# Report on care pathways approaches for multimorbid chronic patients

Deliverable 7-02 of Joint Action CHRODIS

CHRODIS
ADDRESSING CHRONIC DISEASES & HEALTHY AGEING ACROSS THE LIFE CYCLE

Co-funded by the Health Programme of the European Union

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**Specific contributions are available inside this report.**

# Executive summary

The main objective of this report is to describe the activities performed by WP6 team in order to achieve the goal of D0702: Report on care pathways approaches for MM chronic patients. This document arises from two consecutive and progressive work phases corresponding, temporally, to TASK 2 (Objective: Review existing care (pathway) approaches for patients, M 1-12) and TASK 3 (Objecting: Assess and select good practices on management of multimorbid patients, M 13-24) activities from JA-CHRODIS WP6 that aim to "Development of common guidance and methodologies for care pathways for multimorbid patients". In the first part of this document we provide a descriptive overview of integrated comprehensive care programmes for frail patients with multimorbidity available across EU Member States and other European countries by means of the report "Innovative health care approaches for patients with multimorbidity in Europe" elaborated to state TASK2 activities and results. Three data sources were utilized to this work: 1) the so called: "JA-CHRODIS module": specific questions about care pathways, polypharmacy and patient adherence included in a survey among integrated care programmes identified by the ICARE4EU project (European project covering EU Member States, Iceland, Norway and Switzerland) led to collects additional data in line with the specific purpose of this project; 2) Care programmes traced by JA-CHRODIS WP6 partners; 3) Systematic review of international literature describing the effectiveness of integrated care programmes for people with multimorbidity. To gain insight into the effectiveness of integrated care programmes for multimorbid patients a systematic literature review was performed.

In addition, we include also a focus on "Healthcare utilization and costs" to provide a deeper description of the work done to approach this issue and synthesize findings. In the second part, we discuss around the list of twenty components deriving from existing comprehensive care programmes by the mean of the report "Multimorbidity care model: Recommendations from the consensus meeting of the Joint Action on Chronic Diseases" in Chapter 2 prepared to summarize activities, finding and conclusions with regard to TASK 3. We describe the components that were present in one or more care programmes previously identified, either in isolation or combined. Then, based on a dedicated expert discussion, from the initial list of

components, sixteen were selected and discussed in depth. It came out as to improve quality (in terms of clinical outcomes and quality from the patient perspective) and sustainability (in terms of financial and human resources) of care, reforming the way in which healthcare is provided to patients with multimorbidity is essential. Integrated care shows the potential to respond to the challenge of providing good qualitative and sustainable care to patients with multimorbidity. The ideal model of integrated care is patient-centered, proactive and well-coordinated multidisciplinary care, using new technologies to support patients' self-management and improve collaboration between caregivers. This report shows that integrated care programmes are seen as key for the improvement of care for multimorbid patients in Europe. The integrated care programmes share the following common elements: patient-centeredness, an emphasis on coordination of care, improvement of collaboration between (multidisciplinary) caregivers and a focus on outcomes. These programmes involve different disciplines (professional caregivers and/or informal carers) and organisations, and many programmes include the assignment of a case manager for patients. Little is known about the outcomes or effectiveness of integrated care programmes for patients with multimorbidity, mainly because many of these integrated care programmes have recently started and are not thoroughly evaluated yet. However, to date, in those few studies that have been evaluated (in non-controlled designs) in European countries, positive associations were found between participation in integrated care programmes and multimorbid patients' quality of life, patient' satisfaction with the care received, better care planning and referral for patients as well as more appropriate prescribing of medicines and/or a decrease in hospital care utilization or outpatient visits. So far, it is unknown which (sub)groups of patients benefit the most from integrated care programmes. In this respect, further research is needed. We conclude that in many European countries developments exist to reform healthcare delivery for patients with multimorbidity by developing and implementing integrated care programmes.

Note: These are not identical copy of task 2 and 3 report since we made minor changes in order to harmonise the two documents.

# CHAPTER 1

# TASK 2 REPORT – Review existing care (pathway) approaches for multimorbid patients

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This report arises from the Joint Action on chronic diseases and promoting healthy ageing across the life cycle (JA-CHRODIS), which has received funding from the European Union in the framework of the Health Programme (2008-2013). NIVEL has also received funding from the Netherlands Ministry of Health, Welfare and Sports to contribute to this Joint Action.

Data used in this report have been collected in collaboration with partners of the project Innovating care for people with multiple chronic conditions in Europe (ICARE4EU), also co-funded by the EU Health Programme 2008-2013: INRCA, Italian National Institute of Health and Science on Aging, Italy; NIVEL, Netherlands Institute for Health Services Research, the Netherlands; TUB, Technische Universität Berlin, Germany; UEF, University of Eastern Finland, Finland. In addition, partners participating in JA-CHRODIS work package 6 provided data for this report. We would like to thank all ICARE4EU and WP6 partners as well as all participants in the ICARE4EU survey for their contribution to this report.

# Summary

This report provides a descriptive overview of integrated care programmes for patients with multimorbidity that have been developed and implemented in EU Member States and other European countries. Healthcare systems in European countries are facing multiple challenges, such as an ageing population, an increase in people suffering from multimorbidity, and limited financial and human resources for care. Furthermore, most care for patients suffering from multimorbidity is fragmented and disease-specific. To improve quality (in terms of clinical outcomes and quality from the patient perspective) and sustainability (in terms of financial and human resources) of care, reforming the way healthcare is provided to patients with multimorbidity is essential. Integrated care has the potential to respond to the challenge of providing good qualitative and sustainable care to patients with multimorbidity. Integrated care is patient-centered, proactive and well-coordinated multidisciplinary care, using new technologies to support patients' self-management and improve collaboration between caregivers.

Integrated care programmes for patients with multimorbidity in Europe

This report shows that integrated care programmes are seen as key for the improvement of care for multimorbid patients in Europe. We traced 119 care programmes targeting patients with multimorbidity that can be characterised as integrated care programmes. Most integrated care programmes within healthcare for patients with multimorbidity can be found in Spain (n=22), and are, irrespective of the country, (planned to be) implemented on a local or regional level (n=94). The integrated care programmes share the following common elements: patient-centeredness, an emphasis on coordination of care, improvement of collaboration between (multidisciplinary) caregivers and a focus on outcomes. These programmes involve different disciplines (professional caregivers and/or informal carers) and organisations, and many programmes include the assignment of a case manager for patients. Many care programmes include a care pathway (n=76), address polypharmacy (n=62) and/or patient adherence (n=67). A substantial number of integrated care programmes specifically focus on frail elderly (n=47).

Lack of evidence from integrated care programmes addressing multimorbidity.

Little is known about the outcomes or effectiveness of integrated care programmes for patients with multimorbidity. This is mainly because many of these integrated care programmes have recently started and are not thoroughly evaluated yet. The one controlled study conducted in a European country that we identified did not reveal evidence for a beneficial effect of integrated care on patient outcomes. However, in the few studies (n=6) that have been evaluated (in non-controlled designs) in European countries positive associations were found between participation in integrated care programmes and multimorbid' quality of life, patient' satisfaction with the care received, better care planning and referral for patients as well as more appropriate prescribing of medicines and/or a decrease in hospital care utilization or outpatient visits. So far, it is unknown which (sub)groups of patients benefit the most from integrated care programmes. In this respect, further research is needed. We conclude that in many European countries developments exist to reform healthcare delivery for patients with multimorbidity by developing and implementing integrated care programmes. So far, evidence of their potential to improve patient outcomes, decrease healthcare utilization and costs is lacking.

# 1. Multimorbidity, a challenge for healthcare systems in Europe

Key messages

Healthcare systems in Europe are facing multiple challenges: an ageing population, an increase of people suffering from multimorbidity, and limited financial and human resources for care.

Until now, most care for patients suffering from multimorbidity is provided in a fragmented and disease-specific way.

To improve quality and sustainability of care, reforming the way healthcare is provided to patients with multimorbidity is essential.

Especially, integrated care may have the potential to respond to the challenge of delivering high quality care to the growing number of patients with multimorbidity in Europe.

## 1.1 Challenges to face

The number of people living with multiple chronic diseases in Europe is estimated at 50 million (Rijken et al., 2013). With aging, the prevalence of multimorbidity (see Box 1.1) will increase further. Among people over the age of 65 about 65% has multiple chronic diseases; among people over the age of 85 this is estimated at 85% (Marengoni et al., 2011; Vogeli et al., 2007). Consequently, as European populations are ageing, the number of people living with multimorbidity in Europe is expected to increase. Next to the aging population and increasing presence of multimorbidity, European countries are facing challenges in terms of limited financial and human resources for care. Increasing healthcare expenditures and the high demand on healthcare labor markets raise concerns about the sustainability of healthcare systems in European countries.

Box 1.1. Definition of multimorbidity

**Multi-morbidity**: the occurrence of more than one chronic or long lasting disease within an individual (Bower et al., 2011; Smith et al., 2012). Multi-morbidity is (in this report) also referred to as e.g. co-morbidity, pluripathology, polypathology or complex chronic patients.

## 1.2 Multimorbidity: impact and care provided

Multimorbidity has an influence on several levels: the individual, the quality and organization of healthcare delivery at a local level and the whole healthcare system. Multimorbidity deeply impacts on the quality of life of patients and their families, and is associated with psychological distress, disability and an increased mortality risk (Marengoni et al., 2011; Fortin et al., 2006).

Because of the comprehensive needs of patients with multiple chronic diseases, multimorbidity is associated with a high use of (various) health and social care services as well as high public and private costs (Smith et al., 2012). Moreover, it is complex to deliver good quality care for patients with multimorbidity. First of all because there is a lack of evidence about what good quality care is for patients with (specific) combinations of chronic diseases, which type of healthcare providers should be involved and which of their competencies are needed. Furthermore, there are issues of prioritizing of health problems, polypharmacy and patient adherence, the importance to involve patients and families with regard to goal setting, and the fragmentation of organization and financing of services (e.g. Bower et al., 2011; Nuño et al., 2011).

Currently, most care delivery models are disease-specific and therefore not adapted to the needs of patients with multimorbidity. A disease-specific approach may be too narrow for patients with multiple chronic conditions. As disease-specific clinical practice guidelines may contradict each other and do not sufficiently address aspects of multimorbidity, this may result in a lack of evidence regarding treatment and subsequently a lack of decision support for healthcare providers. Furthermore, disease-specific models for multimorbidity incorporate the threat of inadequate coordination of care, interference of medicines and

interference of advised self-care for co-existing diseases (Boyd et al., 2005; Van Weel & Schellevis, 2006; Greβ et al., 2009).

Polypharmacy

A common problem for patients with multimorbidity is the use of multiple medications, also referred to as polypharmacy. Polypharmacy can be defined according to the number of medications (e.g. four to ten or more regular medications taken by one individual, e.g. Bushardt et al., 2008; Hajjar et al. 2007; Duerden et al., 2013). Polypharmacy is associated with several risks, including adverse drug reactions, risk of medication and disease interactions, inappropriate dosing and adherence ("problematic polypharmacy"). On the other hand, patients could benefit from multiple medication use when medications are combined to cure, slow the progression or reduce the symptoms of the disease(s) ("appropriate polypharmacy"; Duerden et al., 2013; Bushardt et al., 2008; Payne & Avery, 2011).

The prevalence of polypharmacy is considerable and increasing. In 1995, 12 percent of patients in primary care in Scotland were dispensed five or more drugs and 1.9 percent of the patients were handed out ten or more drugs. In 2010, 22 percent of the Scottish patients in primary care received five or more drugs and 5.8 percent were dispensed ten or more drugs (Guthrie & Makubate, 2012). Studies from e.g. England and Germany have confirmed the increasing prevalence of polypharmacy (Duerden et al., 2013; Junius-Walker et al., 2007).

Next to morbidity, polypharmacy is associated with age (i.e. increasing rates in older people) and poor self-rated health (Moen et al., 2009). Furthermore, polypharmacy and multimorbidity increase the workload of healthcare providers as they (e.g. doctors, nurses, pharmacists) need to collaborate to optimize their skill-mix (Salisbury et al., 2011). Balancing the risks and benefits of polypharmacy is a challenge for both healthcare providers and patients.

Patient adherence

Many patients with multimorbidity experience difficulty in following (agreed upon) treatment recommendations. According to the WHO, adherence to long-term therapy for chronic illnesses averages 50% (Sabaté, 2003). With the growing burden of multimorbidity and polypharmacy there is a growing impact of poor adherence (Sabaté, 2003). Patient adherence is defined as the extent to which a person's behaviour – taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider (Sabaté, 2003). Consequently, patient adherence requires both input from the healthcare provider and the patient. The care provider needs to be open to and respect the worries, wishes, beliefs and expectations of the patient, and needs to communicate about the effect of medication or lifestyle changes, the use and possible side-effects of the medication. The patient has its own responsibilities and choices to make, with support from the healthcare provider.

## 1.3 Integrated care

To improve quality (in terms of clinical outcomes and quality defined from the patient's perspective) as well as sustainability (in terms of financial and human resources) of care, reforming the way healthcare is provided to patients with multimorbidity is essential. Integrated care has the potential to respond to the challenge of providing good qualitative and sustainable care to patients with multimorbidity. It is characterized as patient-centered, proactive and well-coordinated multidisciplinary care, using new technologies to support patients' self-management and improve collaboration between caregivers (see Box 1.2). As such it intervenes in the provision of care and is expected to improve the quality of care, while making efficient use of resources (Goodwin et al., 2014; Boult et al., 2009). Increasingly, integrated care programmes are implemented in healthcare systems all over the world to address the comprehensive healthcare needs of multimorbid (e.g. Goodwin et al., 2014; Nuño et al., 2011). So far, there is insufficient evidence for the beneficial effect of integrated care on patient outcomes, healthcare utilization and costs. Furthermore, little is known about characteristics of an integrated care programme or approach that may be associated with

positive outcomes and about the patient groups that may benefit the most from integrated care (de Bruin et al., 2012).

Care pathways

Care pathways are often part of integrated care, as they are integrated with the delivery of care (Pinder et al., 2005; Sulch et al., 2000; Box 1.2). A care pathway can cover a fragment of the patients' care chain (e.g. from hospitalization to home; from General Practitioner (GP) to nurse to pharmacist) or the entire chain of care for a patient. As for integrated care, there is a growing interest in care pathways in recent years (Pinder et al., 2005). However, most studies examine a disease-specific care pathway (e.g. Brignole et al., 2006; Pinder et al., 2005; Sulch et al., 2000).

Box 1.2. Definitions of integrated care and care pathway

**Integrated care**: patient-centered, proactive and well-coordinated multidisciplinary care, using new technologies to support patients' self-management and improve collaboration between caregivers. Integrated care is also referred to as e.g. shared care, guided care, transitional care, disease management programmes or comprehensive care programmes (e.g. Goodwin et al., 2014; Nuño et al., 2011; Boult et al., 2009).
**Care pathway**: a multidisciplinary outline of anticipated care, placed in an appropriate timeframe, to help patients with a specific condition or set of symptoms move progressively through a clinical experience to positive outcomes. Other terms are: clinical pathway, critical pathway, integrated care pathway, care maps (Middleton et al., 2001).

Joint Action on Chronic Diseases (JA-CHRODIS)

In this report we provide a descriptive overview of integrated care programmes for patients with multimorbidity that have been developed and implemented in EU Member States and other European countries, which is part of the activities performed within the Joint Action on Chronic Diseases (JA-CHRODIS). JA-CHRODIS (2014-2016) is a joint action of the European Commission and the EU Member States, and aims to reduce the burden of chronic diseases on healthcare systems and individuals through prevention, early intervention and appropriate

management of chronic diseases. One of its core Work Packages (WP6) specifically focuses on the identification, development and implementation of innovative approaches to multimorbidity management. Its aim is to improve the delivery of healthcare for patients with multiple chronic conditions in all EU Member States. WP6 consists of four tasks. The findings described in this report are a result of task 2 (see 'How this report came into being').

## 1.4 What to expect from this report?

By this report we aim to provide more insight into the characteristics of integrated care programmes developed within healthcare systems in Europe for patients with multimorbidity. More specifically, integrated care programmes within healthcare including care pathways, and/or addressing issues of polypharmacy and/or patient adherence will be described. Furthermore, an overview of the evidence from integrated care programmes addressing multimorbidity or frailty [1] is provided, i.e. their impact on patient outcomes (e.g. physical, mental and social health status or functioning, quality of life, patient's satisfaction with care) and healthcare utilization and costs (e.g. utilization of hospital care, primary care, community care utilization, and costs).

More specifically, this report will address:

- which integrated care programmes are currently available within healthcare for patients with multimorbidity in Europe;
- characteristics of these care programmes (e.g. country, aim, population, presence of a care pathway, attention for polypharmacy and/or patient adherence);
- the impact of integrated care programmes for patients with multimorbidity (positively and negatively) on patient outcomes, healthcare utilization and costs.

[1] Multi-morbidity is often confounded by frailty (Duerden et al., 2013). Frailty is a common clinical syndrome in older adults that carries an increased risk for poor health outcomes including falls, incident disability, hospitalization, and mortality (Qian-Li Xue, 2011). It is defined as a clinically recognizable state of increased vulnerability resulting from aging-associated decline in reserve and function across multiple physiologic systems such that the ability to cope with every day or acute stressors is comprised (Qian-Li Xue, 2011).

European countries and regions are expected to respond with different strategies and approaches to the challenge of multimorbidity, due to the variation in contexts and specific problems. This diversity in contexts, strategies and practices will provide a valuable source to gain more insight in which approaches are likely to be (more) successful and have the potential to be implemented in other countries and regions as well (if adapted to the specific context). 2

This report is the result of task 2 of WP6: to identify innovative integrated care programmes for patients with multimorbidity that are available in Europe. The next step (task 3) will be to identify elements or components of 'good practices' in this report by an international, multidisciplinary expert group.

## 1.5 How this report came into being

This report is based on three data sources:

- JA-CHRODIS module: questions about care pathways, polypharmacy and patient adherence included in a survey among integrated care programmes identified by the ICARE4EU project

ICARE4EU is a European project covering 31 countries (all EU Member States, Iceland, Norway and Switzerland). The project activities focus on identifying, describing and analysing integrated care strategies addressing multimorbidity, and disseminating knowledge to improve and monitor multimorbidity chronic illness care in Europe (see Rijken et al., 2013; van der Heide et al., 2015).

Integrated care programmes targeting patients with multimorbidity were identified by expert organisations in 31 European countries, based on selection criteria provided by the ICARE4EU team (see Appendix 1). Subsequently, a survey was conducted to collect data about the included care programmes. For the purpose of this report (and as part of JA-CHRODIS WP6 task 2), an extra module was developed and added to this survey (see Appendix 3; from

[2] The expected differences in context of European countries and their policy responses (e.g. approaches, strategies) are discussed in more detail in the report 'Innovating care for people with multiple chronic conditions in Europe: an overview' which has been written as part of the ICARE4EU (Innovative care for people with multiple chronic conditions in Europe) project (Rijken et al., 2013; van der Heide et al., 2015).

here on referred to as the JA-CHRODIS module). By this JA-CHRODIS module, additional data about the programmes were collected on the continuity of multimorbidity care trajectories (care pathways) within primary and secondary healthcare, polypharmacy management and issues of adherence to treatment. For more information about the ICARE4EU project: www.icare4eu.org . Results from this data source are described in Chapter 2. For an overview of all programmes identified and included in the ICARE4EU project, see Appendix 1.

- Care programmes traced by JA-CHRODIS WP6 partners

In April 2014 and November 2014 JA-CHRODIS WP6 partners3 were asked to inform NIVEL about all relevant care projects, programmes or studies for multimorbid in Europe they knew of; more specifically, care programmes including care pathways and/or addressing polypharmacy or patient adherence.

Results from this data source are described in Chapter 2 and Chapter 3. For an overview of all programmes (that met the pre-set inclusion criteria) reported by CHRODIS WP6 partners, see Appendix 2.

- Systematic review of international literature describing the effectiveness of integrated care programmes for people with multimorbidity

To gain insight into the effectiveness of integrated care programmes for multimorbid a systematic literature review was performed (Hopman et al., in preparation), by updating the review of de Bruin and colleagues (2012). A systematic literature search was performed in multiple electronic databases for English language papers published between January 2011 and March 2014, supplemented by reference tracking and a manual search on the internet. After inclusion, the methodological quality of each study was assessed and a best-evidence synthesis was applied to draw conclusions. Results concerning European studies that were included in this review are described in Chapter 3.

[3] AIFA, Italy; VULSK, Lithuania; TUD, Germany; Norvegian Directory of Health, Norway; Public Health Institute, Croatia; SOTIRA, Spain; ISCIII, Spain; IACS, Spain; Comunitat Valenciana, Spain; Bioef, Spain; THL, Finland; NCPHA, Bulgaria; EPF, Europe; individual partners from France, Italy, Spain, Slovenia, Greece, Malta.

# 2. Integrated care programmes for patients with multimorbidity in Europe

Key messages

- In Spain the highest number of care programmes for patients with multimorbidity within healthcare was identified.
- Most integrated care programmes are (planned to be) implemented on a local or regional level.
- Integration of care (sectors or disciplines) and continuity of care are seen as key for the improvement of care for multimorbid.
- The integrated care programmes share the following common elements: patient-centeredness, an emphasis on coordination of care, improvement of collaboration between (multidisciplinary) caregivers and a focus on outcomes.
- The integrated care programmes involve different disciplines of professional caregivers, (sometimes also informal carers) and organizations, and many programmes include the assignment of a case manager to patients.
- The majority of integrated care programmes include a care pathway, and address polypharmacy and/or patient adherence.
- Between one third and a quarter of the integrated care programmes specifically focus on frail elderly.

In this chapter we provide an overview of the identified integrated care programmes within healthcare for patients with multimorbidity in Europe. More specifically, integrated care programmes within healthcare including care pathways, and/or addressing issues of polypharmacy and/or patient adherence are described. The care programmes are described per data source, i.e. programmes identified by the country expert organizations participating in the ICARE4EU project or additional programmes identified by CHRODIS WP6 partners.

## 2.1 Characteristics of care programmes

Programmes identified by the ICARE4EU project:

101 integrated care programmes were identified and included by the ICARE4EU project (see Appendix 1). Figure 1 presents the number of studies per country. Most programmes are implemented on a local (n=29) or regional level (n=30) or are locally/regionally implemented as part of a national programme (n=18). Fourteen programmes are implemented on a national level, seven are implemented on a national level as part of an international programme, and three programmes are implemented on an international/supranational level.

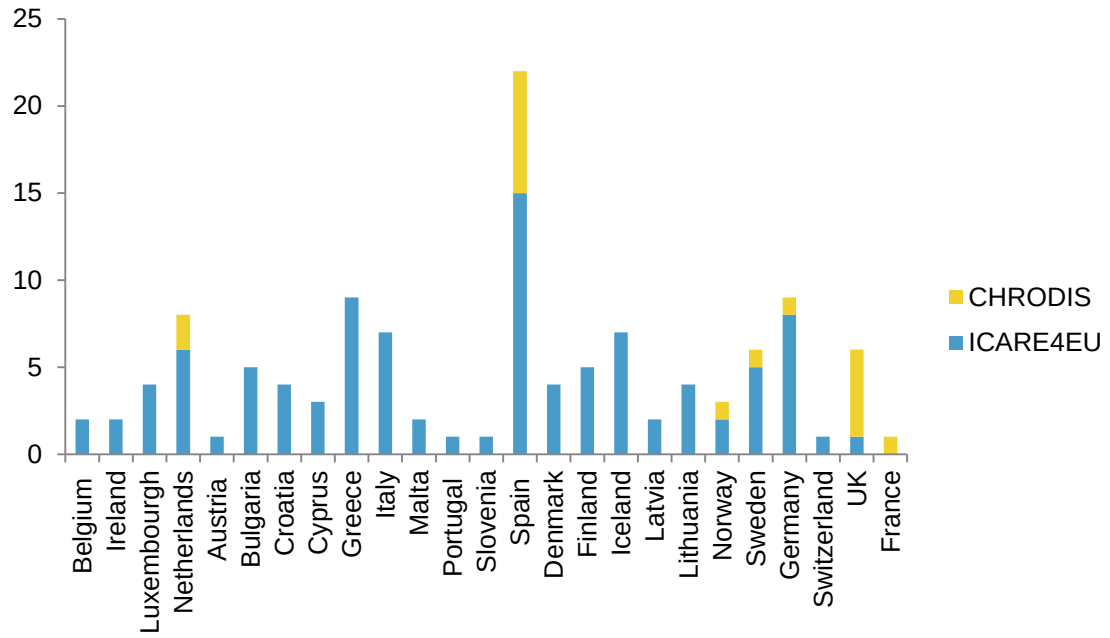


*Figure 1: Number of care programmes included via ICARE4EU (n=101) and JA-CHRODIS (n=18) per country*

Data from the ICARE4EU modules of the survey show that the majority (58%) of 101 the care programmes identified by the ICARE4EU project (n=59) are aimed at patients with multimorbidity in general. Twenty-eight percent of the care programmes (n=28) are developed for patients with a specific diagnosis ('index disease') with a variety of possible co-morbidities. Diabetes type 2, COPD or heart failure are most mentioned as index diseases. Fourteen programmes (14%) focus on a combination of specific chronic conditions. Most

common are the combinations of diabetes with hypertension and/or heart disease. Of the 101 integrated care programmes for patients with multimorbidity, 42 specifically target frail elderly. The main objectives differ per care programme, see figure 2, but the most common objective is to increase multi-disciplinary collaboration.

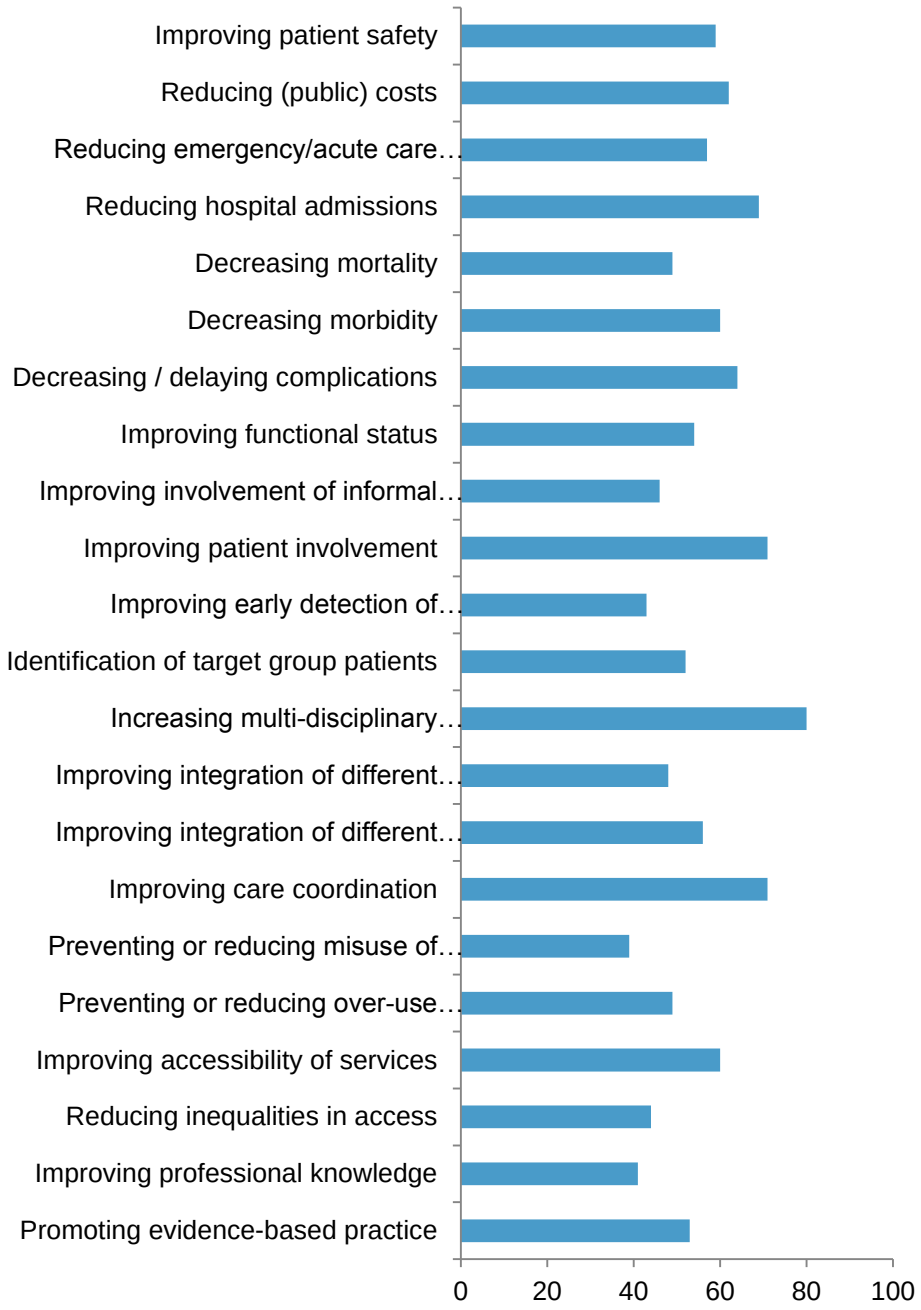


*Figure 2: Main objectives of the care programmes identified by the ICARE4EU project, in % (N=101) (data from the ICARE4EU modules) (van der Heide et al., 2015)*

All 101 included care programmes involve different types of organizations, as indicated by figure 3. Primary care practices and general hospitals are most often involved in the programmes. Furthermore, on organizational level various activities are established in the programs such as appointing a case manager who coordinates the care of patients as they move along the care chain (e.g. from primary care to secondary care, to hospital admission and back home).

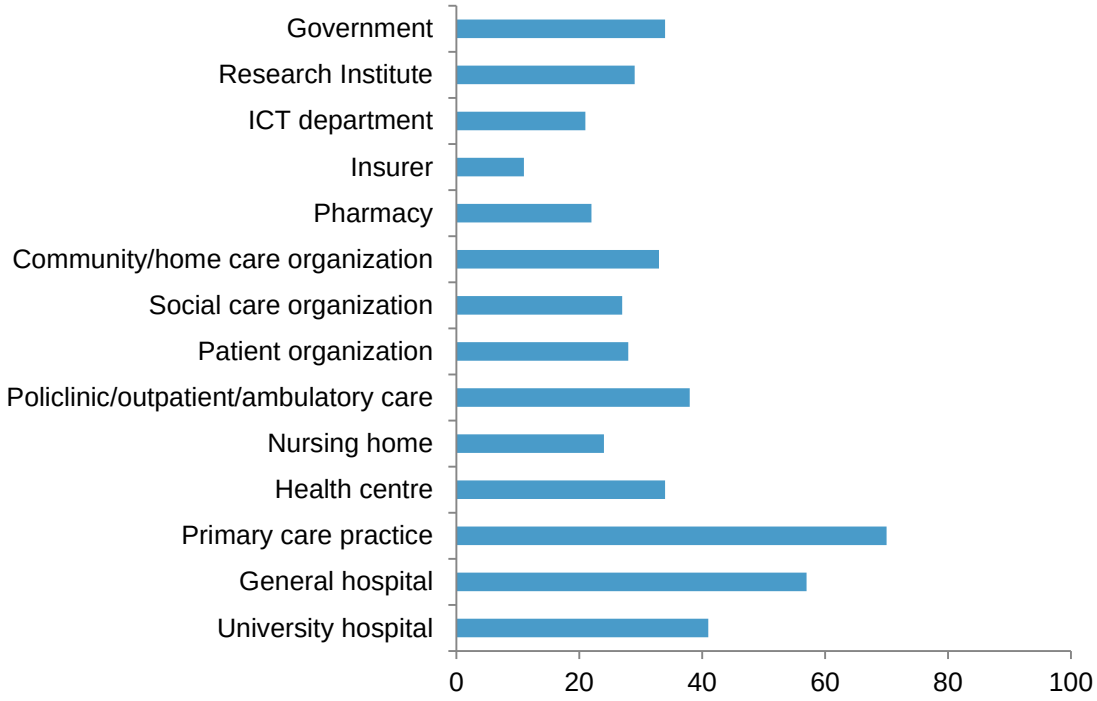


*Figure 3: Organizations involved in the care programmes identified by the ICARE4EU project, in % (N=101) (data from the ICARE4EU modules) (van der Heide et al., 2015)*

Programmes identified by JA-CHRODIS WP6 partners:

From the 296 potential care programmes identified by JA-CHRODIS WP6 partners, 18 care programmes fulfilled our inclusion criteria and were not already identified by the ICARE4EU project (see Appendix 2). Most of these programmes are (intended to be) implemented on a regional level (n=16). One programme is planned to be implemented on a European level and one on a local level. Most programmes are aimed at patients with multimorbidity in general (n=10; Appendix 2, programme 1, 6-9, 11-13, 15 and 16). Five programmes specifically focus on frail elderly (programme 3, 4, 10, 14 and 17). Three other programmes are aimed at a

population with a combination of specific chronic diseases (programme 2, 5 and 18). For example, depression in patients with diabetes and/or coronary heart disease (programme 18). The programmes share common elements: e.g. patient-centeredness, an emphasis on coordination of care, improvement of collaboration between (multidisciplinary) caregivers and a focus on outcomes (Nuño et al., 2013). The specific aims of the care programmes are very diverse. For example, the overall aim of programme 10 is to develop a strategy in which the own health care sector is reorganized to better integrate health and social care, facilitating the participation of citizens, and the objective of programme 1 is to reduce avoidable hospitalization for chronic diseases in the elderly by 20% in 2020 and to increase healthy life years and quality of life. The aims of all programmes are described in Appendix 2.

## 2.2 Care pathways

Programmes identified by the JA-CHRODIS module in the ICARE4EU project:

The JA-CHRODIS module included in the survey provided information about the presence of clinical care pathways as part of the 101 programmes identified by the ICARE4EU project.

Seventy-six of the 101 integrated care programmes (75%) reported to include a care pathway (see Figure 4). For 20 programmes a care pathway is a small part of the care programme, for 38 programmes (50%) it is included as a substantial part of the programme. In 18 programmes a care pathway is the central theme of the care programme. Various health professionals are involved in the programmes that include a care pathway (see Figure 5). These professionals represent diverse organisations, e.g. primary care practices, pharmacy, nursing home, social care organisation. In 34 programmes that include a care pathway a case manager is assigned for the coordination of care for the patient. Case managers are mostly primary care nurses or/and GPs.

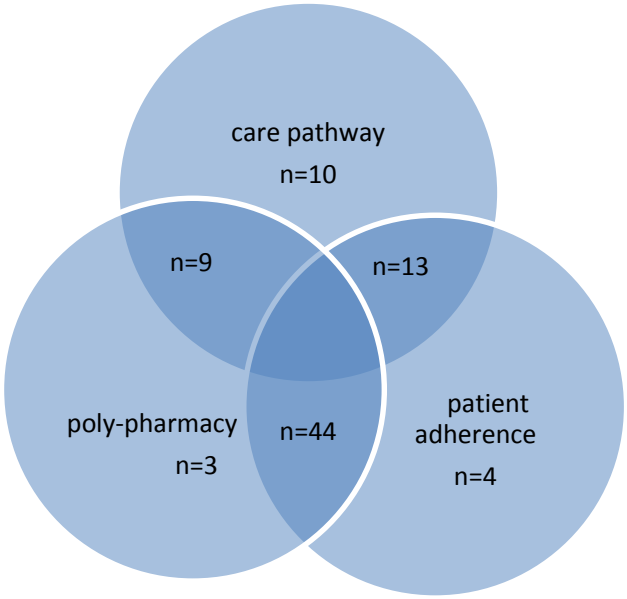


*Figure 4: Number of integrated care programmes identified by the ICARE4EU project that include care pathways, and/or address polypharmacy, and/or patient adherence (data from the JA-CHRODIS module)*

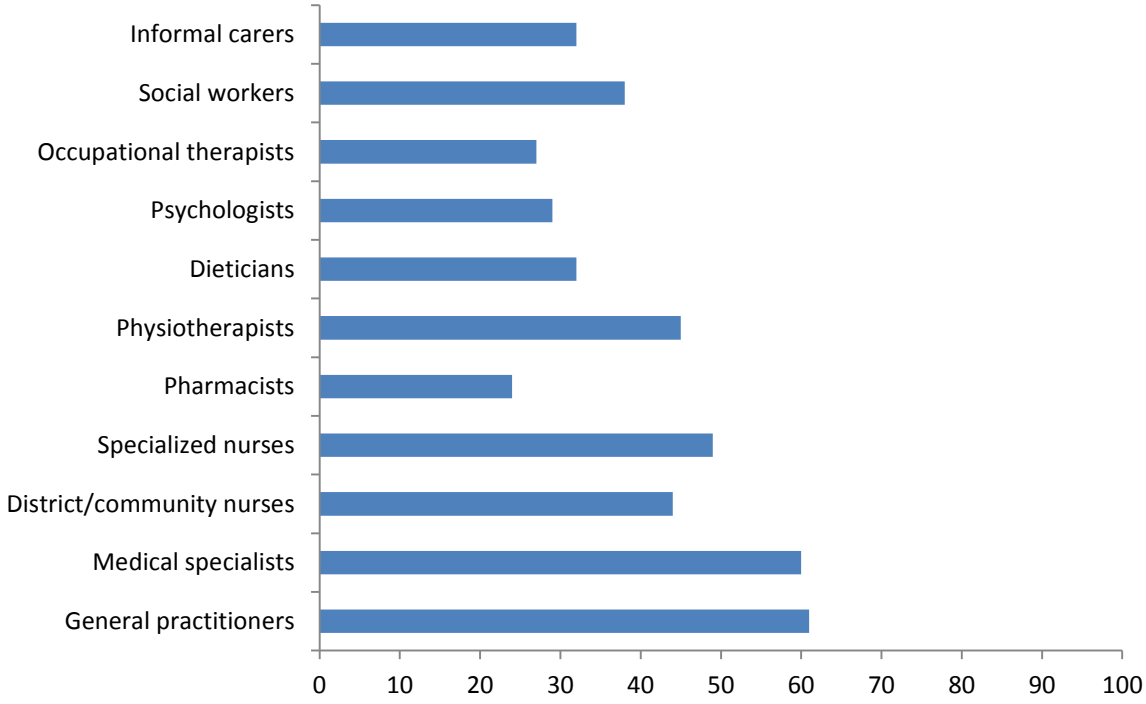


*Figure 5: Disciplines in care programmes identified by the ICARE4EU project that include care pathways, in % (n=76) (data from the JA-CHRODIS module)*

Programmes identified by JA-CHRODIS WP6 partners:

Ten of the 18 integrated care programmes identified by CHRODIS WP6 partners include a care pathway (programme 1, 2, 4-8, 12, 14 and 17), as presented in figure 6. In these programmes different disciplines are involved in caring for patients with multimorbidity: primary care, secondary care and district nurses, GPs, pharmacists, social workers and specialists. Two programmes embrace the entire care chain for patients with multimorbidity (programme 4 and 8). Other programmes include part of the care chain: hospital and primary care (programme 1), primary care (programme 7), primary care, secondary care and social care (programme 17), services linked to GP clusters and integrated teams within zones (programmes 14). Four programmes describe the care pathway only in general terms (programme 2, 5, 6 and 12).

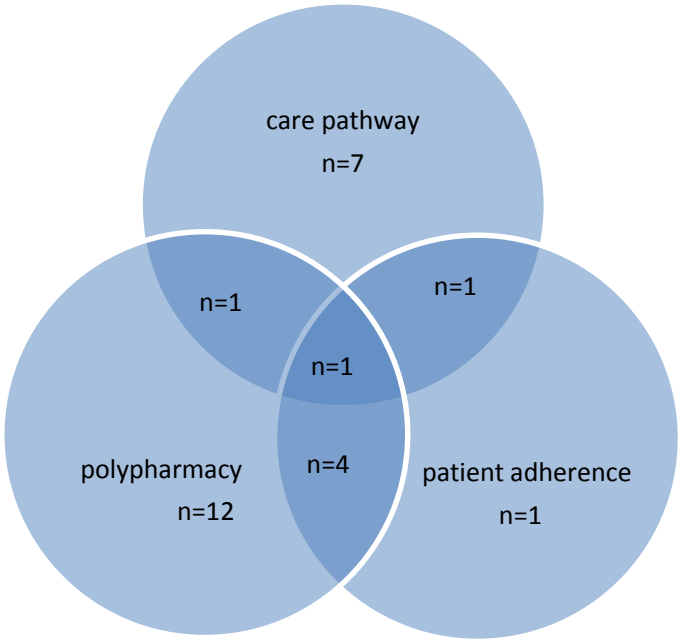


*Figure 6: Number of integrated care programmes identified by JA-CHRODIS WP6 partners that include care pathways, and/or address polypharmacy, and/or patient adherence*

## 2.3 Polypharmacy

Programmes identified by the JA-CHRODIS module in the ICARE4EU project:

The JA-CHRODIS module included in the survey provided information about the extent to which attention is paid to polypharmacy in the 101 programmes identified by the ICARE4EU project.

Of sixty-two of the programmes (61%) it is reported that these programmes pay attention to polypharmacy. For 35 programmes addressing polypharmacy is a small part of the programme, for 20 programmes it is a substantial part and for seven programmes managing polypharmacy is a main objective. For four programmes it is specifically reported that better management of polypharmacy is an aim of the programme and for five programmes it is claimed that attention will be paid to polypharmacy, as part of the programme or as part of a guideline. In sixteen programmes one or more healthcare providers (e.g. pharmacist, GP, nurse) are conducting a medication review and four programmes mention (multidisciplinary) meetings or information exchange about polypharmacy. Four other programmes include education for healthcare providers or family carers about how to manage polypharmacy and two programmes implement a pharmacotherapeutical support tool. The other programmes that address polypharmacy (n=25) are very diverse and therefore not described. In 66% (n=41) of the programmes that address polypharmacy (n=62) one provider is responsible for the issue of polypharmacy. This is usually the GP, nurse or pharmacist. Among the programmes that address polypharmacy, various disciplines are involved (see Figure 7).

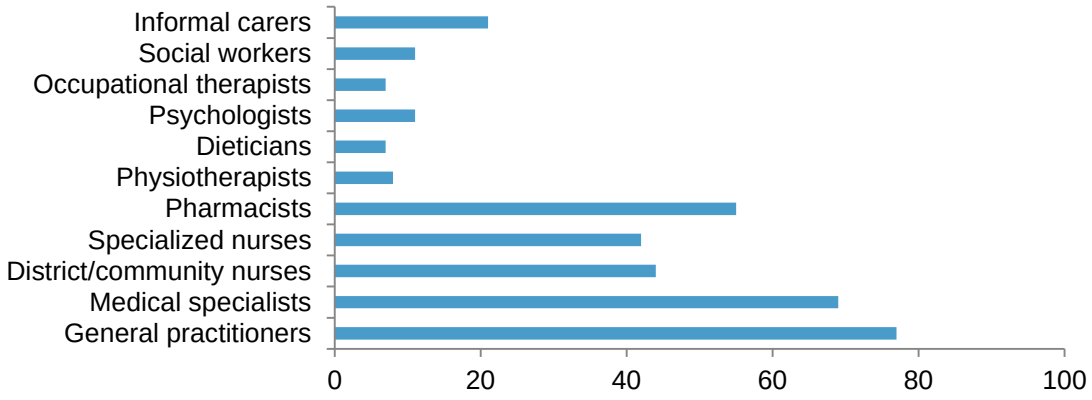


*Figure 7: Disciplines in care programmes identified by the ICARE4EU project that pay attention to polypharmacy, in % (n=62) (data from the JA-CHRODIS module)*

Identified by JA-CHRODIS WP6 partners:

Eight of the 18 care programmes address polypharmacy (programme 3, 7, 9, 11, 13 and 15-17). One programme uses the pressure of polypharmacy (i.e. 5 or more different types of medicines taken by one individual) as an inclusion criterion (programme 13) and in three programmes attention is paid to polypharmacy (programme 3, 11 and 15). Three other programmes are using a polypharmacy review, by reviewing and updating prescriptions of all used medicines and investigating adverse drug events (programme 7, 16 and 17). One programme aims to implement a pharmacological support tool to prevent drug related problems in patients with multimorbidity and send standard e-messages to facilitate communication with other clinicians concerning prescription modification undertaken (programme 9).

## 2.4 Patient adherence

Programmes identified by the JA-CHRODIS module in the ICARE4EU project:

The JA-CHRODIS-JA module included in the survey provided information about the extent to which patient adherence is addressed in the 101 programmes identified by the ICARE4EU project. Of sixty-seven of the programmes (66%) it is reported that these programmes address patient adherence. For 28 programmes patient adherence is a small part of the programme, for 30 programmes it is a substantial part of the programme and for nine programmes patient adherence is a main objective. Most programmes address patient adherence in general (n=48), fourteen refer to patient adherence to medical treatment, one programme refers to adherence to lifestyle recommendations and two programmes address patient adherence to both medical treatment and lifestyle recommendations. Different strategies are used to help patients adhere to their treatment. For example, ten programmes use patient education or counselling, in one programme the healthcare professionals are educated and in one programme multidisciplinary meetings to discuss adherence of patients have been set up. In 64% (n=43) of the programmes that address patient adherence (n=67) one provider is responsible for this issue. This is usually the GP or primary care nurse. Among programmes that address adherence (see Figure 8), various disciplines are involved.

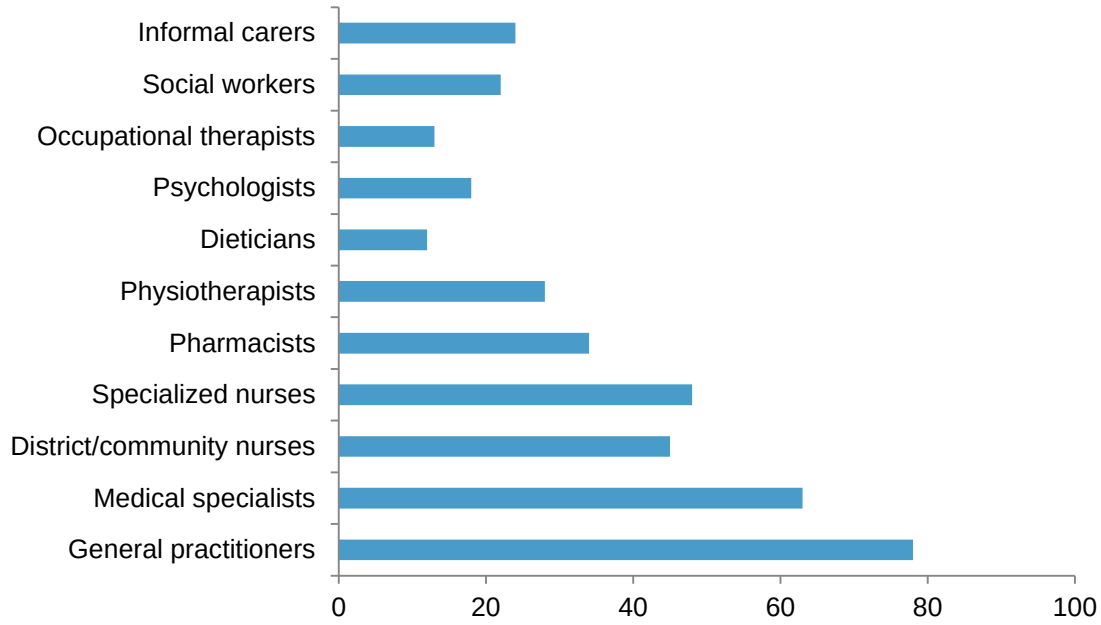


*Figure 8: Disciplines in care programmes identified by the ICARE4EU project that address patient adherence, in % (n=67) (data from the JA-CHRODIS module)*

Identified by JA-CHRODIS WP6 partners:

Seven of the 18 care programmes focus on patient adherence (programme 7-11, 13 and 15). Two programmes address patient adherence to the treatment in general, having no specific focus (programme 8 and 11), three programmes focus on patient adherence with respect to the medical treatment (programme 9, 13 and 15) and two programmes focus on patient adherence to both medical treatment and lifestyle recommendations (programme 7 and 10). For example, adherence to medications, use of inhalers and dietary control (programme 7).

# 3. Evidence from integrated care programmes addressing multimorbidity

Key messages

- So far, there is little research on the effectiveness of integrated care programmes in Europe targeting patients with multimorbidity.
- The one controlled study implemented in a European country that we identified did not reveal evidence for a beneficial effect of integrated care on patient outcomes. However, in the few studies (n=6) that have been evaluated (in non-controlled designs) in European countries positive associations were found between participation in integrated care programmes and multimorbid' quality of life, patient' satisfaction with the care received, better care planning and referral for patients as well as more appropriate prescribing of medicines and/or a decrease in hospital care utilization or outpatient visits.
- It is unknown which (sub)groups of patients benefit the most from integrated care programmes.

In this chapter we provide an overview of the evidence for the effectiveness of integrated care programmes addressing multimorbidity, i.e. their impact on patient outcomes (e.g. physical, mental and social health status or functioning, quality of life, patient' satisfaction with the care received) and healthcare utilization and costs (e.g. utilization of hospital care, primary care, community services and costs). The evidence for the effectiveness of the integrated care programmes for patients with multimorbidity is described per data source (i.e. as derived from the systematic review of Hopman et al. 2015; as identified by CHRODIS WP6 partners).

## 3.1 Patient outcomes

Based on systematic review of the literature:

Twenty publications evaluating nineteen integrated care programmes were included in the systematic review of Hopman and colleagues (in preparation). Only one programme included

an evaluation of an integrated care programme from Europe (i.e. implemented in the Netherlands). This programme was set up to stimulate self-management skills and encourages active involvement in decision-making of frail elderly. Two years after implementation, no effects were found of this integrated care programme on patient outcomes with respect to activities of daily living (i.e. disability, social participation, social support, depression, and fear of falling (Metzelthin et al., 2013)).

Based on programmes identified by JA-CHRODIS WP6 partners:

From the included care programmes targeting patients with multimorbidity additionally traced by the WP6 partners (n=18), six studies evaluated the outcomes of the programme in non-controlled designs. Three of these programmes reported patient outcomes. In these studies, associations were found between participation in integrated care programmes and patients' enhanced quality of life (programme 4) and/or patients' enhanced satisfaction with the care received (programme 4 and 12) or better care planning and referral for patients as well as more appropriate prescribing of medicines (programme 17).

## 3.2 Healthcare utilization and costs

Based on systematic review of the literature:

The only programme from a European country that was included in the systematic review of Hopman and colleagues (in preparation) did not evaluate the effects of integrated care on healthcare utilization and costs (Metzelthin et al., 2013).

Based on programmes identified by CHRODIS WP6 partners:

Four of the six programmes reported on healthcare utilization and/or costs, as evaluated in non-controlled designs. For three programmes it was found that providing integrated care was associated with less healthcare utilization: i.e. decrease in hospital bed days (programme 14), number of ED visits (programme 6, 8 and 14), hospital admissions (programme 6 and 8), outpatient visits (programme 8), use of residential and nursing homes (programme 14). Furthermore, one programme (programme 4) showed that the provision of integrated care

was not cost-effective and about another programme was unclear about the impact of integrated care on healthcare costs (programme 14).

## 3.3 Who will benefit?

Integrated care programmes are mainly aimed at patients with multimorbidity in general. However, a substantial part of the programmes we identified is specifically targeting 'frail elderly' (see Chapter 2). Nevertheless, it is still unknown which subgroups of patients might benefit most from integrated care. This underlines the importance of systematically identifying (sub-)groups of patients with multimorbidity who will benefit from integrated care programmes with specific characteristics.

# 4. Conclusion and considerations

By this report we aimed to describe the availability and characteristics of integrated care programmes developed within healthcare systems in European countries for patients with multimorbidity. More specifically, integrated care programmes including care pathways, and/or addressing issues of polypharmacy and/or patient adherence were described. Furthermore, an overview of the evidence from integrated care programmes addressing multimorbidity was provided, i.e. their impact on patient outcomes (e.g. physical, mental and social health status or functioning, quality of life, patient' satisfaction with the care received) and healthcare utilization and costs (e.g. hospital care, primary care, community services, and costs).

## 4.1 Identified programmes

This report shows that integrated care programmes are seen as key for the improvement of care for multimorbid patients in Europe. We traced 119 care programmes targeting patients with multimorbidity that can be characterized as integrated care programmes. Of all 31 countries considered, Spain had the most integrated programmes reported. This may be due to the fact that the Spanish regions have rather autonomous healthcare systems, in which these programmes are embedded. Irrespective of the country, the great majority of the integrated care programmes for patients with multimorbidity are (planned to be) implemented on a local or regional level. The integrated care programmes share the following common elements: patient-centeredness, an emphasis on coordination of care, improvement of collaboration between (multidisciplinary) caregivers and a focus on outcomes. These programmes involve different disciplines (professional caregivers and/or informal carers) and organizations, and many programmes include the assignment of a case manager for patients. Many programmes include a care pathway and/or address polypharmacy and/or patient adherence. A substantial number of the integrated care programmes specifically focus on frail elderly.

## 4.2 Evidence

Little is known about the outcomes or effectiveness of the integrated care programmes for patients with multimorbidity. This is mainly because many of these integrated care programmes have recently started and are not thoroughly evaluated yet. The one controlled study conducted in a European country that we identified did not reveal evidence for a beneficial effect of integrated care on patient outcomes. However, in the few studies that have been evaluated (in non-controlled designs) in European countries, positive associations were found between participation in integrated care programmes and multimorbid' quality of life, patient' satisfaction with the care received, better care planning and referral for patients as well as more appropriate prescribing of medicines and/or a decrease in hospital care utilization or outpatient visits. More research on the effectiveness of integrated care programmes is recommended. Furthermore, research is needed on what (sub)groups of patients benefit the most from integrated care programmes.

## 4.3 Methodological considerations

This study has several strengths and limitations. A strength of this report is that we used mixed methods (i.e. input from different sources), resulting in a more valid representation of the availability and evidence of integrated care programmes developed within healthcare systems in Europe for patients with multimorbidity. For example, both methods that were used to identify relevant programmes in Europe, revealed that in Spain the most integrated care programmes seem to have been implemented and that a substantial part of the programmes specifically focus on frail elderly. There are also some limitations. We were dependent on expert organizations and experts for input on integrated care programmes. It is possible that we have missed out on integrated care programmes that were not noticed by the experts. By also including a systematic literature review as information source, we have tried to be as complete as possible in providing an overview of integrated care programmes in European countries. Another important issue to mention is that the identification of an integrated care programme does not automatically mean that the programme is currently available for patients with multimorbidity. However, it seems reasonable to assume that in

countries in which relatively many integrated care programmes for patients with multimorbidity were identified (as in Spain), the actual availability of integrated care will also be relatively high.

## 4.4 Conclusion

In many European countries developments exist to reform healthcare delivery for patients with multimorbidity by developing and implementing integrated care programmes. So far, evidence of their potential to improve patient outcomes, decrease healthcare utilization and costs is lacking. The next step of the JA-CHRODIS WP6 will be to identify elements or components of 'good practices' to provide integrated care to patients with multimorbidity.

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# Appendix 1

## ICARE4EU data: inclusion criteria

Programmes that were included met all following criteria:

- Focus on providing care for adult people with multimorbidity (or contain specific elements for this target group), and
- Should be aimed at a patient target group consisting of people aged 18 and older, with two or more medically (i.e. somatic, psychiatric) diagnosed chronic (not fully curable) or long lasting (at least six months) diseases, of which at least one has a (primarily) somatic/physical nature, and
- Involve one or more medical service(s), and
- Involve cooperation between at least two services (these services may be part of the same organization, for example services within a hospital, or may be part of different organizations, for example between medical care and social care), and
- Have some formal status/formalized cooperation (any form), and
- Are evaluable in some way, and
- Are currently running (2014) or finished less than 24 months ago or start within the next 12 months.

| Countries | Reported programmes in 2014 by online ICARE4EU survey | Included programmes |
|---|---|---|
| Austria | 4 | 1 |
| Baltic Sea region | 1 | 0 |
| Belgium | 10 | 2 |
| Bulgaria | 6 | 5 |
| Czech Republic | 3 | 0 |
| Croatia | 4 | 4 |
| Cyprus | 7[a] | 3 |
| Denmark | 4 | 4 |
| Estonia | 5 | 0 |
| England | 1 | 0 |
| Finland | 5 | 5 |
| France | 3[b] | 0 |
| Greece | 10 | 9 |
| Germany | 12[b] | 8 |

| | | |
|---|---|---|
| Iceland | 8 | 7 |
| Ireland | 2 | 2 |
| Italy | 8 | 7 |
| Latvia | 2 | 2 |
| Lithuania | 5 | 4 |

| **Countries** | **Reported programmes in 2014 by online ICARE4EU survey** | **Included programmes** |
|---|---|---|
| Luxembourg | 17 | 4 |
| Malta | 8 | 2 |
| Netherlands | 6 | 6 |
| Norway | 2 | 2 |
| Portugal | 2 | 1 |
| Slovenia | 1 | 1 |
| Spain | 20 | 15 |
| Sweden | 11 | 5 |
| Switzerland | 3 | 1 |
| UK | 2[a] | 1 |
| Unclear | 8 | 0 |
| **Total** | **178** | **101** |

a One of these programmes was targeted at patients with multimorbidity in both the UK and Cyprus and counted once

b One of these programmes was targeted at patients with multimorbidity in both France and Germany and counted once

## ICARE4EU data: overview of included programmes per country(n=101)

| ***Programme 1*** | |
|---|---|
| Name | Optimale Versorgung von langzeitbeatmeten Patienten unter qualitativen und wirtschaftlichen Aspekten |
| Country | Austria |

| ***Programme 2*** | |
|---|---|
| Name | Formes alternatives de soins aux personnes âgées |
| Country | Belgium |

| ***Programme 3*** | |
|---|---|
| Name | Samenwerkingsinitiatief EersteLijnsgezondheidszorg (SEL) |
| Country | Belgium |

| ***Programme 4*** | |
|---|---|
| Name | Volunteers, patients and physicians – united against diabetes |
| Country | Bulgaria |

| ***Programme 5*** | |
|---|---|
| Name | Not available for publication |
| Country | Bulgaria |

| ***Programme 6*** | |
|---|---|
| Name | Caritas Home Care for Elderly People |
| Country | Bulgaria |

| ***Programme 7*** | |
|---|---|
| Name | Center "Home Care" for assistance to elderly, chronically-ill people and people with disabilities |
| Country | Bulgaria |

| ***Programme 8*** | |
|---|---|
| Name | Home care for an independent and dignified life |
| Country | Bulgaria |

| ***Programme 9*** | |
|---|---|
| Name | Adherence to Medication |
| Country | Croatia |

| ***Programme 10*** | |
|---|---|
| Name | Croatian Registry for Renal Replacement Therapy (CRRRT) |
| Country | Croatia |

| ***Programme 11*** | |
|---|---|
| Name | Croatian Psychoses Registry |
| Country | Croatia |

| ***Programme 12*** | |
|---|---|
| Name | Croatian National Cancer Registry |
| Country | Croatia |

| ***Programme 13*** | |
|---|---|
| Name | PROSAFE- Promoting safety and quality improvement in critical care |
| Country | Cyprus |

| ***Programme 14*** | |
|---|---|
| Name | TELEPROMETHEUS: e-Educational Platform for Intensive Care Unit Health Professionals |
| Country | Cyprus |

| ***Programme 15*** | |
|---|---|
| Name | TELEREHABILITATION: Post ICU patient telerehabilitation services |
| Country | Cyprus |

| ***Programme 16*** | |
|---|---|
| Name | Preventing Multimorbidity - Healthier life in social psychiatry |
| Country | Denmark |

| ***Programme 17*** | |
|---|---|
| Name | Deveoplement of disease management programmes for the most commen multimorbidities |
| Country | Denmark |

| ***Programme 18*** | |
|---|---|
| Name | Clinic for Multimorbidity and Polypharmacy |
| Country | Denmark |

| ***Programme 19*** | |
|---|---|
| Name | Not available for publication |
| Country | Denmark |

| ***Programme 20*** | |
|---|---|
| Name | Potku programme - Patient at the Driver's Seat |
| Country | Finland |

| ***Programme 21*** | |
|---|---|
| Name | Not available for publication |
| Country | Finland |

| ***Programme 22*** | |
|---|---|
| Name | PIRKKA-POTKU (a regional sub-programme of the national POTKU programme (Patient at the Driver's Seat) |
| Country | Finland |

| ***Programme 23*** | |
|---|---|
| Name | Not available for publication |
| Country | Finland |

| ***Programme 24*** | |
|---|---|
| Name | Not available for publication |
| Country | Finland |

| ***Programme 25*** | |
|---|---|
| Name | Erbitte Rücksprache über Form und Umfang der Vorstellung |
| Country | Germany |

| ***Programme 26*** | |
|---|---|
| Name | Gesundheitsnetz Qualität und Effizienz eG |
| Country | Germany |

| ***Programme 27*** | |
|---|---|
| Name | Not available for publication |
| Country | Germany |

| ***Programme 28*** | |
|---|---|
| Name | INVADE - Interventionsprojekt zerebrovaskuläre Erkrankungen und Demenz im Landkreis Ebersberg |
| Country | Germany |

| ***Programme 29*** | |
|---|---|
| Name | Netzbezogenes Betreuungsarzt-System mit KOSI-Unterstützung |
| Country | Germany |

| ***Programme 30*** | |
|---|---|
| Name | Gesundes Kinzigtal |
| Country | Germany |

| ***Programme 31*** | |
|---|---|
| Name | Not available for publication |
| Country | Germany |

| ***Programme 32*** | |
|---|---|
| Name | Not available for publication |
| Country | Germany |

| ***Programme 33*** | |
|---|---|
| Name | Galilee Palliative Care Unit |
| Country | Greece |

| ***Programme 34*** | |
|---|---|
| Name | Mediterraneo Hospital |
| Country | Greece |

| ***Programme 35*** | |
|---|---|
| Name | EU-WISE Selfcare for Long-Term Conditions in Europe |
| Country | Greece |

| ***Programme 36*** | |
|---|---|
| Name | Aktios Elderly Care Units, Athens - Greece |
| Country | Greece |

| ***Programme 37*** | |
|---|---|
| Name | "Sotiria" Hospital e-Health Services |
| Country | Greece |

| ***Programme 38*** | |
|---|---|
| Name | Art Palace Elderly Care Unit - www.artpalace.gr |
| Country | Greece |

| ***Programme 39*** | |
|---|---|
| Name | REgioNs of Europe WorkINg toGether for HEALTH - Renewing Health |
| Country | Greece |

| ***Programme 40*** | |
|---|---|
| Name | Division of Geriatric Psychiatry/ Telepsychogeriatric service |
| Country | Greece |

| ***Programme 34*** | |
|---|---|
| Name | Mediterraneo Hospital |
| Country | Greece |

| ***Programme 35*** | |
|---|---|
| Name | EU-WISE Selfcare for Long-Term Conditions in Europe |
| Country | Greece |

| ***Programme 36*** | |
|---|---|
| Name | Aktios Elderly Care Units, Athens - Greece |
| Country | Greece |

| ***Programme 37*** | |
|---|---|
| Name | "Sotiria" Hospital e-Health Services |
| Country | Greece |

| ***Programme 38*** | |
|---|---|
| Name | Art Palace Elderly Care Unit - www.artpalace.gr |
| Country | Greece |

| ***Programme 39*** | |
|---|---|
| Name | REgioNs of Europe WorkINg toGether for HEALTH - Renewing Health |
| Country | Greece |

| ***Programme 40*** | |
|---|---|
| Name | Division of Geriatric Psychiatry/ Telepsychogeriatric service |
| Country | Greece |

| ***Programme 41*** | |
|---|---|
| Name | Integrated health care for HIV patients |
| Country | Greece |

| ***Programme 42*** | |
|---|---|
| Name | Lungrehabiltering |
| Country | Iceland |

| ***Programme 43*** | |
|---|---|
| Name | Pain, fibromyalgia and arthritis program |
| Country | Iceland |

| ***Programme 44*** | |
|---|---|
| Name | Not available for publication |
| Country | Iceland |

| ***Programme 45*** | |
|---|---|
| Name | Not available for publication |
| Country | Iceland |

| ***Programme 46*** | |
|---|---|
| Name | Heilsuborg obesity and lifestyle changes |
| Country | Iceland |

| ***Programme 47*** | |
|---|---|
| Name | Back- and Neck programme of The Spinal Unit at St. Franciscus' Hospital |
| Country | Iceland |

| ***Programme 48*** | |
|---|---|
| Name | Not available for publication |
| Country | Iceland |

| ***Programme 49*** | |
|---|---|
| Name | Medications optimisation in multimorbidity |
| Country | Ireland |

| ***Programme 50*** | |
|---|---|
| Name | OPTIMAL - OccuPaTIonal therapy self-MAnagement muLtimorbidity |
| Country | Ireland |

| ***Programme 51*** | |
|---|---|
| Name | Renewing Health |
| Country | Italy |

| ***Programme 52*** | |
|---|---|
| Name | The UP-TECH project, an intervention to support caregivers of Alzheimer's disease patients in Italy |
| Country | Italy |

| ***Programme 53*** | |
|---|---|
| Name | Il Chronic Care Model, il Punto Unico di Accesso e il Team Aziendale degli Specialisti (attuali UVA) per la presa in carico della persona con Demenza (The Chronic Care Model, Single Point of Access and Corporate Team of Specialists for taking charge of the person with dementia) |
| Country | Italy |

| ***Programme 54*** | |
|---|---|
| Name | G.O.I.D. (Interdepartmental Operations Group) for the treatment of diabetic foot |
| Country | Italy |

| ***Programme 55*** | |
|---|---|
| Name | IGEA: a chronic disease management project for people with Diabetes |
| Country | Italy |

| ***Programme 56*** | |
|---|---|
| Name | Progetto MATRICE |
| Country | Italy |

| ***Programme 57*** | |
|---|---|
| Name | ARIA |
| Country | Italy |

| ***Programme 58*** | |
|---|---|
| Name | Proposals for clients grouping and assessment of necessary amount of services |
| Country | Latvia |

| ***Programme 59*** | |
|---|---|
| Name | Not available for publication |
| Country | Latvia |

| ***Programme 60*** | |
|---|---|
| Name | Not available for publication |
| Country | Lithuania |

| ***Programme 61*** | |
|---|---|
| Name | Development of Integrated care in Alytus city |
| Country | Lithuania |

| ***Programme 62*** | |
|---|---|
| Name | Integrated Care Development in Anyksciai District |
| Country | Lithuania |

| ***Programme 63*** | |
|---|---|
| Name | Not available for publication |
| Country | Lithuania |

| ***Programme 64*** | |
|---|---|
| Name | Programme de réadaptation au domicile du patient âgé polypathologique suite à un accident de santé |
| Country | Luxembourg |

| ***Programme 65*** | |
|---|---|
| Name | Clinique de l'Hypertension artérielle |
| Country | Luxembourg |

| ***Programme 66*** | |
|---|---|
| Name | Service de rééducation gériatrique - Développement d'une filière gériatrique |
| Country | Luxembourg |

| ***Programme 67*** | |
|---|---|
| Name | Clinique de l'obésité |
| Country | Luxembourg |

| ***Programme 68*** | |
|---|---|
| Name | Not available for publication |
| Country | Malta |

| ***Programme 69*** | |
|---|---|
| Name | Not available for publication |
| Country | Malta |

| ***Programme 70*** | |
|---|---|
| Name | Utrecht Proactive Frailty Intervention Trial |
| Country | Netherlands |

| ***Programme 71*** | |
|---|---|
| Name | AGEhIV Cohort Study (Comorbidity and aging with HIV infection) |
| Country | Netherlands |

| ***Programme 72*** | |
|---|---|
| Name | INCA - the INtegrated Care program |
| Country | Netherlands |

| ***Programme 73*** | |
|---|---|
| Name | Een ziekte komt zelden alleen; werkt het Guided Care model bij mensen met multimorbiditeit |
| Country | Netherlands |

| ***Programme 74*** | |
|---|---|
| Name | Casemanagement in addition to diabetes management for comorbid type 2 diabetes patients (CasCo). |
| Country | Netherlands |

| ***Programme 75*** | |
|---|---|
| Name | Disease Management for Co-morbid Depression and Anxiety (DiMaCoDeA) |
| Country | Netherlands |

| ***Programme 76*** | |
|---|---|
| Name | Good patient care pathways for elderly and chronically ill patients in Norwegian municipalities |
| Country | Norway |

| ***Programme 77*** | |
|---|---|
| Name | Whole, coordinated and safe pathways in the municipalities |
| Country | Norway |

| ***Programme 78*** | |
|---|---|
| Name | National Program for Diabetes |
| Country | Portugal |

| ***Programme 79*** | |
|---|---|
| Name | Not available for publication |
| Country | Slovenia |

| ***Programme 80*** | |
|---|---|
| Name | Electronic Balanced Scorecard for Patients with Multiple Chronic Conditions. |
| Country | Spain |

| ***Programme 81*** | |
|---|---|
| Name | Estrategia de Calidad de los Cuidados de Atención Primaria |
| Country | Spain |

| ***Programme 82*** | |
|---|---|
| Name | Programa de Atención al Mayor Polimedicado. |
| Country | Spain |

| ***Programme 83*** | |
|---|---|
| Name | Continuidad de cuidados tras un alta hospitalaria |
| Country | Spain |

| ***Programme 84*** | |
|---|---|
| Name | Programa integral de atención geriátrica. Unidad de atención a las residencies geriátricas |
| Country | Spain |

| ***Programme 85*** | |
|---|---|
| Name | An integrated care procedure for patients with chronic illnesses |
| Country | Spain |

| ***Programme 86*** | |
|---|---|
| Name | Programa de Atención al Paciente Crónico y Polimedicado |
| Country | Spain |

| ***Programme 87*** | |
|---|---|
| Name | Electronic Health Record System (AP-Madrid): e-Protocols designed for the management of patients with chronic conditions |
| Country | Spain |

| ***Programme 88*** | |
|---|---|
| Name | Marco Referencial de la Continuidad de Cuidados en el Servicio Madrileño de Salud |
| Country | Spain |

| ***Programme 89*** | |
|---|---|
| Name | Estrategia de Atención a Pacientes con Enfermedades Crónicas en la Comunidad de Madrid |
| Country | Spain |

| ***Programme 90*** | |
|---|---|
| Name | Estratificación de la población de acuerdo a su nivel de riesgo. |
| Country | Spain |

| ***Programme 91*** | |
|---|---|
| Name | Receta Electrónica |
| Country | Spain |

| ***Programme 91*** | |
|---|---|
| Name | Strategy for chronic care in Valencia - Estrategia para la atención a pacientes crónicos en la Comunitat |
| Country | Spain |

| ***Programme 93*** | |
|---|---|
| Name | Care of the chronically state of clinical complexity and advanced disease (PCC and MACA) -Programa d'Int |
| Country | Spain |

| ***Programme 94*** | |
|---|---|
| Name | HORUS - Historia Clínica en Atención Primaria y Especializada |
| Country | Spain |

| ***Programme 95*** | |
|---|---|
| Name | Samordning för Linnea - lokala team med samordningsansvar i Kronobergs län |
| Country | Sweden |

| ***Programme 96*** | |
|---|---|
| Name | ViSam modellen |
| Country | Sweden |

| ***Programme 97*** | |
|---|---|
| Name | Not available for publication |
| Country | Sweden |

| ***Programme 98*** | |
|---|---|
| Name | Not available for publication |
| Country | Sweden |

| ***Programme 99*** | |
|---|---|
| Name | Äldres Bästa projekt äldrelots |
| Country | Sweden |

| ***Programme 100*** | |
|---|---|
| Name | Patients complexes |
| Country | Switzerland |

| ***Programme 101*** | |
|---|---|
| Name | Well Connected: Integrated Care Programme for Worcestershire |
| Country | UK |

# Appendix 2

## Care programmes for patients with multimorbidity identified by JA-CHRODIS WP6 partners

Inclusion criteria:

1. Programme/study focused on adult people suffering from multimorbidity or/and frail elderly. So called 'complex chronic patients', patients with 'co-morbidity' or 'pluripathology' were also included.
2. Programme/study took place within healthcare.
3. Programme/study is currently running (2014) or finished in 2009 or later.
4. Programme study took place in Europe (or European countries in combination with other non-European countries).
5. Integrated care programme, i.e. involve (formal) cooperation between at least two services.

**Excluded were:**

- Programmes/studies that focused on elderly in the general population (i.e. not a focus on multimorbidity or frail elderly).
- Programmes/studies that (mainly) focused on patients or elderly in their home environment or in a nursing home (e.g. telehomemonitoring, virtual ward studies were excluded).
- Programmes/studies that mentioned 'multiple medications', but in which it was not clear whether this concerned multimorbid or patients with one chronic disease. However, if the programme or study concerned four or more medications we considered it to address polypharmacy; hence it was included.
- Programmes/studies that were a duplicate of a programme already reported by another JA-CHRODIS WP6 partner or already identified by the ICARE4EU survey.

**Included programmes (n=18)**

| ***Programme 1*** | |
|---|---|
| Name | MACVIA-LR (Multimorbid clinic for chronic diseases) |
| Country | France |
| European/national/regional or local | Regional (Languedoc Roussillon: Montpellier, Nîmes) |
| Date | 2013-2015 |
| Initiated by | Combattre les Maladies Chronique pour un Vieillissment Actif en Languedoc Roussillon. |
| Aim(s) of the programme | To reduce avoidable hospitalizations for chronic diseases in the elderly by 20% in 2020 and increase in Health Life Years (HLY) and Quality of Life (QOL) (full MACVIA-LR project). Specific objectives are the number of patients included in primary care (including remote areas). |
| Population | Patients with multi/comorbid chronic diseases and/or falls. Aimed at adults and the elderly. |
| Care pathways | Integrated pathways for chronic diseases have been initiated in hospitals (secondary care) and remote rural areas (primary care, end 2013). They include multi-sectorial care. |
| Poly-pharmacy | - |
| Patient's adherence to (medical/ lifestyle) treatment or care programme | - |
| (Perceived) outcomes | Evaluations will be carried out every 2 years. Reduce avoidable hospitalisations, increase in Health Life Years (HLY) and Quality of Life (QOL). |
| Contact details | Dr Françoise Radier-Pontal<br>f.radier@offisecure.com |

| ***Programme 2*** | |
|---|---|
| Name | MANAGE CARE (Active Ageing with Type 2 Diabetes as Model for the Development and Implementation of Innovative Chronic Care Management in Europe) |
| Country | Germany |
| European/national/regional or local | European |
| Date | This programs is currently running (2014) |
| Initiated by | Technische Universität Dresden, Germany. |
| Aim(s) of the programme | To develop an innovative Chronic Care Model with applicable standards for clinical pathways as well as guidelines and training curricular for healthcare professionals using these standards. The final deliverable of MANAGE-CARE will be a practical toolkit for the development of chronic care management programs applicable to healthcare management organizations, scientific and medical associations, insurance and payer stakeholders and political partners. |
| Population | Diabetes type 2 patients in Europe as an example for Chronic Care. Applicable not only for Diabetes type 2 care but also for other chronic diseases (e.g. heart failure/COPD or other chronic diseases). Focus specifically on needs of elderly population, but also on young populations. |
| Care pathways | Programme will develop patient pathway recommendations that will become the new reference for chronic care management in Europe. |
| Poly-pharmacy | - |
| Patient's adherence to (medical/ lifestyle) treatment or care programme | - |
| (Perceived) outcomes | MANAGE-CARE will develop recommendations for disease management for elderly people living with chronic diseases, including requirements for the use of new technologies, which will have a strong impact on points of care and the development of medical devices used at home. |
| Contact details | Prof. Peter Schwarz<br>peter.schwarz@uniklinikum-dresden.de<br>PD Dr. Ulrike Rothe<br>ulrike.rothe@tu-dresden.de |

| ***Programme 3*** | |
|---|---|
| **Name** | EMBRACE ('SamenOud') |
| **Country** | Netherlands |
| **European/national/regional or local** | Regional (municipalities of Stadskanaal, Veendam and Pekela) |
| **Date** | This program is currently running, started in January 2012 |
| **Initiated by** | The Department of Health sciences (University Medical Center Groningen, University of Groningen), health insurance company Menzis, and health care organization Meander. |
| **Aim(s) of the programme** | Embrace is an Integrated Elderly Care Program: it is a redesign of the care delivery system into personalized, coherent, proactive and preventive care and support for elderly people of 75 years and older. Patients receive a questionnaire each year to screen their health situation for complex care needs and frailty. Data are used for triage of these patients to a suitable level of care. Embrace recognizes three levels of care intensity, resulting in three main profiles. In each general practice an Elderly Care Team (ECT) organizes coherent, suitable, proactive and preventive care for each individual patient. The GP is in charge of this team, which furthermore comprises a district nurse and a social worker (both in the role of case manager), and an Elderly Care Physician (ECP). The ECTs are supported by a local network of medical and non-medical professionals and volunteers. |
| **Population** | Frail elderly of 75 years and older in the municipalities of Stadskanaal, Veendam and Pekela (in the North part of the Netherlands). Specific attention to multimorbid patients and polypharmacy. |
| **Care pathways** | - |
| **Polypharmacy** | Specific attention will be paid to polypharmacy. |
| **Patient's adherence to (medical/ lifestyle) treatment or care programme** | - |
| **(Perceived) outcomes** | Primary outcome variables will be patient outcomes, service use, costs, and quality of care. |
| **Contact details** | Dr. Klaske Wynia |

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|---|---|
| | k.wynia01@umcg.nl<br>Website:<br>http://www.integratedelderlycare.nl/ |

| ***Programme 4*** | |
|---|---|
| **Name** | The Walcheren Integrated Care Model |
| **Country** | Netherlands |
| **European/national/regional or local** | Regional (Walcheren) |
| **Date** | 2010-2013 |
| **Initiated by** | Erasmus University Rotterdam |
| **Aim(s) of the programme** | To improve the quality and efficacy of care given to frail elderly living independently by implementing and evaluating a preventive integrated care model for the frail elderly: The Walcheren Integrated Care Model (WICM). |
| **Population** | Frail elderly aged 75 years or older. |
| **Care pathways** | The model focuses on the entire chain, from detection to the provision of care, in the fields of prevention, cure, care, welfare and residence, in primary, secondary and tertiary care. |
| **Polypharmacy** | - |
| **Patient's adherence to (medical/ lifestyle) treatment or care programme** | - |
| **(Perceived) outcomes** | The WICM proved to enhance the quality of life of frail elderly and their satisfaction with the quality of care, whilst not enhancing their health care use. Informal caregivers reported to feel less burdened. Health professionals experienced an enhanced integration and coordination of care, a better working environment and they were more satisfied with the continuity and quality of care. Their objective burden increased due to non-patient related tasks (e.g. time spent on the multidisciplinary meeting). The model was not cost-effective. |
| **Contact details** | I.N. Fabbricotti<br>fabbricotti@bmg.eur.nl<br>M. van Werkhoven<br>mvanwerkhoven@ketenzorgzeeland.nl |

| ***Programme 5*** | |
|---|---|
| Name | Patient-centred care pathways for multi-morbid patients across healthcare settings |
| Country | Norway |
| European/national/regional or local | Regional |
| Date | This programs is currently running (2014). Qualitative study conducted in 2009-2010. |
| Initiated by | Healthcare managers from the city of Trondheim in cooperation with St. Olavs Hospital and researchers from the Norwegian University of Science and Technology (NTNU) in Central Norway |
| Aim(s) of the programme | Primary care providers took the initiative to develop a model for integrated care pathways across care levels for older patients in need of home care services after discharge. Initially, the objective was to develop pathways for patients diagnosed with heart failure, COPD and stroke. A common patient-centred care pathway, not disease specific, that could meet the needs of multi-morbid patients was recommended (after the qualitative study). |
| Population | Older patients in need of home care services after discharge. Specifically, patients diagnosed with heart failure, COPD and stroke. |
| Care pathways | Initially, the objective was to develop pathways for patients diagnosed with heart failure, COPD and stroke. A common patient-centred care pathway, not disease specific, that could meet the needs of multi-morbid patients was recommended. |
| Poly-pharmacy | - |
| Patient's adherence to (medical/ lifestyle) treatment or care programme | - |
| (Perceived) outcomes | Not yet available/ unknown. |
| Contact details | Tove Røsstad<br>tove.rosstad@ntnu.no |

| ***Programme 6*** | |
|---|---|
| Name | The establishment of a continuity of care unit (CCU) composed of an internist, a liaison nurse and a social worker, Bidasoa integrated health organization (IHO) |
| Country | Spain |
| European/national/regional or local | Regional (Basque country) |
| Date | 2010-2011 |
| Initiated by | Bidasoa Integrated Health Organisation (Hondarribia, Basque Country, Spain) |
| Aim(s) of the programme | The aims of the CCU are: to support primary care (PC) and providing one-stop appointments to provide a health care unit for patients with multiple conditions. The referral internist (one for each health centre) is responsible for the admission of patients with complex or multiple conditions in the event that they require admission to hospital. The mission of the CCU is to stabilize patients and facilitate continuity of care by the PC doctor and nurse. These patients have in place a continuity of care plan (CCP) between levels of care. The role of the liaison nurse is to support the patient in his/her transition from hospital to home, where they are followed up by PC. The referral internist visits the health centre every other week to undertake clinical sessions with the PC professionals, and is available to general practitioners at any time for any queries they may have. |
| Population | Patients with complex or multiple conditions (including combinations of DM, COPD, high blood pressure, heart failure). |
| Care pathways | Development of integrated care pathways (ICPs): care pathways that specify the relationships between professionals participating in the provision of care related to a specific health problem. In 2011, the ICPs for atrial fibrillation, heart failure (HF) and chronic obstructive pulmonary disease (COPD) were designed. |
| Poly-pharmacy | - |
| Patient's adherence to (medical/ lifestyle) treatment or care programme | - |
| (Perceived) outcomes | The creation of the CCU has resulted in a decrease in hospital admissions and in attendances to the Emergency Department by patients with multiple conditions. |
| Contact details | Iñaki Berraondo Zabalegui<br>ignaciojesus.berraondozabalegui@osakidetza.net |

| ***Programme 7*** | |
|---|---|
| Name | Strategy for proactive integrated care for high-risk, high-cost patients |
| Country | Spain |
| European/national/regional or local | Regional (four health areas) |
| Date | Started in 2012 |
| Initiated by | The Baix Empordà Integrated Health Service (SSIBE *Serveis de Salut Integrats Baix Empordà*). |
| Aim(s) of the programme | Our objective is to be able to define a proactive healthcare strategy for potentially high-cost patients identified using a predictive model. Once defined, this strategy should allow us to divert resources to and tailor interventions for this type of patient. A second objective is to assess whether the interventions adopted are able to decrease the morbidity compared to the expected rates. |
| Population | High-risk, high-cost patients; complex chronic patients. |
| Care pathways | Establish a coordinated care pathway for use on discharge to ensure that patient care is well coordinated in primary care. |
| Poly-pharmacy | Reviewing and updating of prescriptions for complex chronic patients. |
| Patient's adherence to (medical/ lifestyle) treatment or care programme | Assessment of the level of adherence to medications, attendance to primary care/hospital appointments and more specific issues (such as use of inhalers, dietary control, and social risk). |
| (Perceived) outcomes | The identification of high-risk, high-cost patients facilitates the task of care of primary care doctors/nurses and continuity with the other levels of care. The intervention defined has been found to be feasible and has made it possible to identify areas of improvement in the monitoring and control of chronic patients by primary care professionals. |
| Contact details | Xavier Pérez Berruezo<br>xperez@ssibe.cat |

| ***Programme 8*** | |
|---|---|
| Name | Focused care for frail chronic patients: impact of a new care pathway |
| Country | Spain |
| European/national/regional or local | Local/regional (Barcelona) |
| Date | 2010 |
| Initiated by | Viladecans Hospital, Barcelona, Spain |
| Aim(s) of the programme | The aims are: 1) To reduce the number of acute admissions and visits to the Emergency Department related to chronic health problems 2)To assess whether integrated care of frail patients on this special care pathway through the Day Hospital in our organization decreases frequent attendance as an outpatient to specialists. |
| Population | Complex frail patients with multiple pathologies. |
| Care pathways | Designed and implemented a care pathway for complex frail patients with multiple pathologies, which represents a project in care coordination between levels of healthcare (primary care—hospitals—long-term care facilities) to ensure a community approach to such patients and continuity in their care. |
| Poly-pharmacy | - |
| Patient's adherence to (medical/ lifestyle) treatment or care programme | Advise and positive reinforcement by healthcare providers about adherence to therapy and management of multiple health problems toward patients and their relatives (which are family caregivers). |
| (Perceived) outcomes | A care pathway for frail patients with multiple medical conditions, a care coordination project between primary care, hospitals and extended care facilities, was found to be effective for reducing emergency hospital admissions, outpatient visits to specialists and visits to the Emergency Department. In our sample, we should highlight the fact that in the first six months after patients entered the care pathway those whose caregiver was a relative were less often admitted to hospital and seen in the Emergency Department, compared to those with a professional or institutional caregiver. |
| Contact details | Ana María Francisco Lucena afrancisco.hv@gencat.cat |

| ***Programme 9*** | |
|---|---|
| Name | Multiple strategies for clinical medication review and reconciliation of the medication in complex chronic patients improving safety, efficiency and adherence |
| Country | Spain |
| European/national/regional or local | Regional (Catalunya) |
| Date | 2011-2015 |
| Initiated by | CatSalut (Catalan Health Service). |
| Aim(s) of the programme | To promote the safe, effective and efficient use of drugs in order to grant the rational use of medicines. Different interventions to improve medication management are being developed. Main characteristics of these interventions are: patient-centred, participation and comprise of all the organizations from the territory, healthcare professionals coordination and integrated work, multidisciplinary team work. |
| Population | Chronic patients and specifically Chronic Complex patients (defined as people with multiple long-term conditions, hospitalizations and use of resources). |
| Care pathways | - |
| Poly-pharmacy | The implementation of an electronic prescription system and other pharmacological support tools to prevent drug related problems and standard e-messages to facilitate communication with other clinicians concerning prescription modification undertaken. |
| Patient's adherence to (medical/ lifestyle) treatment or care programme | Implement processes on medication review, medication reconciliation and adherence in all the organizations. |
| (Perceived) outcomes | Establish indicators and tools to evaluate the outcomes of the program. Implementation is expected to obtain the following outcomes: 1) improved prescription security through reduced duplication, interaction, contraindicated medications, polypharmacy, number of inappropriate medications and therapeutic cascade in chronic patients; 2) improve the appropriateness of drug treatments; 3) improve medication effectiveness and efficiency; 4) improve patient's adherence to treatments when they have been previously reviewed and afterwards agreed with the patient. |
| Contact details | Anna Coma acomaf@catsalut.cat<br>Corinne Zara czara@catsalut.cat<br>Pilar López pilopez@catsalut.cat<br>Núria Escodanescoda@catsalut.cat |

| ***Programme 10*** | |
|---|---|
| Name | FEDON |
| Country | Spain |
| European/national/regional or local | Regional (Murcia) |
| Date | Started in 2013 |
| Initiated by | Consejería de Sanidad y Politica Social, Region de Murcia. |
| Aim(s) of the programme | In general: to develop a strategy in which the own health care sector is reorganized to better integrate health and social care, facilitating the participation of citizens. More specific: To develop, implement and evaluate a local experience which includes: 1) a set of educational activities essential for the management of chronic disease conditions that foster the autonomy of patients and their caregivers; 2) ICT platforms that facilitate a two-way communication between patients/caregivers and health care providers; 3) integration between hospital records, primary care and social workers ensuring better delivery with safety and convenience for the patients/caregivers. |
| Population | Persons aged 65 years or older from a geographical area (containing both rural and urban settings), whom have either at least a health risk factor or a chronic disease. Also persons who are more in need or at risk of limited literacy. |
| Care pathways | - |
| Poly-pharmacy | - |
| Patient's adherence to (medical/ lifestyle) treatment or care programme | To achieve better adherence to health prescriptions. Pharmacological and non-pharmacological. |
| (Perceived) outcomes | Project is in design phase. Outcomes will include: adherence to health indications, pharmacological and non-pharmacological, quality of life, self-perceived health status, cost-effectiveness and acceptance of the intervention. |
| Contact details | Maria-José Tormo<br>mjose.tormo@carm.es<br>Beatriz Martinez-Lozano Aranaga<br>beatriz.martinez-lozano@carm.es<br>Gorka Sanchez Nanclares<br>gorka.sanchez@carm.es |

| ***Programme 11*** | |
|---|---|
| Name | Adhiérete: assessment of pharmaceutical care services on adherence for elderly chronic and polymedicated patients |
| Country | Spain |
| European/national/regional or local | Regional (Barcelona, Vizcaya, Cáceres, Badajoz) |
| Date | This program is currently running (2014) |
| Initiated by | Consejo General de Colegios Oficiales de Farmacéuticos de Espana (General Council of Pharmacists Chambers of Spain). |
| Aim(s) of the programme | Main aim: To improve adherence for patients > 65 years old who are chronically ill and poly-medicated. Other aims: increase patient's quality of life, detect drug related problems in order to reduce adverse drugs events and improve medicines management, assess the impact of e-prescriptions in terms of efficacy and effectiveness to medication adherence, improve collaborations between doctors and pharmacists, improve the relationship between patient and pharmacist, assess value of pharmacy ICT systems in terms of improved adherence to treatment, contribute to a sustainable and efficient health system by assessing the impact of pharmacy led interventions to adherence. |
| Population | Patients > 65 years old who are chronically ill and poly-medicated and non-adherent to their treatment. |
| Care pathways | - |
| Poly-pharmacy | Specifically aimed at patients with polypharmacy (and chronically ill and non-adherent). |
| Patient's adherence to (medical/ lifestyle) treatment or care programme | Improving (medication) adherence is one of the main aims. |
| (Perceived) outcomes | Perceived outcomes: improvement in patient adherence, improvement in health outcomes, reduction in number of hospitalizations, reduction in number of emergency visits, improvement in patient's quality of life, degree of satisfaction of patients. |
| Contact details | Sonia Ruiz<br>sruizmo@redfarma.org |

| ***Programme 12*** | |
|---|---|
| Name | Population Intervention Plans (PIP's) |
| Country | Spain |
| European/national/regional or local | Regional (Basque country) |
| Date | 2009-2012 |
| Initiated by | Department of Health of the Basque Country |
| Aim(s) of the programme | To improve healthcare (in Basque Country) considering chronic pathology and morbidity. |
| Population | The following groups of patients according to the layers of the pyramid of Kaiser : 1) pluripathology patients (case management); 2) patients with DM, COPD, HF (disease management); 3) physical activity in diabetes, coronary risk, detoxification and smoking cessation and influenza vaccination (self-management/ prevention and promotion). |
| Care pathways | The PIP defined their criteria based on prevalence of chronic diseases and advancing path existence in the coordination between levels of care. |
| Poly-pharmacy | - |
| Patient's adherence to (medical/ lifestyle) treatment or care programme | - |
| (Perceived) outcomes | Citizens of Basque Country have expressed their satisfaction and positive perception of their health system (higher than average users). Furthermore, 16% of the people identified as a target for case management have been actively intervened (high complexity patients), 26% of the population identified as disease management (medium complexity patients) have been intervened, 2% of the population is currently (2012) participating in self-management programs. |
| Contact details | Joana Mora Amengual<br>jmora@kronikgune.or |

| ***Programme 13*** | |
|---|---|
| Name | The Skåne model for medication review and reconciliation |
| Country | Sweden (already implemented in Norway) |
| European/national/regional or local | Regional (Skåne) |
| Date | 2013 |
| Initiated by | Region Skåne/ Skåne County Council |
| Aim(s) of the programme | At least 40% of all patients, 75 years or older with 5 or more types of prescribed medication should have received a cross-professional medication review according to a specific Skåne model. Secondly, at least 70% of discharged patients over 75 years with more than five types of prescribed medicines should receive a medical screening prior to leaving. |
| Population | Patients aged 75 years or older with 5 or more types of prescribed medication. |
| Care pathways | - |
| Poly-pharmacy | Study includes patients aged 75 years or older with 5 or more types of prescribed medication (i.e. polypharmacy). |
| Patient's adherence to (medical/ lifestyle) treatment or care programme | Adherence to medication guidelines. |
| (Perceived) outcomes | Skåne model results in safer care and better health for patients (as implemented in Norway). Specific aims of 2013 not yet evaluated. |
| Contact details | Åsa Bondesson<br>asa.c.bondesson@skane.se |

| ***Programme 14*** | |
|---|---|
| Name | The Torbay Model |
| Country | UK |
| European/national/regional or local | Regional (Torbay and South Devon) |
| Date | 2000-to the present (2014) |
| Initiated by | Torbay & South Devon Health and Care Trust |
| Aim(s) of the programme | To improve quality of care for users, simplify access, reduce number of assessments, improve referral times, improve independence and reduce hospitalisations by integrating community health and social care services in Torbay. Mrs Smith as a case study (a fictitious 80-year-old user of a fragmented range of services). The South Devon and Torbay clinical commissioning group have recently introduced proactive case management of at-risk older people, using predictive risk tools. This has provided an added capability to intervene before hospitalisation occurs. |
| Population | Frail elderly; elderly with complex needs/ high risk of hospital admission (including long-term conditions and complex co-morbidities) |
| Care pathways | Referral pathways were judged to be the priority for improvement because separate routes existed for each profession, some were unnecessarily complex and some were unsupported by information technology. The key question was how the service should be organised: as a centralised specialist service overseeing the pathway between hospital and home (which is the usual model), or linked to GP clusters and the integrated teams within zones. The latter option was chosen and it improved access to intermediate care in the home, which was an important recommendation in the national study of intermediate care (Intermediate Care National Evaluation Team 2006). In Torbay, it meant that the need for formal referral to a separate intermediate care service was eliminated. |
| Poly-pharmacy | - |
| Patient's adherence to (medical/ lifestyle) treatment or care programme | - |
| (Perceived) outcomes | The results of integration include reduced use of hospital beds, low rates of emergency hospital admissions for those aged over 65, and minimal delayed transfers of care. Use of residential and nursing homes has fallen and at the same time there has been an increase in the use of home care services. There has been increasing uptake of direct payments in social care and favourable ratings from the Care Quality Commission. |
| Contact details | Dr Nick Goodwin, International Foundation for Integrated Care.Lara Sonola and Veronika Thiel, The King's Fund London. |

| ***Programme 15*** | |
|---|---|
| Name | Appropriate prescribing for patients and polypharmacy guidance for review of quality, safe and effective use of medication |
| Country | UK |
| European/national/regional or local | Regional (Scotland) |
| Date | Started in 2012 |
| Initiated by | NHS 24 (representing NHS Scotland). |
| Aim(s) of the programme | Enhance the role of pharmacists and encourage closer working with GPs and community services providing personalized care for long-term conditions and minor ailments to ensure people get the best results from their medicines. Aligning it with other specific medicines interventions Scotland will have a coherent quality program to drive safe, effective, person centred practice and deliver pharmaceutical care that improves adherence and clinical outcomes. |
| Population | People with multiple long term conditions and polypharmacy. Especially people identified at risk of emergency admission. |
| Care pathways | - |
| Poly-pharmacy | Specifically aimed at patients with polypharmacy (and multiple long term conditions). |
| Patient's adherence to (medical/ lifestyle) treatment or care programme | Improving medication adherence is a main objective. |
| (Perceived) outcomes | Feedback from health boards on the impact of ongoing reviews (i.e. medication reviews), together with feedback from pharmacists and GPs undertaking the reviews. A previous study with a similar tool (among frail elderly) showed that prescriptions are improved and also patient safety is improved. |
| Contact details | Alpana Mair<br>alpana.mair@scotland.gsi.gov.uk |

| ***Programme 16*** | |
|---|---|
| Name | Achieving benefits for patients by levering the use of risk prediction to support anticipatory care planning at scale through the General Practice contract |
| Country | UK |
| European/national/regional or local | Regional (Scotland) |
| Date | 2013-2014 |
| Initiated by | NHS Scotland |
| Aim(s) of the programme | Acknowledging the potential benefit for patients, their carers, and local health and care service providers, Anticipatory Care Planning and Polypharmacy Review was agreed as part of the Quality and Productivity domain of the General Medical Services contract in Scotland for 2013-2015. This domain assigns GPs the resources required to enable them to identify, review and then co-produce an anticipatory care plan with patients and their carers at significant risk of future emergency admission to hospital. |
| Population | Patients who benefit most from an anticipatory care plans and poly-pharmacy review: Long-term conditions and multi-morbidity. Patients at significant risk of future emergency admission to hospital. |
| Care pathways | - |
| Poly-pharmacy | Poly-pharmacy review is part of the aim. |
| Patient's adherence to (medical/ lifestyle) treatment or care programme | - |
| (Perceived) outcomes | Anticipatory Care Planning combined with a review for medicines for people prescribed multiple drugs can help reduce the risk of medication harm. |
| Contact details | Dr John Nugent<br>john.nugent@scotland.gsi.gov.uk<br>Anne Hendry<br>anne.hendry@scotland.gsi.gov.uk<br>Susan Bishop<br>susan.bishop2@scotland.gsi.gov.uk |

| ***Programme 17*** | |
|---|---|
| Name | SPARRA (Scottish Patients at Risk of Readmission and Admission): Risk prediction in the community |
| Country | UK |
| European/national/regional or local | Regional (Scotland) |
| Date | Started in 2012 |
| Initiated by | The Information Services Division Scotland |
| Aim(s) of the programme | SPARRA helps practitioners plan and co-ordinate the care and support for people with complex or frequently changing needs, achieving a better experience and outcomes for the patient and avoiding emergency hospitalization. Regular use of SPARRA data should also prompt discussions at multi-disciplinary, multi-agency team meetings with practices or other settings and helps make best use of people, resources and services. |
| Population | Three different cohorts: a younger chaotic lifestyle group, a long term conditions cohort and a frail elderly group. |
| Care pathways | New community pathways are further being developed between primary care, social care and secondary care as a result of using a more integrated approach to patient case management in the community. |
| Poly-pharmacy | Poly-pharmacy review is part of the programme. |
| Patient's adherence to (medical/ lifestyle) treatment or care programme | - |
| (Perceived) outcomes | SPARRA has helped to identify patients earlier, before they require intervention from acute secondary services. Primary and community care interventions include better care planning and referral for patients, and more appropriate prescribing of medicines. Improved secondary care outcomes should include a reduction in the expected number of readmissions, the number of hospital beds used and a reduced length of stay for patients who have had a community intervention. |
| Contact details | http://www.isdscotland.org/Health-Topics/Health-and-Social-Community-Care/SPARRA/ |

| ***Programme 18*** | |
|---|---|
| Name | COINCIDE trail |
| Country | UK |
| European/national/regional or local | Regional (North West of the UK) |
| Date | This program started in 2012, anticipated end date 2013 |
| Initiated by | University of Manchester |
| Aim(s) of the programme | COINCIDE trial will test the effectiveness of collaborative care in the UK for patients with depression and a long-term condition (i.e. diabetes and/or coronary heart disease). |
| Population | Care for depression in people with diabetes type 1 or 2 and/or coronary heart disease. |
| Care pathways | - |
| Poly-pharmacy | - |
| Patient's adherence to (medical/ lifestyle) treatment or care programme | - |
| (Perceived) outcomes | We will measure levels of depression at study entry and at six month follow-up to evaluate if patients receiving collaborative care have lower levels of depression, compared to those that received usual care. The trial will also evaluate the extent to which patients have utilized health care services and examine the cost-effectiveness of collaborative care. |
| Contact details | Dr. Andrea Cherrington<br>Andrea.cherrington@manchester.ac.uk<br>Website: http://clahrc-gm.nihr.ac.uk/coincide/ |

# Appendix 3

## JA-CHRODIS module in questionnaire filled out by contact persons of the 101 care programmes identified by the ICARE4EU project

**Pathways, polypharmacy & adherence**

1. A. To what extent are care pathways[4] concerning the continuity of multimorbidity care part of the programme?

- ○ This is not part of the programme (please proceed to question 13)
- ○ This is a small part of the programme
- ○ This is a substantial part of the programme
- ○ This is completely what the programme is about

B. Please briefly describe the activities concerning care pathways within the programme.

…….(max 300 characters)

C. Please specify what kind of activities related to care pathways are performed in the programme.

…….(max 300 characters)

D. Is one specific care provider (e.g. central care provider or case manager) responsible for these care pathways?

- ○ No
- ○ Yes, namely: (function/type of care provider)

…….(max 100 characters)

E. Please indicate which disciplines are involved in the part of the care programme that is dedicated to care pathways.

*Please tick all boxes that apply*

- ☐ General practitioners
- ☐ Medical specialists
- ☐ District / community nurses
- ☐ Specialized nurses
- ☐ Pharmacists
- ☐ Physiotherapists
- ☐ Dieticians

[4] *[Infobox: A care pathway is a multidisciplinary outline of anticipated care, placed in an appropriate timeframe, to help patients with a specific condition or set of symptoms move progressively through a clinical experience to positive outcomes. Other terms are: clinical pathways, critical pathways, integrated care pathways, care maps.]*

- ☐ Psychologists / psychotherapists
- ☐ Occupational therapists
- ☐ Social workers
- ☐ Informal carers
- ☐ Other, namely: …… (max 100 characters)

(+option to add a maximum of 3 other's)

F. Has this particular part of the programme (care pathways) been evaluated?

- ○ Yes, internally
- ○ Yes, by an external organization
- ○ No
- ○ No, but internal evaluation is planned for month- year (1-12, 2011-2018)
- ○ No, but external evaluation is planned for month- year (1-12, 2011-2018)

G. Concerning the care pathways, please indicate for each of the aspects below whether a) it was set as a goal, and b) whether it has been reached.

a. Improved clinical outcomes
b. Improved physical functioning
c. Improved patient participation in society[5]
d. Improved quality of life
e. Reduced hospital (re)admissions
f. Improved patient satisfaction
g. Improved staff and management responsiveness
h. Improved cost effectiveness
i. Improved equity
j. Increased competencies of the staff

| *Set as goal?* | | *Reached?* | | |
|---|---|---|---|---|
| Set as goal | Not set as a goal | Reached | Not reached | Not evaluated |
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[5] *[Infobox: with patient participation in society we mean aspects such as labour participation, participation in leisure activities, having social contact and the ability to use neighbourhood services/facilities]*

2. A. To what extent is management of multiple medication (polypharmacy) part of the programme?

- ○ This is not part of the programme (please proceed to question 14)
- ○ This is a small part of the programme
- ○ This is a substantial part of the programme
- ○ This is completely what the programme is about

B. Please briefly describe the activities concerning polypharmacy management within the programme.

……(max 300 characters)

C. Please specify what kind of activities related to polypharmacy management are performed in the programme.

……(max 300 characters)

D. Is one specific care provider (e.g. central care provider or case manager) responsible for polypharmacy management.

- ○ No
- ○ Yes, namely: (function/type of care provider)

……(max 100 characters)

E. Please indicate which disciplines are involved in the part of the care programme that is dedicated to polypharmacy management.

*Please tick all boxes that apply*

- ☐ General practitioners
- ☐ Medical specialists
- ☐ District / community nurses
- ☐ Specialized nurses
- ☐ Pharmacists
- ☐ Physiotherapists
- ☐ Dieticians
- ☐ Psychologists / psychotherapists
- ☐ Occupational therapists
- ☐ Social workers
- ☐ Informal carers
- ☐ Other, namely: …… (max 100 characters)

(+option to add a maximum of 3 other's)

F. Has this particular part of the programme (polypharmacy management) been evaluated?

- ○ Yes, internally
- ○ Yes, by an external organization
- ○ No
- ○ No, but internal evaluation is planned for month- year (1-12, 2011-2018)
- ○ No, but external evaluation is planned for month- year (1-12, 2011-2018)

G. Concerning polypharmacy management, please indicate for each of the aspects below whether a) it was set as a goal, and b) whether it has been reached.

a. Improved clinical outcomes
b. Improved physical functioning
c. Improved patient participation in society
d. Improved quality of life
e. Reduced hospital (re)admissions
f. Improved patient satisfaction
g. Improved staff and management responsiveness
h. Improved cost effectiveness
i. Improved equity
j. Increased competencies of the staff

| *Set as goal?* | | *Reached?* | | |
|---|---|---|---|---|
| Set as goal | Not set as a goal | Reached | Not reached | Not evaluated |
| | | | | |
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3. A. To what extent are activities concerning adherence to the (medical) treatment part of the programme?

- ○ This is not part of the programme (please proceed to question 15)
- ○ This is a small part of the programme
- ○ This is a substantial part of the programme
- ○ This is completely what the programme is about

B. Please briefly describe the activities concerning adherence to (medical) treatment within the programme.

…….(max 300 characters)

C. Please specify what kind of activities related to adherence to (medical) treatment are performed in the programme.

…….(max 300 characters)

D. Is one specific care provider (e.g. central care provider or case manager) responsible for the activities concerning adherence to (medical) treatment?

- ○ No
- ○ Yes, namely: (function/type of care provider)

…….(max 100 characters)

E. Please indicate which disciplines are involved in the part of the care programme that is dedicated to adherence to (medical) treatment.

*Please tick all boxes that apply*

- ☐ General practitioners
- ☐ Medical specialists
- ☐ District / community nurses
- ☐ Specialized nurses
- ☐ Pharmacists
- ☐ Physiotherapists
- ☐ Dieticians
- ☐ Psychologists / psychotherapists
- ☐ Occupational therapists
- ☐ Social workers
- ☐ Informal carers
- ☐ Other, namely: …… (max 100 characters)

(+option to add a maximum of 3 other's)

F. Has this particular part of the programme (adherence) been evaluated?

- ○ Yes, internally
- ○ Yes, by an external organization
- ○ No
- ○ No, but internal evaluation is planned for month- year (1-12, 2011-2018)
- ○ No, but external evaluation is planned for month- year (1-12, 2011-2018)

G. Concerning adherence to (medical) treatment, please indicate for each of the aspects below whether a) it was set as a goal, and b) whether it has been reached.

| | *Set as goal?* | | *Reached?* | | |
|---|---|---|---|---|---|
| | Set as goal | Not set as a goal | Reached | Not reached | Not evaluated |
| a. Improved clinical outcomes | | | | | |
| b. Improved physical functioning | | | | | |
| c. Improved patient participation in society | | | | | |
| d. Improved quality of life | | | | | |
| e. Reduced hospital (re)admissions | | | | | |
| f. Improved patient satisfaction | | | | | |
| g. Improved staff and management responsiveness | | | | | |
| h. Improved cost effectiveness | | | | | |
| i. Improved equity | | | | | |
| j. Increased competencies of the staff | | | | | |

# FOCUS ON COST-EFFECTIVENESS: FINDINGS FROM SYSTEMATIC REVIEWS

# 1. COST-EFFECTIVENESS EVALUATION

In order to achieve one of specific component of this deliverable (D07-02) we performed an evaluation of cost-effectiveness of comprehensive care programs for multimorbid patients as stated in the paragraph 3.2 Healthcare utilization and costs of TASK 2 report (Innovative health care approaches for patients with multimorbidity in Europe).

In details three systematic reviews were taken into account and to follow we have synthesized results and conclusion to give further information useful to go inside this issue.

## 1.1. Systematic reviews:

### 1.1.1. Smith et al., 2012

*Results*

Four organizational studies provided data on costs. These data were difficult to compare across the studies and were often presented in relation to non-significant results, indicating that no study had identified a significantly cost-effective intervention.

Two patient oriented studies provided data on directs costs of providing the intervention. One calculated that the reduction in hospital admissions led to a saving in healthcare costs per participant of […] (€ 611), which was 10 times the cost of the intervention.

*Conclusions*

Costs were presented in six studies but data were only provided on direct costs. The results relating to improved prescribing and risk factor management, particularly in the comorbidity trials, indicate a potential for these interventions to reduce health service costs over longer periods.

### 1.1.2. de Bruin, et al., 2012 Review

*Results*

There is moderate evidence for a beneficial effect of comprehensive care on inpatient healthcare utilization and healthcare costs. There is insufficient evidence for an effect of comprehensive care on outpatient healthcare utilization.

*Conclusions*

Despite indications that comprehensive care programs for multimorbid patients decrease inpatient healthcare utilization and healthcare costs, improve […], it is as yet too early to draw firm conclusions regarding their effectiveness.

### 1.1.3. Hopman et al. (submitted)

*Results*

Regarding the impact of comprehensive care on healthcare utilization and costs, there is no evidence that the provision of comprehensive care results in a reduced number of primary care or GP visits in people with multimorbidity or frailty or in cost savings, and insufficient evidence was found that comprehensive care results in a reduced use of inpatient care (Figure 1 and 1a)

*Conclusions*

It is clear that, like in the previous review of de Bruin and colleagues, the poor quality of many studies hindered us to draw firm conclusions. Apart from that our review did not show any result whatsoever that justifies a belief in a beneficial effect of comprehensive care on healthcare utilization by multimorbid or frail people nor on its costs.

## 1.2. Overall conclusion

It is unknown whether integrated care programmes targeting people with multimorbidity are cost-effective, because cost-effectiveness studies have hardly been conducted until now. Some (other) studies show a reduction in hospital admissions as a result of providing integrated care to people with multimorbidity or frailty, which might lead to lower healthcare costs at the long run. However, the evidence is not conclusive and more studies of good quality are needed to draw firm conclusions.

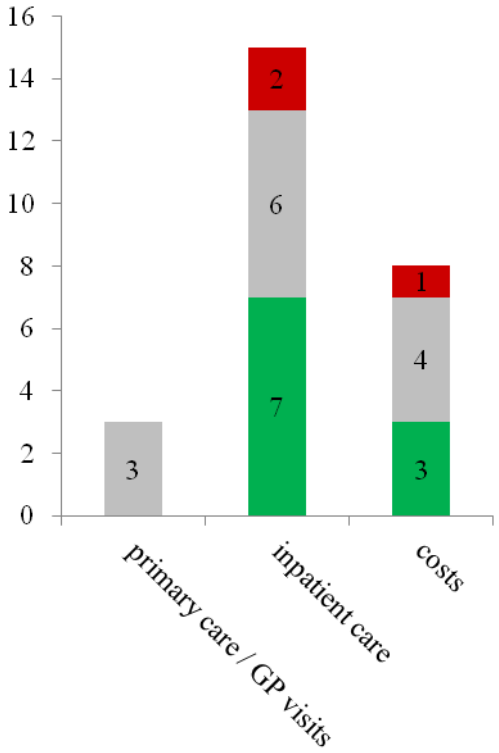


*Figure 1: Summary of the reported effects of comprehensive care programs on healthcare utilization and costs based on all studies included (Hopman et al review)*

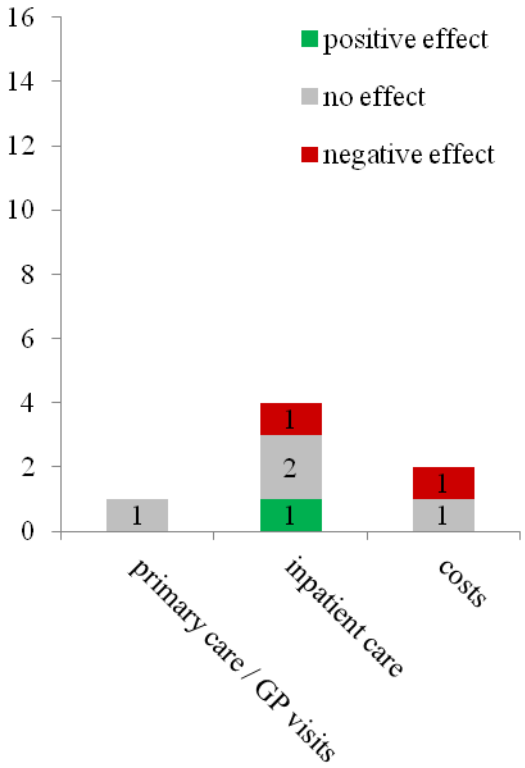


*Figure 1.a: Summary of the reported effects of comprehensive care programs on healthcare utilization and costs based on studies with a good or high quality sum-score.*

# Literature references

1. Smith SM, Soubhni H, Fortin M, Hudon C, O'Dowd T. Managing patients with multimorbidity: systematic review of interventions in primary care and community settings. BMJ 2012; 345. DOI: 10.1136/bmj.e5205.

2. de Bruin SR, Versnel N, Lemmens LC, Molema CCM, Schellevis FG, Nijpels G, Baan CA. Comprehensive care programs for patients with multiple chronic conditions: a systematic literature review. Health Policy 2012, 107: 108–145.

3. Hopman P, de Bruin SR, Forjaz MJ, Rodriguez-Blaszquez C, Tonnara G, Lemmens LC, Onder G, Baan CA, Rijken M. Effectiveness of comprehensive care programs for patients with multiple chronic conditions or frailty: a systematic literature review. Submitted.

# CHAPTER 2

# TASK 3 REPORT – Multimorbidity care model: Recommendations from the consensus meeting of the Joint Action on Chronic Diseases (JA-CHRODIS)

# Authors

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# INTRODUCTION

Worldwide health care systems are currently faced with a significant and growing challenge of multimorbidity, defined as the co-occurrence of multiple chronic diseases in a single patient. The prevalence of multimorbidity is high (Tinetti et a, 2012) and increases with age, affecting more than 60% of people aged 65 or older (Barnett et al 2012, Melis et al, 2014, Marengoni et al, 2008, Marengoni et al, 2011). Multimorbidity is associated with numerous negative outcomes, including mortality, disability, low quality of life and high healthcare costs (Onder et al, 2015).

Patients with multimorbidity have complex health needs but, due to the current traditional disease-oriented approach, they face a highly fragmented form of care that leads to incomplete, inefficient, ineffective and possibly harmful clinical interventions, and are likely to receive complex drug regimens which increase the risk of inappropriate prescribing, drug-drug interactions, and poor adherence (Fortin et al, 2007)

As the care and treatment of multimorbid is complex, it often involves a large number of healthcare providers and resources. There is limited evidence on the currently available care pathways for multimorbidity; there are few examples of integrated care programs for chronic diseases implemented in relatively small populations (for a review see Hopman et al, 2015). Most of the interventions implemented have been multi-dimensional, including different components, but are but poorly standardized. Therefore, evidence on the efficacy of care pathways for multimorbidity provide conflicting results, and there are no widely accepted care models for multimorbidity (Smith et al, 2012). All these factors lead to a need to develop a system that works for multimorbidity to deliver good quality of care to these patients (Banerjee, 2014).

With this challenge in mind, a group of experts met to discuss the components of a multimorbidity care model. The aim was to assess these components to discuss their definition, aims, key characteristics, target population and relevance for patients with multimorbidity in order to develop a framework for care of multimorbid that can be applied

across Europe. This was done within a project funded by the European Commission; the Joint Action on Chronic Diseases and Promoting Healthy Ageing across the Life Cycle (JA-CHRODIS). This project specifically focuses on development of common guidance and methodologies for care pathways for multimorbid patients (Onder et al, 2015, Cordis 2015), and includes over 60 European partners, including national and regional departments of health and research institutions from 26 EU Member States.

The process for developing this multimorbidity care model is as follows. First, we identified a list of components from existing comprehensive care programs for patients with multiple chronic conditions or frailty (for a systematic review, see Hopman et al. 2015). These components were present in one or more care programs, either in isolation or combined with other components. Twenty components were identified across five domains (Table 1). Based on discussion, the experts decided that from the initial list of twenty components, sixteen were selected by the experts. These sixteen components are discussed in depth later.

*Table 1: Original list of components discussed during the 1st JA-CHRODIS WP6 Expert Meeting, identified by a systematic review (Hopman et a, 2015).*

| Type of component | Components |
|---|---|
| Delivery of system design | - Regular comprehensive assessment<br>- Multidisciplinary team<br>- Individualized care plans<br>- Appointment of a case manager |
| Decision support | - Implementation of evidence-based medicine<br>- Team training |
| Self-management support | - Training of care providers to tailor self-management support for patients<br>- Providing options for patients to improve their health literacy<br>- Patient education<br>- Involving family members and family education<br>- Offering approaches to strengthen patients' self-management and self-efficacy |

| | |
|---|---|
| | - Involving patients in decision-making<br>- Training patients to use medical devices, supportive aids and health monitoring tools correctly |
| Clinical information system | - Electronic patient records and computerized clinical charts<br>- Exchange of patient information<br>- Uniform coding of patients' health problems<br>- Patient platforms allowing patients to exchange information with their care providers |
| Community resources | - Access to community resources<br>- Involvement of social network<br>- Psychosocial support |

Second, after identification of the possible components of the care model, a selection of experts met to discuss the relevance of the components (see author list). The experts were chosen to ensure a diverse group who represent both the patients and care providers, and included physicians specialized in different specialties (neurologists, geriatricians, internists, cardiologists, endocrinologists), epidemiologists, and psychologists, as well as representatives from patient organizations such as the European Patient Forum. The 1st JA-CHRODIS WP6 Expert Meeting was held on October 28, 2015 in Brussels, Belgium.

During the meeting, each component was discussed by the experts to decide on a definition, and discuss aims, key characteristics, target populations, and relevance for patients with multimorbidity in order to develop a framework for care of multimorbid that can be applied across Europe. The overall aim was to describe the components of a multimorbidity care model to implement in the care and treatment of patients with multimorbidity. In this article we describe the sixteen components that were identified by the experts as being key for an optimum care model for multimorbid, outlining the description and aims of each component, the key characteristics, and the specific relevance to patients with multimorbidity. This report outlines an ideal clinical scenario to be applied within different health care systems in Europe, with room for interpretation applicable to the different systems.

# SECTION 1: DELIVERY OF THE CARE MODEL SYSTEM

## Component 1. Regular comprehensive assessment of patients

***Description and aims:*** Regular comprehensive assessment of patients, including, i) assessment of the complexity of conditions and/or medical treatment, as well as treatment burden and interactions, and ii) evaluation of patients' preferences and personal resources (e.g. coping skills, health literacy), and social resources (e.g., available social network). Comprehensive assessment is a diagnostic process that should be used to determine the medical, psychological, and functional capabilities of patients with multimorbidity in order to develop a coordinated and integrated care plan for multidisciplinary treatment and long-term follow-up of patients. This comprehensive multidisciplinary assessment should examine the burden of treatment and assess specific diseases and patterns, as well as evaluate the desires and opinions of patients and relatives, social support, and resources available to patients in order to achieve an agreement on the patient's individualized care plan (see Component 4). Patient risk stratification should be done during comprehensive assessment, to identify the risk of complications and level of care needs (for example, a low risk patient might be one with few co-morbid conditions requiring little self-management and no home-help care needs, whereas a high risk patient might be one with multiple comorbidities requiring numerous pharmaceutical drugs, daily self-management, and significant care needs to support functional limitations).

***Key Characteristics:*** Regular comprehensive assessment should be done using standardized assessment tools where possible, along with a clinical interview. The assessment should preferably take into account all current and previous information from other resources, such as clinical records and other physician assessments. It should assess the complexity of conditions including treatment burden, drug interactions, and disease patterns etc. The comprehensive assessment should identify key aspects which will be used in any consequent care planning steps, including patient empowerment and allocating resources, through the construction of an individualized care plan, which is reviewed and updated during the regular

subsequent assessments and shared between care providers, as well as with patients and their families (see Component 4).

***Relevance to multimorbid:*** Due to complexity of multimorbid, adverse outcomes related to the presence of multiple diseases, and the risk of drug-drug interactions, multimorbid need a comprehensive and extensive assessment that takes into account all underlying medical disorders and evaluates the complex care needs of the patient. Regular reassessment is of particular importance to these patients, due to changing symptoms and severity of ongoing multiple chronic disorders.

## Component 2: Multidisciplinary, coordinated team

***Description and aims:*** One of the main features of the regular comprehensive assessment (see Component 1) is the inclusion of a multidisciplinary team and network to evaluate and deliver treatment and care relating to the patient's functioning, impairments, and social support. The use of a multidisciplinary team aims to address disease specific needs, avoiding fragmentation and ensuring continuity of care. The objectives are to increase efficiency and accessibility of care by providing multidisciplinary care both in terms of different levels of the healthcare profession (nurses, physicians, physiotherapists, social workers etc.) and different disease specializations.

***Key Characteristics:*** Teams should be composed of a clinician with a generalist approach (e.g., geriatrician, internist, general practitioner), as well as specialists in the relevant diseases, and healthcare professionals addressing pharmacological needs, social care, and psychological aspects. One nominated clinician responsible for overseeing the care and making clinical decisions about the patient's treatment and care is essential to ensure continuity of care, and where necessary, the provision of a case manager to act as the primary contact for the patient and coordinate their care plan, manage care, and arrange social support should be considered (see Component 3). Involvement of the patient's general practitioner should be emphasized, and coordination between all relevant team members must be maximized (supported by the information systems described later).

***Relevance to multimorbid:*** Multimorbid have, by definition, multiple comorbid conditions requiring care and treatment from different medical specialists and might also have functional and social care needs requiring access to multiple care service providers. Providing these patients with a coordinated and integrated team to manage their overall care aims to maximize outcomes and increase continuity of care, while decreasing fragmentation and optimizing access to care and services.

## Component 3: Professional appointed as coordinator of the individualized care plan and contact person for patient and family ("case manager")

***Description and aims:*** Patients with complex care needs should be appointed a case manager, who is the primary contact point for the patient and their family, representing a single entry point into the system. The case manager should act as coordinator between patient and various members of the multidisciplinary team to manage care, actively linking the patient to providers, medical services, residential, social, behavioral, and other support services where needed in the most effective way, monitoring continuity of care, follow-ups, and documentation. This aims to increase accessibility to healthcare, and improving continuity and effectiveness of following the individualized care plan.

***Key Characteristics:*** A named contact person, acting as a single access point to the system for communication between the patient and the team. As described in Component 2, patients should also have a named senior clinician, who is responsible for overseeing the care and treatment of the patient.

***Relevance to multimorbid:*** A case manager is necessary for multimorbid with complex care needs, who need a coordinated level of care that integrates various levels of healthcare and support.

## Component 4: Individualized Care Plans

***Description and aims:*** Individualized, coordinated, and integrated plans for the treatment and long-term follow-up of patients should be developed based on the comprehensive

assessment by the multidisciplinary team, including a patient-centered approach that considers the preferences of the patients, and the prioritization of cross-disease, holistic approach, including targeting symptoms, functional ability, quality of life, desired patient outcomes etc.

***Key Characteristics*:** Patient-centered, and focused on multiple outcomes, the written plan should be agreed with the patient (or with the family/caregiver in the case of patients with, for example, severe cognition impairment) and shared with the multidisciplinary team, including the senior clinician, care manager, general practitioner, and families (with permission of the patient). The individualized care plans should be reviewed and modified at each reassessment of the patient, and any changes shared with the team. The individualized care plan may include a risk assessment of the patient, identifying those with a high risk of adverse negative outcomes, and a case manager should be appointed (see Component 3). The plan should specify the nominated clinician in charge of the patients overall care decisions (see Component 2).

***Relevance to multimorbid:*** Individualized care plans are of particular relevance to multimorbid because they incorporate the information from different physicians and health care providers, incorporating a plan that is integrated and coordinated, focusing on integrated outcomes rather than disease specific outcomes.

# SECTION 2: DECISION SUPPORT

## Component 5. Implementation of evidence based practice

***Description and aims:*** Flexible application of disease-specific evidence based guidelines, with consideration of multimorbidity, disease interactions, and drug-drug interactions should be used. Healthcare providers should promote clinical care that is consistent with available scientific evidence and is consistent with patient preferences. As specific disease guidelines do not represent the evidence base for multimorbidity, caution is needed, applying a critical appraisal of the evidence, with critical review by the multidisciplinary team.

***Key Characteristics:*** Assessment, treatment, and care should be consistent with scientific evidence. The use of guidelines is encouraged, but must be multimorbidity-centered, with focus on drug-drug and disease interactions, while also considering the preferences of the patient.

***Relevance to multimorbid:*** Current evidence specific to multimorbidity is relatively scarce, and future research needs to focus on this, moving away from disease-specific guidelines.

## Component 6. Training members of the multidisciplinary team

***Description and aims:*** Training members of the multidisciplinary team is an important element of multimorbidity care, aiming to improve knowledge and skills, focus on the following themes: comprehensive assessment concepts, multimorbidity and its consequences, health outcomes, innovation technologies, implementation of individualized treatment/care plans and goal setting, working effectively as a team, training in the critical appraisal of knowledge and evidence based knowledge, patient-centeredness, patient empowerment, and self-management (see Component 8). Key team members should receive training, as well as any external experts who provide treatment or care to the patient on specific occasions.

***Key Characteristics.*** Training and education should focus specifically on multimorbidity and care of multimorbid, despite the lack of current evidence based guidelines, and be targeted mainly towards case managers, persons who are responsible for the coordination of care, core team members, and preferably specialists who supply regular, significant care or treatment to the patient.

***Relevance to multimorbid:*** As the care of multimorbid requires a more comprehensive and integrated care approach than patients with less complex clinical needs, training on effective teamwork and how to integrate care and treatment should aim to help to improve outcomes, increase motivation, and build care plans, among others.

## Component 7. Developing a consultation system to consult professional experts

***Description and aims:*** The development of a consultation system to discuss patient care and treatment with specialist with professional experts (e.g. highly specialized medical specialists, but also medical/clinical psychologists with specific expertise, e.g. cognitive problems, frailty). These consultants should be trained for the care of multimorbid, or similar (see Component 6). This aims to provide decision support in situations where further clinical support or knowledge is needed outside of the core team. Providing the multidisciplinary team with access to high competence in all cases that are particular and delicate or when a sufficient expertise is not available will provide significant value. The aim is to increase accessibility to very specific professionals and specific knowledge.

***Key Characteristics:*** Providing more simple access to expertise that is not part of the core multimorbidity team, e.g., via creation of a web-based official expert list at a national level.

***Relevance to multimorbid:*** This is of particular relevance to multimorbid, who may present for treatment to a specialist who does not have expertise in the other comorbid conditions of the patient. Sharing of expert knowledge, and assessing and treating the person's multimorbid condition rather than focusing on specific morbidities aims to increase treatment outcomes and improve quality of treatment and care. Involving external experts in the multimorbidity team will enable continuity of the individualized care plan, while allowing a high level of professional input.

# SECTION 3. SELF MANAGEMENT SUPPORT

## Component 8. Training of care providers to tailor self-management support based on patient preferences and competencies:

***Description and aims:*** The training of staff to support self-management among patients and their caregivers, via comprehensive training of health care professionals (such as through

courses, online training, educational materials). This should also include encouraging patients to increase health literacy and tailored health promotion and prevention strategies.

***Key characteristics:*** Focusing on communicating to patients (using lay language, listening actively to patients, apply human rights approaches), and encouraging adherence to treatment, and enhancing patient empowerment.

**Relevance to multimorbid:** This is relevant to multimorbid as they have complex care needs, constantly changing severity of disease, a higher need for self-management, and a greater risk of polypharmacy. Many of the conditions often need to be managed outside the clinical setting, frequently including non-pharmaceutical interventions such as lifestyle changes including diet and exercise.

## Component 9. Providing options for patients and families to improve their self-management.

***Description and aims:*** Providing options and support for patients and their families and caregivers to improve the self-management of their conditions, including patient training and support tailored to patients' preferences and competencies. This includes offering approaches (e.g. online courses, group-based courses, individual counselling, dependent on patients' preferences and competencies) to strengthen patients' self-management and self-efficacy, including explaining their diagnoses, diseases, and medical conditions, as well as providing information on medication use, and training patients to use medical devices, supportive aids, and health monitoring tools correctly (for example, blood pressure and glucose monitoring tools etc.). Family members should be included and family education should be encouraged where appropriate, with consent of the patient. The aims are to improve self-management, promote healthy lifestyles, and encourage patients to actively participate in decision making, while supporting them in coping with chronic conditions in their daily life.

***Key Characteristics:*** Education should be personalized to the patients, consistent with their individualized care plans, taking into account their knowledge, educational level, health literacy, and functional aspects (such as whether they have visual problems or cognitive

impairment, which might affect comprehension). It aims to empower patients, to enable shared decision making and encourage self- monitoring of outcomes, improving communication between patients and care providers, and increasing adherence to treatment. Care should be taken regarding confidentiality issues, according to privacy policies and patient preferences.

***Relevance to multimorbid:*** Self-management is often more complicated in patients with multimorbidity, as they have numerous conditions to monitor simultaneously, many of which affect the other comorbidities. Empowering patients is crucial for chronic conditions in order to improve outcomes without resulting in excessive healthcare costs.

## Component 10. Shared decision making (care provider and patients)

***Description and aims:*** Health care professionals should include the patient (and, where relevant, their family) in making decisions about their care and treatment, including identifying their individual needs as well as deciding on future goals and outcomes to aim for. Individualized care plans should be constructed that represent these shared desires and decisions, and shared with the patient and relevant care providers (See component 4).

***Key Characteristics:*** The involvement of family members and caregivers should carefully consider confidentiality issues, and be done according to privacy policies and patient preferences.

***Relevance to multimorbid:*** This is relevant to multimorbid as they often have complex care needs that need careful consideration of potential negative outcomes, including loss of physical functioning, depression, and reduced quality of life. Treatment side effects and lifestyle changes that affect these patients are not simple, and therefore need active involvement of the patient where necessary.

# SECTION 4. INFORMATION SYSTEMS AND TECHNOLOGY

## Component 11. Electronic patient records and computerized clinical charts

***Description and aims:*** Electronic patient records and computerized clinical charts to allow exchange of patient information (with permission of patient) between the multimorbidity team and other care providers and sectors by compatible clinical information systems. This includes any electronic technology used to enter data and manage the care of patients, to keep track of their medical history, diagnoses, symptoms, hospital visits, health care utilization, care needs, or medications etc., allowing different providers of health and social care to share information about a single patient, preferably using standardized tools and similar diagnostic systems (see Component 13).

***Key Characteristics:*** Preferably there should be a level of standardization of what is included within electronic records, with a minimum basic data set that includes, for example, results of the comprehensive assessment, individualized care plans, patient preferences etc.

***Relevance to multimorbid***: As multimorbid patients often have multiple care providers and attend numerous health care clinics, electronic patient records would represent a valuable tool for sharing information between the services, allowing physicians to access important information about the patient that might otherwise be missed, such as potential drug-drug interactions, additional medical diagnoses etc. Allowing healthcare providers to view the patient's individualized care plan, comprehensive assessment and medical history electronically, will increase efficiency, allowing new team members, for example, to view the whole case and clinical history more efficiently, and therefore provide more appropriate care and treatment.

## Component 12. Exchange of patient information (with permission of patient) between care providers and sectors by compatible clinical information systems.

***Description and aims:*** This component involves different providers of health and social care sharing information about a single patient, preferably using standardized tools and similar diagnostic systems (see Components 11 and 13). It is important to have a comprehensive set

of information available for all healthcare providers and decision makers because without it updating individualized care plans might be too slow, and therefore any acute care or management of the patient may be compromised. The benefits include increased speed of care and decision making, as well as improved comprehensiveness.

***Key Characteristics:*** Patient confidentiality must always be paramount, and therefore, patients must give their permission for information exchange.

***Relevance to multimorbid***: Multimorbid patients frequently have multiple care providers, and information sharing may help to decrease adverse events related to their care and treatment, such as drug-drug interactions, etc. Viewing the patient as a person with comorbid conditions, rather than treating individual diagnoses, is an important part of multimorbidity care, which can be achieved via information sharing between physicians and care providers.

## Component 13. Uniform coding of patients' health problems where possible.

***Description and aims:*** Using the same classification system to evaluate and record symptoms, diagnoses, medication, patient-reported outcomes, individualized treatment/care plans, and aspects of health care utilization between nurses, physicians, and other care providers.

***Key Characteristics:*** International Classification of Functioning, Disability, and Health (ICF) codes, or standardized patient reported outcomes, healthcare usage, and other factors relevant to the care plan, as well open, non-coded fields, for example, for patient preferences. These should preferably be standardized between different organizations, using inter-organizational communication forms.

***Relevance to multimorbid:*** Patients with multimorbidity often have multiple physicians and numerous diagnoses, and therefore a uniform system for coding diagnoses and other information relating to their treatment and care is essential for ensuring continuity of care and sharing of information between care providers.

### Component 14. Patient-operated technology allowing patients to send information to their care providers.

***Description and aims:*** Patient-operated technology allowing patients to send information (e.g., health monitoring data) to their care providers to complement face to face visits (with consent/desire of the patient). This should include technology tailored to the patient's needs which allows the health care professionals to view, monitor, and react to information directly from their patient via the technology (e.g., glucose levels, blood pressure etc.), to compliment face-to-face meetings, aiming to reduce health care utilization and improve clinical outcomes. Potential target populations include patients who live remotely, or those with low social support or with reduced mobility. Using telemedicine (telemonitoring), should provide a bridge between self-management and healthcare providers, enabling faster and timely access to healthcare providers.

***Key Characteristics:*** The team must target patients who have the motivation and capacity to utilize the technology effectively. These systems can support the delivery and monitoring of the components, and numerous systems already exist, such as the "telehealth" systems, but current evidence on their efficacy is limited, and caution is needed until more research is available.

***Relevance to multimorbid:*** These systems have particular relevance to multimorbid because the sooner that health care providers react to small changes in symptoms, the better. This also aims to empower the patients and increases their self-management while enabling faster and timely access to healthcare providers.

# SECTION 5. SOCIAL AND COMMUNITY RESOURCES

During the consensus meeting the experts highlighted that they believe that access to social and community resources are relevant aspects of the care of patients with multimorbidity, but as these are not included in the formal care process and the availability of these services is extremely variable, the following components (15 and 16) are difficult to standardized and, thus, only a general description can be provided.

## Component 15. Supporting access to community- and social-resources

***Description and aims:*** Improving patient access to community resources, formal care, and patient associations, support groups, and psychosocial support (including home help, transportation etc), and supporting access to such services.

***Key Characteristics:*** The comprehensive assessment should identify needs and help support access to the necessary resources.

***Relevance to multimorbid:*** Multimorbid patients often have very comprehensive and extensive needs, and require to access to more services, and therefore need more support to access these services.

## Component 16. Involvement of social network (informal), including friends, patient associations, family, neighbours.

***Description and aims:*** Involving the patient's informal social network, including family, friends, patient associations, neighbours, with either their treatment or care, and finding ways to increase their social support network.

***Key Characteristics:*** Relevant member of the social network can be identified during the comprehensive assessment. Care should be taken regarding confidentiality issues, according to privacy policies and patient preferences.

***Relevance to multimorbid patients:*** This aims to improve the provision of care in multimorbid patients with very high care demands.

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