisation is a key aspect, but discrepancies herein can exist between persons involved in the care process [78,84]. Shared decision-making is thus an integral part of integrated care, and entails discussing goals and options to achieve these, identifying and clarifying issues and possible solutions, and ensuring that all involved persons understand one-another [21,30,37,39,41,62,66,69]. The person with multi-morbidity and the informal caregiver should be empowered and engaged in becoming partners [11,16,41,70,93,104] with shared responsibility [38,56] in the decision-making and care process. The goal hereof is maintaining autonomy, increasing adherence, and improving outcomes [38,41,104].

Shared decision-making should result in the development of a single individualised care plan [45]. For persons with multi-morbidity individualised care planning appears to promise more successful integrated care [19,29,32,39,43]. Planning may include agreed upon goals and treatments, timelines, responsibilities, and follow-up to review progress. [38,44,46,49–51,66,71,72,74,77,81,84,94,96,104] Plans can also be used to reassess and adjust goals, ensure continuity of care, and act as a communication tool between providers and patients [45].

Such plans should also specify who is responsible for the coordination of care. Coordination should be tailored to the complexity of the person's care needs [103]. In managing persons with multi-morbidity, recognition is needed that not everyone requires the most intense form of coordination (e.g., a case manager) [80,99,107]. A formal holistic assessment can be used as a means of determining the type of care needed [70] and to help staff determine which resources (e.g., the level of coordination) are needed [48].

3.2.3.2. Meso.

Successful implementation of integrated care for multi-morbid persons can be stimulated by supportive leadership that is fully committed to clearly-defined goals, is trusted by those involved, and acknowledges professional autonomy [62]. Supportive leadership throughout all levels of integrated care that promotes open discussion is seen as an important success factor for interprofessional collaboration [103] and commitment to quality [74]. In line with this, strong and engaged leaders should promote the uptake of a new approach and facilitate [readiness for] change [16,20,111]. Organisational transparency and **clear accountability** towards employees (e.g., care providers) and end-receivers (e.g., persons with multi-morbidity, informal caregivers) are important to foster in decision-making processes [11].

Furthermore, in providing integrated care for multi-morbidity it may be important that a culture of shared vision, ambition, and values is created [77]. In order for professionals and organisations to successfully collaborate, willingness and belief in the collaboration, trust in one-another, and mutual respect is necessary [103].

It is advocated that integrated care in multi-morbidity is supported by performance-based management through measurement of performance targets on all levels, monitored by a limited core set of indicators [21,31]. Implementing performance-based manage-

Please cite this article in press as: Leijten FRM, et al. The SELFIE framework for integrated care for multi-morbidity: Development and description. Health Policy (2017), http://dx.doi.org/10.1016/j.healthpol.2017.06.002

ment should be done carefully to avoid opportunistic behaviour, but instead create a culture of continuous improvement. This can be facilitated by a continuous quality improvement system.

3.2.3.3. Macro.

A person-centred integrated care programme can benefit from wider political commitment and should be well-embedded in the structure and governance of the regional and national system, as these can both positively and negatively influence a programme [102]. Thus it is important that (inter)national/regional policy and action plans on chronic diseases and multi-morbidity promote multidisciplinary and inter-organisational collaborative care [11].

3.2.4. Workforce

3.2.4.1. Micro.

Integrated care for multi-morbidity calls for multidisciplinary team work that crosses the healthcare, social care, and volunteer work boundaries [12,16,21,31,32,37,41,44,68,71,73,82,85,94]. Multidisciplinary teams need to be tailored to the target population and the context [71], and it is important to realize that it takes time to achieve effective teamwork [108]. Not only professionals with different backgrounds need to work together and trust one-another, but also persons with multi-morbidity and informal caregivers themselves need to be involved in such teams [80]. An important aspect of efficient teamwork is good communication between all persons involved in the process [48,85,99].

Often, a differentiation is made between a core group of professionals and a wider network that can be called upon [32]. Having too many professionals involved in the core team can confuse and overwhelm persons with multi-morbidity and discourage them from taking on an active role in the care process themselves [63]. Clear roles and responsibilities for all persons involved, including the person with multi-morbidity him- or herself, are thus desirable. Having a named coordinator is deemed important [32,37,38,58,74,76,78,99,102].

3.2.4.2. Meso.

Continuous professional education and development is an important topic in integrated care for multi-morbidity [19,50,64], that can be divided into training of 'soft skills' (i.e., communication, teamwork and relationships, self-management promotion, willingness to change/learn) and managerial skills for multi-morbidity. There seems to be a need to train skills in teamwork and in building durable relationships with patients, other professionals, and informal caregivers [58,78,109]. Professionals also need to know how to train self-management skills [37,41,82], and specifically learn motivational interviewing techniques [74,85,96]. Managerial skills include training in being a case manager [49,110], conducting assessments [47,48], navigating the health- and social care systems [48], working with individualised care plans [48], and knowing how to risk-stratify in order to ensure that care is tailored to complexity [48]. Continuous professional education and development is, however, not self-evident and stresses the need for willingness to change, learn from each other, and to share best practices [21,79].

As described in the sections above, the role of the informal caregiver in the multi-morbidity care process is often prominent. As both a user and provider of care, the informal caregiver can be found at the core of the framework as well as in service delivery and in the workforce components of the care process. However, it should always be discussed openly whether and how the informal caregiver can be involved in the care process. The caregiver burden should be addressed [10,75] as well as appropriate support for informal caregivers [75]. Forms of support include education [19,31] to increase abilities [95] and strengthen confidence [95] and reducing the pressure of being the sole responsible person (i.e., establishing clear responsibilities, offering possibilities to take a caregiving break).

Appropriate workforce planning at organisational level is necessary and includes attention for workload and sufficient team resources [71,104,111], professional education, and sustainability of staff and informal caregivers [111]. The increasing pressure on the traditional workforce and the need to contain costs underline the need for exploring new professional roles (e.g., physician assistants, specialised nurse practitioners, social district support teams) [27] or shifting tasks to specially trained professionals, provided that it is in the interest of persons with multi-morbidity.

3.2.4.3. Macro.

At the macro level, workforce development must match the challenges of an ageing society in which retirement ages are increasing while at the same time a greater proportion of people require care for multiple morbidities. These changes result in an increased need for care professionals, persons with multi-morbidity, and informal caregivers alike to remain in paid employment longer. It is important to consider possible strains on the workforce-demography match. The workforce needs to be sustainable in providing care, and legislation needs to be in place that supports flexible working arrangements, for example to allow informal caregivers to balance paid employment and caregiving [31].

In educational and workforce planning, changes in demography and the type of care provision that will be needed in the future should be considered. For the prior this could be by including the training of geriatric skills, generalist competencies, and communication and teamwork skills in curriculums [31]. For the latter it can include enrolling sufficient students into these curriculums and creating new professional roles and volunteer opportunities.

3.2.5. Financing

3.2.5.1. Micro.

Coverage and reimbursement of the interventions included in person-centred integrated care programmes need to be generous enough to ensure equity in financial access for those who need them. Reimbursement structures should also guarantee enough time for professionals to work with persons with multi-morbidity and informal caregivers [64]. The extent of co-payments, co-insurance, and deductibles (cost-sharing) for services and goods covered, direct payments for those not covered, and in some contexts informal payments should also be considered because these out-of-pocket costs may influence access, [non]adherence, and how and which care is used. Certain financial incentives may be used to motivate persons with multi-morbidity to participate in and adhere to integrated care programmes, such as, vouchers, free gym memberships, free workshops or training and out of office-hours access to care [35].

3.2.5.2. Meso.

Whereas the most dominant payment systems for individual providers are fee-for-service and/or capitation, single organisations are often paid by Diagnostic Related Groups (DRG) or an overall budget. These payment systems lack specific incentives to stimulate multidisciplinary collaboration. In fact, the incentive in a fee-for-service system is to increase production; a DRG system provides stronger incentives for producing DRGs than for appropriately addressing patient's needs within the DRG [33]. In reaction, new payment systems that intend to support collaboration between professionals and organisations have been introduced [25,26]. The simplest example hereof is pay-for-coordination, i.e., specific payments for support services that are not covered by the base payment systems [28]. A more comprehensive form with greater incentives to collaborate is bundled payment, i.e., a single payment that covers all services from different providers related

Please cite this article in press as: Leijten FRM, et al. The SELFIE framework for integrated care for multi-morbidity: Development and description. Health Policy (2017), http://dx.doi.org/10.1016/j.healthpol.2017.06.002

to a particular disease or episode during a defined period of time [28]. In the Netherlands bundled payment for the care for frail elderly, covering care provided by various disciplines (GP, geriatrician, occupational therapist, pharmacist) is being piloted [112]. The most comprehensive form to date are population-based payment frameworks involving the definition of a virtual budget that is based on the case mix of the catchment population. When the actual costs of this target population are lower than the expected costs, based on either historical data or norm-costs, the savings can be shared between professionals and organisations involved. An example of a shared savings contract applied in a population-based integrated care approach is that of Gesundes Kinzigtal in Germany [113].

Several blended payment systems can be identified that are complemented with pay-for-performance financial incentives to improve quality of care and control costs. There is evidence that the success of such arrangements depends on the details, such as the choice of quality indicators, the definition of the targets (absolute, relative, mixed), the size of the bonus or perhaps the penalty, and the receiver of the bonus/penalty (the individual provider or group of providers/organisation)[23,24].

To avoid providers running higher risks for treating persons with multi-morbidity, it is of great importance that there is adequate adjustment for differences in case-mix – this may also reduce adverse selection and cream-skimming. Such risk adjustment is particularly relevant for payment systems based on patient or population characteristics like capitation, bundled payment, and population-based payments [33]. Without adequate case-mix adjustment in integrated care, especially for persons with multi-morbidity, there is the potential of 'upcoding', that might allow a provider to spend more time and resources on such complex cases. This is important to consider and underlines the importance of appropriate monitoring and data collection.

It has been argued that a basic level of financial security ('secured budget') for provider organisations is necessary to ensure a sustainable commitment to providing person-centred integrated care for persons with multi-morbidity [33,36]. This may require longer-term contracting. Part of this is the recognition that not only the costs of routine delivery of integrated care should be covered, but also the costs of development and implementation. It helps if there is a clear business-case for each provider that accounts for economies of scale and scope [22].

3.2.5.3. Macro.

The specific provider payment systems discussed above are embedded in a national or regional financial system for health and social care. Governmental recognition that innovative payment systems can be developed specifically to stimulate integrated care is important, because that may stimulate more systematic development, research, and evaluation of such systems. When distributing scarce resources at macro-level, governments can decide to prioritise developments that benefit integrated care for multi-morbidity, including an increased focus on prevention and community resources [11,31,87]. Ensuring equal access and safeguarding equity is a macro-level responsibility that can be taken up by generous coverage and specific action plans to reach out to individuals from lower socio-economic classes who suffer from more morbidities but may be more difficult to reach. Furthermore, stimulating investments in innovative care models, such as those spanning across health- and social care or start-up funding's, may be needed at a national or regional level.

3.2.6. Technologies & medical products

This component is closely tied to the 'Information & research' component. The difference is that the current component stresses the need for technologies & medical products to be developed, user-friendly, and available to support care processes. The next component (Information & research) stresses using the collected information successfully in the care process, and conducting research.

3.2.6.1. Micro.

Information and communications technology (ICT) can be a facilitator of integrated and coordinated care, but is not necessarily a prerequisite [32,71]. The use of technology should be tailored to the multi-morbid person's abilities. Examples of ICT applications at the micro level include electronic medical records (EMRs) and patient portals. EMRs are pointed out in the literature as being supportive in facilitating information exchange between professionals, organisations, patients, and informal caregivers [37,85], linking clinical and management information [49], improving communication [84], allowing for flexible access to up-to-date data [49,74], proactively finding persons with multi-morbidity [39,46], tracking progress and change [46,49,60], and providing reminder prompts [60]. Patient portals can promote self-management and prioritization [37,72]. As ideally patient portals should be linked to EMRs, agreements need to be made with the patient about which professionals have permission to access the EMR [39].

E-health tools or telemedicine can contribute to the ability of persons with multi-morbidity to live an independent life in their own home with improved distant care facilities [34]. For persons still living at home this can include assistive technologies such as activity observation or fall detection [114]. Furthermore, e-health tools often aim to improve and monitor self-management, for example via web-based and telephone consultations, reminder systems [for medication intake], and remote monitoring of clinical indicators such as blood pressure, blood sugar, muscle strength, oxygen level, and lung function [83,110,115,116].

3.2.6.2. Meso.

Considering the multiple providers and care settings involved, a shared information system (e.g., EMRs including care plans) that is accessible by multiple professionals can greatly facilitate communication, person-centeredness, tailored care, and care coordination [16,21,48,51,62,74,111,115]. Such shared information systems can support continuity of care between organisations and throughout the care process [41,74,81,87,117]. The different ICT systems used by different organisations involved in the care process of a person with multi-morbidity underline the need to develop interoperable systems or linked information systems.

3.2.6.3. Macro.

Nationwide policies that foster technological development and innovation, especially with regard to ICT and e-health will likely benefit integrated care for multi-morbidity [34]. Furthermore, the availability of and equitable access to technologies mentioned before (e.g., remote monitoring systems, internet in rural areas) as well as other innovative and effective medical products (e.g., personalized medicine, miniaturized pace makers, insulin pumps, pharmaceuticals, imaging technologies) are important to improve the quality of life of persons with multi-morbidity [31].

3.2.7. Information & research

3.2.7.1. Micro.

Individual level data should be effectively used in the care process. Specifically for continuity of care this can include notifications of emergency department visits to the core team of professionals [71] and sharing medicine-related information [78] and information about hospital discharge is shared with primary care providers and pharmacists [114]. Collected data can be used for individual risk prediction that can contribute to pro-active care with early treatment of risk factors. Examples of how technology can aid this include a 'patient journey record' in which early detection of

Please cite this article in press as: Leijten FRM, et al. The SELFIE framework for integrated care for multi-morbidity: Development and description. Health Policy (2017), http://dx.doi.org/10.1016/j.healthpol.2017.06.002

adverse changes can prompt care [118] and computerized algorithms that recommend care pathways [51].

3.2.7.2. Meso.

When information is shared and used by multiple persons and providers, data ownership and protection need to be considered. Linked information systems whereby different professionals or care organisations have different levels of access to data depending on the case at hand could be considered. There are also more pragmatic approaches such as having professionals posted at one-another's sites to allow for access.

Information collected may further be used for risk stratification both at the individual and group level. Triage systems and predictive modelling, for example based on EMR and questionnaire data, can stratify patients into different levels of complexity in order to match care and estimate future care needs [81,86]. Such stratification can also inform future capacity planning [38,71] and budget planning [33].

Innovative research [methods] in the field of integrated care and multi-morbidity could assist in increasing the evidence-base of complex interventions and bringing research findings into practice [57,103]. In order to adopt a holistic approach to individuals with multi-morbidity in research, using a life course perspective [119] or applying sequence clustering might be interesting future directions [120]. Different integrated care programmes for multi-morbidity exist (see Struckmann et al., submitted), however, evaluation methods are heterogeneous and findings mixed [10,56,102]. Attributing causality is difficult in evaluations of such complex interventions where there are frequently no control groups or standard outcome indicators [32,87,91,97]. However, advanced statistical analyses and innovative study designs are being proposed to improve the evidence-base. Multidisciplinary research is called for that incorporates the perspectives of different groups of stakeholders, such as persons with multi-morbidity and their informal caregivers [12,97,105]. There is also a need to develop indicators that are particularly relevant for the care of persons with multi-morbidity, for example indicators related to the level of integration between health and social care, continuity of care, and polypharmacy.

3.2.7.3. Macro.

Alongside data ownership at the meso level, privacy and data protection legislation with regard to information sharing between multiple organisations is an important consideration [34]. Furthermore, policies that stimulate research in the field of integrated care and multi-morbidity (e.g. national research programmes) can benefit innovation, care, and ultimately persons with multi-morbidity.

Access to information may be an important issue in particular for persons with multi-morbidity. Disease-specific information can be easily found on the internet, but information on navigating the care system (e.g., who to see when and for what, who is responsible, what is [not] covered in an insurance package) is more difficult to find and is in turn important for motivation, adherence, and self-management. The media may be an increasingly important means to promote access to information and promoting health literacy.

3.2.8. Monitoring

An important element that relates to the six components and in particular to information and research, is monitoring of the triple aim of integrated care, i.e., simultaneously improving population health, improving patient experience, and reducing cost (increase) [121,122]. Monitoring can take place at the core of the framework, and the micro, meso, and macro levels and can function as a means of providing feedback and stimulating constant improvement. [19,21]. At the core and micro levels, this can pertain to pro-active monitoring of changes between face to face encounters [88,115] and the monitoring of care plans [73], self-management [82], clinical indicators [79], and preferences [66]. Monitoring these factors repeatedly can ensure that care remains tailored and matches needs [45,66,104]. At the meso level, continuous monitoring using a quality improvement system can aid performance-based management and pay-for-performance, and can provide information on organisational and structural integration that may lead to optimization in processes [31,68]. At the macro level, monitoring can support information on the workforce-demography match and provide epidemiological data on the prevalence and incidence of multi-morbidity in society.

4. Discussion

The framework presented in this article structures relevant concepts and elements of integrated care for multi-morbidity that were identified in the literature and through international expert meetings of five stakeholder groups, i.e., patients, partners and informal caregivers, professionals, payers, and policy makers. By connecting concepts and grouping them into six components with three levels per component, and adding and highlighting issues particularly relevant for multi-morbidity, a comprehensive framework that will hopefully show to be applicable in different contexts was developed. The concepts at each level and within each component should contribute to the development and (re-)organisation of integrated care models. Integrated care, as the framework shows, is not a noun, but instead is an active process that spans across different healthcare sectors (e.g., primary, secondary, tertiary), between health- social- and community sectors, and can also go beyond these to include churches, employers, housing, local communities, and education.

The framework can be used as a starting point to systematically describe integrated care programmes for multi-morbidity *(micro-meso)* and their respective target groups (*the core*) within their respective contexts (*meso-macro*). Such structured descriptions can aid comparison across programmes by making variations at all levels and components explicit and can provide input for designing evaluations of integrated care programmes for multi-morbidity.

As can be seen by the length of the descriptions and number of references per component, level, and concept described in the framework, most findings in the scientific literature pertained to the core, micro levels, and the service delivery component. Much less literature was found on macro level legislation and policies to support integrated care and on financing. This could be due to the broad search terms used, but also reflects that these topics are less frequently addressed in the scientific literature. Furthermore, as the scientific literature search was restricted to the English language, national policy described in non-English journals may be missing. However, the grey literature and stakeholder advisory board meetings allowed for cross-national insights on all concepts of the framework. We consider the use of multiple methods in the development of the framework a major asset to this study. A further strength of the presented framework is that concepts at the macro level are described that are relevant in integrated care for multi-morbidity, these can be considered when addressing transferability and [larger-scale] implementation.

It is important to note that the framework does not constitute a set of evidence-based guidelines on how to design the ideal integrated care programme for multi-morbidity, nor is it a recipe for reform. We explicitly choose not to try to weigh the importance of various concepts in the framework because the strength of evidence varies. Moreover, the appropriate mix of components in integrated care is largely driven by the local context, the existing health and social care service delivery system, the existing barriers and the specific political, legal, and financial constraints, at all levels of the framework. We do note, however, that normative statements are

Please cite this article in press as: Leijten FRM, et al. The SELFIE framework for integrated care for multi-morbidity: Development and description. Health Policy (2017), http://dx.doi.org/10.1016/j.healthpol.2017.06.002

made – some concepts are generally seen as relevant and important in integrated care.

Throughout the iterative process of developing the framework, several topics led to debate, for instance on the expected role of the individual with multi-morbidity and the informal caregiver throughout the care process. We decided to highlight the importance of understanding the entire situation of the individual with multi-morbidity, including his/her social network, and subsequently tailoring care as appropriate.

Furthermore, there was some debate as to whether concepts included in the framework should be evidence-based. We realized, however, that the body of literature on the effectiveness of integrated care programmes for multi-morbidity was still too limited. We therefore decided to include concepts that were deemed relevant based on experts' opinions or because a logical mechanism of action was presented.

Fortunately, the interest and evidence in this field is growing rapidly. We conducted an updated search for the period between October 2015 and March 2017 in one database, i.e., PubMed, which resulted in 330 new hits, and 17 potentially relevant articles. These articles seem to reiterate and support the concepts already highlighted in the SELFIE framework. We plan to update the SELFIE framework in the future. This will be done on the basis of the grey and scientific literature, as well as on the evaluations of 17 integrated care programmes for multi-morbidity that are currently being evaluated in the SELFIE project.

Parallel to the development of our framework, the Multimorbidity Care Model was developed by the EU Joint Action on chronic diseases and healthy ageing across the life cycle (JA-CHRODIS) [123,124]. This model identifies 16 components of integrated care for multi-morbidity which are all covered in the SELFIE framework. The SELFIE framework includes a wider range of concepts and structures them in a different form and encompasses an explicit layering of the micro, meso, and macro levels. Both the SELFIE framework and the JA-CHRODIS model provide important insights for the development, organisation, and evaluation of integrated care for multi-morbidity.

5. Conclusion

The presented framework builds upon existing frameworks on integrated and person-centred care and systematically addresses integration of care at the micro, meso, and macro level according to the six key [WHO] components. The framework's usability will be tested in describing various integrated care programmes for multi-morbidity in eight European countries and will guide the development of an analytical evaluation framework for these programmes.

Acknowledgements

We would like to acknowledge the SELFIE International Stakeholder Advisory Board and the SELFIE National Stakeholder Advisory Boards from the Netherlands, Austria, Croatia, Germany, Hungary, Norway, Spain, and the United Kingdom for their reflections and contributions to the framework development. We would like to thank Judith Gulpers, Gusta Drenthe, and Anne Spranger for their help with the scoping review and Maaike Vergouwen for helping design the framework. The SELFIE project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 634288. The content of this publication reflects only the SELFIE groups' views and the European Commission is not liable for any use that may be made of the information contained herein.

References

[1] Fortin M, Bravo G, Hudon C, Lapointe L, Almirall J, Dubois MF, et al. Relationship between multi-morbidity and health-related quality of life in patients in primary care. Quality of Life Research 2006;15(1):83–91.
[2] Menotti A, Mulder I, Nissinen A, Giampaoli S, Feskens EJ, Krombout D. Prevalence of morbidity and multimorbidity in elderly male population and their impact on 10-year all-cause mortality: the FINE study (Finland, Italy, Netherlands,Elderly). Journal of Clinical Epidemiology 2001;54(7):680–6.
[3] Hopman P, Heins MJ, Rijken M, Schellevis FG. Health care utilization of patients with multiple chronic diseases in The Netherlands: differences and underlying factors. European Journal of Internal Medicine 2015;26(3):190–6.
[4] Leijten FRM, van den Heuvel SG, Ybema JF, Robroek SJ, Burdorf A. Do work factors modify the association between chronic health problems and sickness absence among older employees? Scandinavian Journal of Work, Environment and Health 2013;39(5):477–85.
[5] Jason KJ, Carr CD, Washington TR, Hilliard TS, Mingo CA. Multiple chronic conditions, resilience, and workforce transitions in later life: the Socio-Ecological Model. Gerontologist 2015;(July 25) (online first).
[6] van Oostrum SH, Picavet HSJ, van Gelder BM, Lemmens LC, Hoeymans N, van Dijk CE, et al. Multimorbidity and comorbidity in the Dutch population –data from general practices. BMC Public Health 2012;12:715.
[7] Barnett K, Mercer SW, Norbury M, Watt G, Wyke S, Guthrie B. Epidemiology of multimorbidity and implications for health care, research, and medical education: a cross-sectional study. The Lancet 2012;380(9836):37–43.
[8] Glynn LG, Valderas JM, Healy P, Burke E, Newell J, Gillespie P, et al. The prevalence of multimorbidity in primary care and its effects on health care utilization and costs. Family Practice 2011;28(5):516–23.
[9] Vogeli C, Shields AE, Lee TA, Gibson TB, Marder WD, Weiss KB, et al. Multiple chronic conditions: prevalence, health consequences, and implications for quality, care management, and costs. Journal of General Internal Medicine 2007;(Suppl. 3):391–5.
[10] van der Heide I, Snoeijs S, Melchiorre MG, Quattribi S, Boerma W, Schellevis VF, et al. Innovating care for people with multiple chronic conditions in Europe: An overview. Utrecht, the Netherlands: ICARE4EU, NIVEL; 2015.
[11] World Health Organization. WHO global strategy on people-centred and integrated health services: Interim Report. Geneva: WHO; 2015.
[12] de Bruin SR, Versnel N, Lemmens LC, Molema CC, Schellevis FG, Nijpels G, et al. Comprehensive care programs for patients with multiple chronic conditions: a systematic review. Health Policy 2012;107(2-3):108–45.
[13] Smith SM, Soubhi H, Fortin M, Hudon C, O'Dowd T. Managing patients with multi-morbidity: systematic review of interventions in primary care and community settings. British Medical Journal 2012;345:e5205.
[14] France EF, Wyke S, Gunn JM, Mair FS, McLean G, Mercer SW. Multimorbidity in primary care: a systematic review of prospective cohort studies. British Journal of General Practice 2012;62(597):297–307.
[15] Mercer SW, Smith SM, Wyke S, O'Dowd T, Watt GC. Multimorbidity in primary care: developing the research agenda. Family Practice 2009;26(2):79–80.
[16] Wagner EH, Austin BT, Von Korff M. Organizing care for patients with chronic illness. Milbank Quarterly 1996;74(4):511–44.
[17] Armstrong R, Hall BL, Doyle J, Waters E. 'Scoping the scope' of a Cochrane review. Journal of Public Health 2011;33(1):145–50.
[18] WHO. Key components of a well functioning health system. Geneva: WHO; 2010.
[19] Boult C, Karm L, Groves C. Improving chronic care: the 'Guided care' model. The Permanente Journal 2008;12(1):50–4.
[20] Minkman MMN, Vermeulen RP, Ahaus KTB, Huijsman R. The implementation of integrated care: the empirical validation of the Development Model for Integrated Care. BMC Health Services Research 2011;11:177.
[21] Minkman MMN, Ahaus KTB, Huijsman R. A four phase development model for integrated care services in the Netherlands. BMC Health Services Research 2009;9:42.
[22] Tsiachristas A. Hipple Waters B, Adams SA, Mölken MP: Identifying and explaining the variability in development and implementation costs of disease management programs in the Netherlands. BMC Health Services Research 2014;14:518.
[23] Eijkenaar F, Emmert M, Scheppach M, Schöffski O. Effects of pay for performance in health care: a systematic review of systematic reviews. Health Policy 2013;110(2–3):115–30.
[24] Van Herck P, Annemans L, De Smedt D, Remmen R, Sermeus W. Pay-for-performance step-by-step: introduction to the MIMIQ model. Health Policy 2011;102(1):8–17.
[25] Tsiachristas A, Hipple-Walters B, Lemmens KMM, Nieboer AP, Rutten-van MP. Towards integrated care for chronic conditions: Dutch policy developments to overcome the (financial) barriers. Health Policy 2011;101(2):122–32.
[26] Tsiachristas A, Dikkers C, Boland MR, Rutten-van MP. Impact of financial agreements in European chronic care on health care expenditure growth. Health Policy 2016;120(4):420–30.
[27] Tsiachristas A, Wallenburg I, Bond CM, Elliot RF, Busse R, van Exel J, et al. Costs and effects of new professional roles: evidence from a literature review. Health Policy 2015;119(9):1176–87.
[28] Tsiachristas A, Dikkers C, Boland MR, Rutten-van Mölken MP. Exploring payment schemes used to promote integrated chronic care in Europe. Health Policy 2013;113(3):296–304.

Please cite this article in press as: Leijten FRM, et al. The SELFIE framework for integrated care for multi-morbidity: Development and description. Health Policy (2017), http://dx.doi.org/10.1016/j.healthpol.2017.06.002

[29] Coulter A, Entwistle VA, Eccles A, Ryan S, Shepperd S, Perera R. Effects of personalised care planning for people with long-term conditions. Cochrane 2015;3:CD010523.
[30] Légaré F, Stacey D, Turcotte S, Cossi MJ, Kryworuchko J, Graham ID, et al. A review of the ways in which healthcare professionals can be helped to involve their patients in the healthcare decision making process. Cochrane 2014;9:D006732.
[31] WHO. World Report on Ageing and Health. Luxembourg: WHO; 2015.
[32] Goodwin N, Dixon A, Anderson G, Wodchis W. Providing integrated care for older people with complex needs: Lessons from seven international case studies. London: The King's Fund; 2014.
[33] Struckmann V, Quentin W, Busse R, van Ginneken E. How can we strengthen financing methods to promote care for people with multiple chronic conditions in Europe? European Observatory on Health Systems and Policies 2017;24.
[34] Barbabella F, Melchiorre MG, Quattrini S, Papa R, Lamura G. How can we strengthen eHealth in caring for people with multi-morbidity in European countries? European Observatory on Health Systems and Policies 2017;25.
[35] Struckmann V, Boerma W, van Ginneken E. Innovating care for people with multiple chronic conditions in Europe: The Gesundes Kinzigtal programme, Germany. Berlin, Germany: ICARE4EU, Technical University Berlin; 2015.
[36] Struckmann V, Barbabella F, Dimova A, van Ginneken E. Innovating care for people with multiple chronic conditions in Europe: Regional non-profit organisation (NPO) Diabetic care Burgas, Bulgaria. Berlin, Germany: ICARE4 EU, Technical University Berlin; 2015.
[37] Onder G, Palmer K, Navickas R, Jurevičienė E, Mammarella F, Strandzheva M, et al. Time to face the challenge of multimorbidity: a European perspective from the joint action on chronic diseases and promoting healthy ageing across the life cycle (JA-CHRODIS). European Journal of Internal Medicine 2015;26(3):157–9.
[38] ACT. What does it take to make integrated care work?: A 'cookbook' for large-scale deployment of coordinated care and telehealth. A personalised approach that will benefit patients in your organisation. ACT; 2015.
[39] National Clinical Guideline Centre. Draft for Consultation: Multimorbidity: clinical assessment and management. NICE guideline; 2016.
[40] Bayliss EA, Bonds DE, Boyd CM, Davis MM, Finke B, Fox MH, et al. Understanding the context of health for persons with multiple chronic conditions: moving from what is the matter to what matters. Annals of Family Medicine 2014;12(3):260–9.
[41] Findley PA. Social work practice in the chronic care model: chronic illness and disability care. Journal of Social Work 2014;14(1):83–95.
[42] Fabbricotti IN, Janse B, Looman WM, de Kuijper R, van Wijngaarden JD, Reiffers A. Integrated care for frail elderly compared to usual care: a study protocol of a quasi-experiment on the effects on frail elderly, their caregivers, health professionals and health care costs. BMC Geriatrics 2013;13:31.
[43] Boult C, Wiland GD. Comprehensive primary care for older patients with multiple chronic conditions: nobody rushes you through. The Journal of the American Medical Association 2010;304(17):1936–43.
[44] Sampalli T, Fox RA, Dickson R, Fox J. Proposed model of integrated care to improve health outcomes for individuals with multimorbidity. Patient Prefer Adherence 2012;6:757–64.
[45] Morgan MA, Coates MJ, Dunbar JA. Using care plans to better manage multimorbidity. Australasian Medical Journal 2015;8(6):208–15.
[46] Lin EHB, Von Korff M, Peterson D, Ludman EJ, Ciechanowski P, Katon W. Population targeting and durability of multimorbidity collaborative care management. American Journal of Managed Care 2014;20(11):887–985.
[47] Landi F, Lattanzio F, Gambassi G, Zuccalà G, Sgadari A, Panfilo M, et al. A model for integrated home care of frail older patients: the Silver Network project. Aging 1999;11(4):262–72.
[48] Ivbijaro GO, Enum Y, Kahn AA, Lam SS, Gabzdyl A, et al. Collaborative care: models for treatment of patients with complex medical-psychiatric conditions. Current Psychiatry Reports 2014;16(11):506.
[49] Hébert R, Durand PJ, Dubuc N, Tourigny A. PRISMA Group Frail elderly patients. New model for integrated services delivery. Canadian Family Physician 2003;49:992–7.
[50] Fortin M, Chouinard MC, Bouhali T, Dubois MF, Gagnon C, Bélanger M. Evaluating the integration of chronic disease prevention and management services into primary health care. BMC Health Services Research 2013;13:132.
[51] Dubuc N, Bonin L, Tourigny A, Mathieu L, Couturier Y, Tousignant M, et al. Development of integrated care pathways: towards a care management system to meet the needs of frail and disabled community-dwelling older people. International Journal of Integrated Care 2013;13:e107.
[52] Huber M, Knottnerus JA, Green J, van der Horst H, Jadad AR, Kromhout D, et al. How should we define health? British Medical Journal 2011;343:d4163.
[53] Huber M, van Vliet M, Giezenberg M, Winkens B, Heerkens Y, Dagnelie PC, et al. Towards a 'patient-centred' operationalisation of the new dynamic concept of health: a mixed methods study. British Medical Journal Open 2016;6(1):e010091.
[54] Morrin L, Britten J, Davachi S, Knight H. Alberta Healthy Living Program –a model for successful integration of chronic disease management services. Canadian Journal of Diabetes 2013;37(4):254–9.
[55] Sen A. Capability and well-being ?in Quality of Life. In: Nussbaum M, Sen A, editors. Oxford, UK: Clarendon Press; 1993.
[56] Singer SJ, Burgers J, Friedberg M, Rosenthal MB, Leape L, Schneider E. Defining and measuring integrated patient care: promoting the next frontier in health care delivery. Medical Care Research and Review 2011;68(1):112–27.
[57] Oni T, McGrath N, BeLue R, Roderick P, Colagiuri S, May CR, et al. Chronic diseases and multi-morbidity –a conceptual modification to the WHO ICCC model for countries in health transition. BMC Public Health 2014;14:575.
[58] Bayliss EA, Bosworth HB, Noel PH, Wolff JL, Damush TM, Mciver L. Supporting self-management for patients with complex medical needs: recommendations of a working group. Chronic Illness 2007;3(2):167–75.
[59] Corser W, Dontje K. Self-management perspectives of heavily comorbid primary care adults. Professional Case Management 2011;16(1):6–15.
[60] Corser WD. Increasing primary care comorbidity: a conceptual research and practice framework. Research and Theory for Nursing Practice 2011;25(4):238–51.
[61] Lorig K. Chronic diseases self-management: a model for tertiary prevention. American Behavioral Scientist 1996;39(6):676–83.
[62] Calciolari S, Illinca S. Comparing (and learning from) integrated care initiatives: an analytical framework. International Journal of Integrated Care 2011;19(6):4–13.
[63] Coventry PA, Fisher L, Kenning C, Bee P, Bower P. Capacity, responsibility, and motivation: a critical qualitative evaluation of patient and practitioner views about barriers to self-management in people with multi-morbidity. BMC Health Services Research 2014;14(536).
[64] American Geriatrics Society Expert Panel on the Care of Older Adults with Multimorbidity. Patient-centered care for older adults with multiple chronic conditions: a stepwise approach from the American Geriatrics Society: american Geriatrics Society Expert Panel on the Care of Older Adults with Multimorbidity. Journal of the American Geriatrics Society 2012;60(10):1957–68.
[65] Boyd CM, Fortin M. Future of multimorbidity research: how should understanding of multimorbidity inform health system design? Public Health Reviews 2011;32(2):451–74.
[66] Muth C, van den Akker M, Blom J, Mallen CD, Rochon J, Schellevis FG, et al. The Ariadne principles: how to handle multimorbidity in primary care consultations. BMC Medicine 2014;12:223.
[67] Allen KR, Hazelett SE, Radwany S, Ertle D, Fosnight SM, Moore PS. The promoting effective advance care for elders (PEACE) randomized pilot study: theoretical framework and study design. Population Health Management 2012;15(2):71–7.
[68] Béland F, Bergman H, Lebel P, Dallaire L, Fletcher J, Contandriopoulos AP, et al. Integrated services for frail elders (SIPA): a trial of a model for Canada. Canadian Journal on Aging 2006;25(1):5–42.
[69] Amblàs-Novellas J, Espaulella J, Rexach L, Fontecha B, Inzitari M, Blay C, et al. Frailty, severity, progression and shared decision-making: a pragmatic framework for the challenge of clinical complexity at the end of life. European Geriatric Medicine 2015;6(2):189–94.
[70] Berry LL, Rock BL, Smith Housekamp B, Brueggeman J, Tucker L. Care coordination for patients with complex health profiles in inpatient and outpatient settings. Mayo Clinic Proceedings 2013;88(2):184–94.
[71] Hong CS, Siegel AL, Ferris TG. Caring for high-need, high-cost patients: what makes for a successful care management program? Issue Brief Commonwealth Fund 2014;19:1–19.
[72] Grant RW, Adams AS, Bayliss EA, Heisler M. Establishing visit priorities for complex patients: a summary of the literature and conceptual model to guide innovative interventions. Healthcare (Amsterdam) 2013;1(3–4):117–22.
[73] Eng C, Pedulla J, Eleazer GP, McCann R, Fox N. Program of All-inclusive Care for the Elderly (PACE): An innovative model of integrated geriatric care and financing. Journal of the American Geriatrics Society 1997;45(2):223–32.
[74] Dorr DA, Wilcox A, Burns L, Brunker CP, Narus SP, Clayton PD. Implementing a multidisease chronic care model in primary care using people and technology. Disease Management 2006;9(1):1–15.
[75] Bird SR, Kurowski W, Dickman GK, Kronborg I. Integrated care facilitation for older patients with complex health care needs reduces hospital demand. Australian Health Review 2007;31(3):451–61.
[76] Reeve J, Blakeman T, Freeman G, Green LA, James PA, Lucassen P, et al. Generalist solution to complex problems: generating practice-based evidence –the example of managing multi-morbidity. BMC Family Practice 2013;14:112.
[77] Soubhi H, Bayliss EA, Fortin M, Hudon C, van den Akker M, Thivierge R, et al. Learning and caring in communities of practice: using relationships and collective learning to improve primary care for patients with multimorbidity. Annals of Family Medicine 2010;8(2):170–7.
[78] Roughead EE, Vitry AI, Caughey GE, Gilbert AL. Multimorbidity, care complexity and prescribing for the elderly. Aging Health 2011;7(5):695–705.
[79] Yardley S, Cottrell E, Rees E, Protheroe J. Modelling successful primary care for multimorbidity: a realistic synthesis of successes and failures in concurrent learning and healthcare delivery. BMC Family Practice 2015;16:23.
[80] Knowles SE, Chew-Graham C, Adeyemi I, Coupe N, Coventry PA. Managing depression in people with multimorbidity: a qualitative evaluation of an integrated collaborative care model. BMC Family Practice 2015;16:32.
[81] Spoorenberg SLW, Uittenbroek RJ, Middel B, Kremer BP, Reijneveld SA, Wynia K. Embrace, a model for integrated elderly care: study protocol of a randomized controlled trial on the effectiveness regarding patient outcomes, service use, costs, and quality of care. BMC Geriatrics 2013;13:62.
[82] Coventry P, Lovell K, Dickens C, Bower P, Chew-Graham C, McElvenny D, et al. Integrated primary care for patients with mental and physical multimorbidity: cluster randomised controlled trial of collaborative care for patients with depression comorbid with diabetes or cardiovascular disease. British Medical Journal 2015;350:h638.

Please cite this article in press as: Leijten FRM, et al. The SELFIE framework for integrated care for multi-morbidity: Development and description. Health Policy (2017), http://dx.doi.org/10.1016/j.healthpol.2017.06.002

[83] Ridgeway JL, Egginton JS, Tiedje K, Linzer M, Boehm D, Poplau S, et al. Factors that lessen the burden of treatment in complex patients with chronic conditions: a qualitative study. Patient Prefer Adherence 2014;8:339–51.
[84] Harris MF, Dennis S, Multimorbidity Pillay M. Negotiating priorities and making progress. Australian Family Physician 2013;42(12):850–4.
[85] Lalonde L, Goudrea J, Hudon E, Lussier MT, Duhamel F, Bélanger D, et al. Priorities for action to improve cardiovascular preventive care of patients with multimorbid conditions in primary care –a participatory action research project. Family Practice 2012;29(6):733–41.
[86] Boyd CM, Boult C, Shadmi E, Leff B, Brager R, Dunbar L, et al. Guided care for multimorbid older adults. Gerontologist 2007;47(5):697–704.
[87] Parekh AKGRA, Gordon C, Koh HK. HHS Interagency Workgroup on Multiple Chronic Conditions. Managing multiple chronic conditions: a strategic framework for improving health outcomes and quality of life. Public Health Reports 2011;126(4):460–71.
[88] Piette JD, Richardson C, Valenstein M. Addressing the needs of patients with multiple chronic illnesses: the case of diabetes and depression. American Journal of Managed Care 2004;10(2):152–62.
[89] Wu CJ, Chang AM. Application of a theoretical framework to foster a cardiac-diabetes self-management programme. International Nursing Review 2014;61(3):336–43.
[90] Béland F, Hollander MJ. Integrated models of care delivery for the frail elderly: international perspectives. Gaceta Sanitaria 2011;(Suppl. 2):138–46.
[91] Chan CL, You HJ, Huang HT, Ting HW. Using an integrated COC index and multilevel measurements to verify the care outcome of patients with multiple chronic conditions. BMC Health Services Research 2012;12(405).
[92] Summer MM, Engstrom G. Experience of self-management of medications among older people with multimorbidity. Journal of Clinical Nursing 2015;24(19–20):2757–64.
[93] Doos L, Bradley E, Rushton CA, Satchithananda D, Davies SJ, Kadam UT. Heart failure and chronic obstructive pulmonary disease multimorbidity at hospital discharge transition: a study of patient and carer experience. Health Expectations 2014;18(6):2401–12.
[94] Tracy CS, Bell SH, Nickell LA, Charles J, Upshur RE. The IMPACT clinic: innovative model of interprofessional primary care for elderly patients with complex care needs. Canadian Family Physician 2013;59(3):e148–55.
[95] Hjelm M, Holmgren AC, Willman A, Bohman D, Holst G. Family member of older persons with multi-morbidity and their experiences of case managers in Sweden: an interpretive phenomenological approach. International Journal of Integrated Care 2015;15:e011.
[96] Muntinga ME, Hoogendijk EO, van Leeuwen KM, van Hout HP, Twisk JW, van der Horst HE, et al. Implementing the chronic care model for frail older adults in the Netherlands: study protocol of ACT (frail older adults: care in transition). BMC Geriatrics 2012;12:19.
[97] Lefevre T, d'Ivernois JF, De Andrade V, Crozet C, Lombrail P, Gagnayre R. What do we mean by multimorbidity? An analysis of the literature on multimorbidity measures, associated factors, and impact on health services organization. Revue d'epidemiologie et de sante publique 2014;62(5):305–14.
[98] Luijks HD, Loeffen MJ, Lagro-Janssen AL, van Weel C, Lucassen PL, Schermer TR. GPs' considerations in multimorbidity management: a qualitative study. British Journal of General Practice 2012;62(600):e503–510.
[99] Smith SM, O'Kelly S, O'Dowd T. GPs' and pharmacists' experiences of managing multimorbidity: a 'Pandora's box'. British Journal of General Practice 2010;60(576):285–94.
[100] Uhlig K, Leff B, Kent D, Dy S, Brunnhuber K, Burgers JS, et al. A framework for crafting clinical practice guidelines that are relevant to the care and management of people with multimorbidity. Journal of General Internal Medicine 2014;29(4):670–9.
[101] Morello CM, Hirsch JD, Lee KC. Navigating complex patients using an innovative tool: the MTM Spider Web. Journal of the American Pharmaceutical Association 2013;53(5):530–8.
[102] Kodner DL. Whole-system approaches to health and social care partnerships for the frail elderly: an exploration of North American models and lessons. Health and Social Care in the Community 2006;14(5):384–90.
[103] Smith G, Clarke D. Assessing the effectiveness of integrated interventions: terminology and approach. Medical Clinics of North America 2006;90(4):533–48.
[104] Hamberger LK, Hindman M. Collaborative care of a patient with multiple, chronic physical and emotional health problems. Clinical Case Studies 2005;4:139–59.
[105] Kernick D. A theoretical framework for multimorbidity: from complicated to chaotic. British Journal of General Practice 2012;62(602):e659–662.
[106] Hujala A, Taskinen H, Rissanen S. How can we strengthen integration to promote care for people with multiple chronic conditions in Europe? European Observatory on Health Systems and Policies 2017;26.
[107] Stokes J, Panagioti M, Alam R, Checkland K, Cheraghi-Sohi S, Bower P. Effectiveness of case management for 'at risk' patients in primary care: a systematic review and meta-analysis. PUBLIC LIBRARY OF SCIENCE 2015;10(7):e0132340.
[108] Boyd CM, Shadmi E, Conwell LJ, Griswold M, Leff B, Brager R, et al. A pilot test of the effect of guided care on the quality of primary care experiences for multimorbid older adults. Journal of General Internal Medicine 2008;23(5):536–42.
[109] Tanio C, Chen C. Innovations at Miami practice shows promise for treating high-risk Medicare patients. Health Affairs 2013;32(6):1078–82.
[110] Silver G, Keefer JM, Rosenfeld P. Assisting patients to age in place: an innovative pilot program utilizing the Patient Centered Care Model (PCCM) in home care. Home Health Care Manag Pract 2011;6:446–53.
[111] Kadu M, Stolee P. Facilitators and barriers of implementing the chronic care model in primary care: a systematic review. BMC Family Practice 2015;16:12.
[112] Hoedemakers M, Leijten F, Boland M, Tsiachristas A, de Bont A, Bal R, et al. Thick description of Care Chain Frail Elderly (CCFE). Rotterdam, the Netherlands: SELFIE; 2016.
[113] Hildebrandt H, Hermann C, Knittel R, Richter-Reichhelm M, Siegel A, Witzenrath W. Gesundes Kinzigtal Integrated Care: improving population health by a shared health gain approach and a shared savings contract. International Journal of Integrated Care 2010;10(2).
[114] Pielawa L, Helmer A, Brell M, Hein A. Intelligent environments supporting the care of multi-morbid patients. A concept for patient-centered information management and therapy. 4th International Symposium on Applied Sciences in Biomedical and Communications Technologies 2011.
[115] Van Houdt S, Heyrman J, Vanhaecht K, Sermeus W, De Lepeleire J. An in-depth analysis of theoretical frameworks for the study of care coordination. International Journal of Integrated Care 2013;13:e204.
[116] Libby C, Dusseault JJ, Dahrouge S, Hogg W, Lemelin J, Humbert J. Telehomecare for patients with multiple chronic illnesses: pilot study. Canadian Family Physician 2008;54(1):58–65.
[117] Pietrantonio F, Orlandini F, Moriconi L, La Regina M. Acute Complex Care Model: an organizational approach for the medical care of hospitalized acute complex patients. European Journal of Internal Medicine 2015;26(10):759–65.
[118] Martin CM, Vogel C, Grady D, Zarabzadeh A, Hederman L, Kellett J, et al. Implementation of complex adaptive chronic care: the Patient Journey Record system (PaJR). Journal of Evaluation in Clinical Practice 2012;18(6):1226–34.
[119] Elder Jr GH, Johnson MK, Crosnoe R. The emergence and development of life course theory. In: Mortimer JT, Shanahan MJ, editors. Handbook of the life course. New York: Kluwer Academic/Plenum; 2003.
[120] Huang Z, Lu X, Duan H. On mining clinical pathway patterns from medical behaviors. Artificial Intelligence in Medicine 2012;56(1):35–50.
[121] Berwick DM, Nolan TW, Whittington J. The triple aim: care, health, and cost. Health Affairs 2008;27(3):759–69.
[122] Whittington JW, Nolan K, Lewis N, Torres T. Pursing the triple aim: the first 7-years. Milbank Quarterly 2015;93(2):263–300.
[123] Palmer A, Marengoni A, Forjaz MJ, Jureviciene E, Laatikainen T, Mammarella F, et al. Multimorbidity care model: recommendations from the consensus meeting of the joint action on chronic diseases and promoting healthy ageing across the life cycle (Ja-CHRODIS). Health Policy 2017 (this issue).
[124] Navickas R, Onder G, Jureviciene E, Gargalskaite U. Multimorbidity care model applicability assessment across different healthcare settings: JA-CHRODIS Task 3. JA-CHRODIS; 2016.

Please cite this article in press as: Leijten FRM, et al. The SELFIE framework for integrated care for multi-morbidity: Development and description. Health Policy (2017), http://dx.doi.org/10.1016/j.healthpol.2017.06.002