



Innovating care for people with multiple chronic conditions in Europe

The Strategy for Chronic Care in Valencia Region (*Estrategia para la atención a pacientes crónicos en la Comunitat Valenciana*), Spain

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Currently, an estimated 50 million people in the European Union live with multiple chronic diseases (multimorbidity) and this number is expected to further increase in the near future. As multimorbidity deeply impacts on people's quality of life – not only physically, but also mentally and socially, there is a growing demand for multidisciplinary care that is tailored to the specific health and social needs of these people. Integrated care programmes have the potential to adequately respond to the comprehensive needs of people with multimorbidity by taking a holistic approach while making efficient use of resources. Such programmes are characterised by providing patient centred, proactive and coordinated multidisciplinary care, using new technologies to support patients' self-management and improve collaboration between caregivers.

To inform policymakers, managers and professionals working in health and social care as well as patients' and informal carers' representatives throughout Europe, about promising initiatives to provide integrated care for people with multimorbidity, a series of case reports describing these initiatives was written as part of the ICARE4EU project (see Colophon). This case report describes an innovative approach to providing integrated care for people with multimorbidity in Spain.



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Summary of the Strategy for Chronic Care programme

- A specific part of the Spanish “Strategy for Chronic Care in Valencia Region” focuses on chronic patients with multimorbidity.
- The goal of this policy programme is to develop a comprehensive framework for an integrated care model for patients with chronic diseases and multimorbidity in need of highly complex care.
- The target group is represented by complex patients needing chronic care or palliative care, who access hospital services and/or live in the community.
- The programme implements an integrated care model that allows continuity of care thanks to the joint collaboration of hospital nurse case managers and community nurse case managers, in charge of monitoring and supporting patients and mobilizing primary or specialized resources according to their needs.
- Information systems are used for stratifying population according to patient’ morbidity profile and monitoring their drug therapies.
- The integrated care model is successfully implemented, with benefits for patients, professionals and the health sector. The drug monitoring system allowed saving over 35 million Euros by reviewing drug therapies in the period 2012-14.

1. Care for people with multimorbidity in Spain

In 2013, among a total Spanish population of 46.7 million inhabitants, 17.7% were aged 65 years or older, and 5.5 percent were 80 years or older (1). Considering the adult population between 16 and 64 years old, a 23.4% was estimated to have at least one long-standing illness or health problem (2). Spain shares the international trend of a growing number of people with chronic diseases and multimorbidity, who represented 51% of the population aged 50 and older in 2011 (3).

The Valencia Region (*Comunitat Valenciana*) has 4.7 million inhabitants. Out of the population between 65 and 74 years old, 78.6% has at least one chronic disease, percentage which increases to 85.7% in the segment aged 85 or more (4). The territory is divided into 24 geographical areas (“health departments”) with about 200,000 inhabitants each. A general manager and a management team are in charge for all primary and specialized health care in each department.

In the last years, new policies have been developed for addressing the issue of chronic care at national level (5), as well as by the Valencia Region (6). In this latter case, the Strategy for Chronic Care (*Estrategia para la atención a pacientes crónicos en la Comunitat Valenciana*) launched in 2014 represents the last policy action of the Valencia Region on the issue.

Information regarding the Spanish and Valencian health and long-term care system can be found in Appendix 1, whereas a complete list of abbreviations and acronyms used is available in Appendix 2.

2. Introduction to the Strategy for Chronic Care

Background and theoretical pillars

The Strategy for Chronic Care is a policy programme introduced by the Regional Ministry of Health of the Valencia Region in 2014 in order to promote a change of the cultural paradigm in current healthcare organisation for chronic care and multimorbidity (6).

The Strategy is mainly based on three theoretical pillars, widely recognised at international level and which support the focus on the patient: the Chronic Care Model (CCM) (7), the Innovative Care for Chronic Conditions (ICCC) framework (8), and the Kaiser's Permanente Stratification Risk Model (9). The CCM identifies the following fundamental components of a health care system that sustain a high quality of chronic care: community, health system, self-management support, delivery system design, decision support, and clinical information systems. The ICCC framework includes a set of guidelines for decision makers in order to address the threats of chronic diseases, in particular addressing the following dimensions: the support to a paradigm shift, the management of the political environment, the building of an integrated health care, the alignment of sectoral policies for health, the more effective use of health care personnel, the focus of care on patient and family, the support to patients in their communities, the emphasizing of prevention.

The Strategy for Chronic Care does not give only policy guidelines to health management of the Valencia Region. It stands as the last step of a long, coherent process of continuous improvement of public health sector and chronic care which involve practitioners, patients and stakeholders. The results achieved so far by the Valencia Region are indeed based on a robust experience and concrete actions, which concern in particular care organisation and delivery, health data treatment and decision support systems (DSSs). Indeed, the Strategy has practical implications for multiple actors, who behave in mutual agreement and in accordance to described guidelines.

Aims and key features

The following ones are the main objectives the programme aims to achieve (6):

1. *Modelling the health system for addressing chronic care:* in order to achieve this objective, the Strategy includes actions at different levels for re-organising the health system according to needs of chronic patients. Management and practitioners should work together to ensure continuity of care, integrate hospital and community care, strengthen hospital at home (HaH) services, offer more adequate hospitals for chronic and palliative care (HACLE), and address both health and social needs of patients. The approach towards patients should be proactive and longitudinal, carrying on a continuous monitoring and intervening, if

necessary, even if a patient does not express a health need. Valuable instruments for accomplishing this objective are a stratification system for the population with relevant risk profiles and predictive models of health resource utilisation.

2. *Designing a care model focused on the patient and his/her situation:* the Strategy underlines the importance, for practitioners, to dedicate full attention to the patient, his/her family carers and environment. In this sense, the patient becomes the central axis of care organisation. He or she should be involved in care planning and receive training for improving self-care competences. Furthermore, support to family carers should be guaranteed, also by means of relief services and direct contact with professionals to clarify daily care issues. In this respect, some instruments are the provision of training and health information, the organisation of forums with patients and health professionals. Also decision support systems for monitoring and rationalising drug therapies and polypharmacy are essential tools of the Strategy.
3. *Implementing policies for health promotion and prevention of chronic diseases:* the promotion of active and healthy ageing is fundamental for addressing risk factors and determinants of chronic diseases. Chronic care should be an issue included in health plans at regional and local levels and discussed by different components of society (institutions, non-profit sector, patient organisations etc.). Furthermore, new programmes for health promotion and prevention should be evidence-based and exploit the large amount of knowledge already existing at local, national and international level.
4. *Strengthening knowledge management in chronic care:* knowledge sharing, training and information between professionals are prerequisites for guaranteeing adequate levels of care and the standardisation of care processes. Furthermore, research should find its space in order to improve evidence of needs and interventions.
5. *Developing information and communication technologies (ICTs) for chronic care:* it is essential to further develop and integrate already existing technologies in the health sector for better addressing complex cases. Concretely, various corporate information systems should be integrated and improved, including decision support systems for population stratification and risk marks, and monitoring drug therapies. In fact, e-Health and m-Health tools are important means for training patients and family carers, for integrating them into the care process, and for social inclusion.

On the basis of previous policy initiatives already implemented successfully in the field, the Strategy developed a comprehensive and coherent framework of an integrated care model for complex cases needing high-intensive chronic care.

3. The integrated care model of complex cases

Complex cases

In the Valencia Region special attention has been paid to the care processes of highly complex chronic patients. The concept of 'highly complex patient' does not only refer to multimorbidity; the definition also covers other related problems, including the patient, the family carer and their environment (10). The holistic definition for a 'complex case' used is given in Box 1.

Box 1: Definition of the 'complex case'

In accordance to the Kaiser's Stratification Risk Pyramid, the Valencia Region defined a complex case as a patient in need for an intensive level of attention in terms of chronic or palliative care, i.e. among those fitting into the apex of the Pyramid (around 3% of the overall population in Valencia Region). Patients defined as complex usually have the following characteristics:

- Age: often older people, especially those over 75 years old;
- Multimorbidity: presence of more chronic conditions, even cognitive impairments (e.g., dementia), which need different specialists;
- Polypharmacy: high consumption of drugs and frequent problems related to medication, particularly treatment adherence;
- Hospital resources: high use of hospital emergency departments and frequent hospitalisation for acute episodes;
- Technology: both assisted (e.g., walkers, wheelchairs, decubitus mattresses, adjustable beds, crane) and vital technologies (oxygen therapy, mechanical ventilation, home enteral and parental nutrition) can be needed;
- Complex procedures: treatments require to be accomplished by professionals in the homes, like in the case of ostomies, catheters or reservoirs, periodic blood transfusions and/or paracentesis;
- Functional dependency: most complex patients have lack in mobility and need care at home;
- Fragile family support: no carers or limited availability of family carers for providing necessary care;
- Social and economic needs: lack of social support and poverty conditions can affect negatively the home care context;
- Frequent changes of situation: clinical status of the patient, circumstances of carers or home living conditions might change frequently.

Goal and specific aims of the model

The main purpose of the integrated care model implemented in the Valencia Region is to improve the quality of care for complex cases, keeping the patient as much time as possible in the community environment with the best possible quality of life by preventing or delaying the clinical, functional and social deterioration and, when appropriate, guaranteeing dying with dignity. The integrated

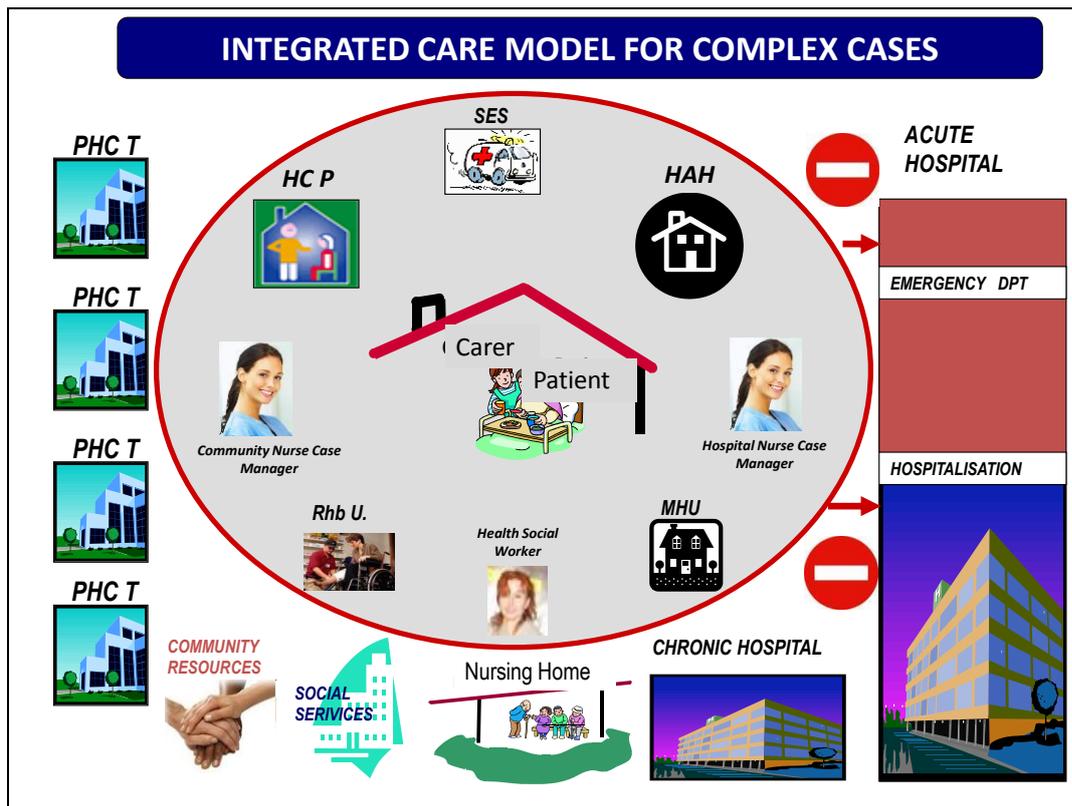
model for chronic care is indeed based on these approaches and specifically aims to improve the quality of care for complex cases by: (a) providing care characterized by being proactive, comprehensive, individualized on specific needs, customized on values and preferences, coordinated, continuous, long-term and linked during transitions; (b) making possible to address patient' needs by community services when possible, avoiding inappropriate hospitalisation; (c) contributing to the efficiency and sustainability of the health system by favouring an appropriate use of resources (especially concerning the most expensive, i.e. the hospitals) and focusing on highest cost patients.

Organisation of the model

In practical terms, this model integrates hospital, primary and community health services in such a way that the patient is constantly monitored and accompanied in each step of the care process: services are designed around the patient. A general overview of the model is provided in Fig. 1. Detailed information on how the integrated care model works is provided in the following paragraphs.

All the hospital and primary care services in each health department of the Region are run under one single management, which favours linkages and optimisation of resources. The model is clearly patient-centred: it introduces the roles of two nurses acting as hospital nurse case manager (HNCM) or community nurse case manager (CNCM). They are jointly responsible for monitoring the patient and interacting with professionals as well as checking the appropriateness of care received. The two nurses are in constant communication to ensure seamless coordination if a patient switches from living in the community to accessed hospital services. The case management approach enhances patient-centredness by developing continuity and quality of care in the care process, taking into considerations patients' own wishes and needs and by giving support to them and their family carers.

Figure 1: Integrated care model for complex cases in Valencia Region



From the hospital side, the patient can access different levels of care according to the complexity of his/her situation: hospitals for acute care and short-term treatments; hospitals at home (HaH) for complex cases needing high-intensive care but not hospitalisation (see Box 2); chronic care hospitals for post-acute, rehabilitation and mental health services, and palliative care (HACLE) (see Box 3). In periods of stability of high risk patients or for less complex cases, home and community care services are available, with health centres acting as ‘hubs’ of both primary and, to a certain extent, specialised care. All health data and information on the care process are recorded and treated by dedicated information systems, some of them (like SIP, SIA-ABUCASIS and GAIA) constitute the basis for all services since they are common to all health facilities, some others are developed specifically by single hospitals or departments (like NomhadChronic in Valencia-La Fe Hospital) especially for managing electronic health records (EHRs) and patient profiling (for more details on information systems, see *e-Health* section).

Box 2. Hospital at Home and Telemedicine: The example of Valencia-La Fe department

Hospital at Home (HaH), provided in Valencia region since 1990, is an innovative service offered to complex patients. HaH is a service that provides active treatment by hospital professionals in the patient's home for a condition that otherwise would require care in an area of an acute hospital (mainly a specialized ward but also emergency, outpatients clinic, day care etc.). HaH provides specialized high technology support care for patients with complex conditions who are cared for at home. If HaH was not available, then the patient would be treated in an acute hospital or would remain in a ward. By providing direct support to primary health care teams, the HaH maximizes the ability of solving problems in the community setting, thus avoiding admissions in acute hospitals (substitution pattern). Furthermore, HaH services shorten days of stay in a ward through early discharge process (complementary pattern). Thus it optimizes the use of resources and the results improving productivity and cost-effectiveness of the health care system. The underlying idea of the patient-centeredness here is that, compared to hospital setting, home is a more comfortable psychological environment for patients and, in some way, the best therapeutic place (11).

Together, the 26 current hospital at home units (HHU) form the largest hospital in the region (over 1,500 patients/day of capacity and more than 44,000 patients treated in 2014) and is a pillar in the integrated care model for complex cases

Hospital at home and Telemedicine in Valencia-La Fe department

The particular HHU of La Fe department is organized in 4 lines of activity: general, paediatric, mental and rehabilitation. It comprises 10 doctors, 2 paediatricians, 1 psychiatrist, 1 psychologist, 1 physiotherapist, 1 social worker, as well as 25 nurses and others (nurse and administrative assistants). It has 170 patients/day of capacity and treats around 5,000 patients per year.

Moreover, this HHU shares a project of case management supported with telemedicine. This model, known as Gechronic, is based in a reengineering care process which adds to the common case management interventions the support of the Telemedicine unit as responsible of the remote follow-up and the introduction of new technologies: a predictive model defined for identifying chronic complex patients, an e-Health tool (NomhadChronic) developed to monitor regularly patients through different ICT devices.

The internal statistical analysis finds that case management intervention reduces the number of admissions (CI 95% [0.101, Inf]) and RR of admission due to a decompensation decreases to a 58.3% (RR=0.583 with 95% confidence interval [0.522, 0.652]). Also, effectiveness of the intervention was evaluated through a clinical trial with 500 patients. The results suggest that an intervention focused in Case Management Program supported by e-Health tool improves perception of patient's quality of life. Recently, HHU professionals are participating as partners in a European project (BeyondSilos: www.beyond-silos.eu) that aims to integrate the social area.

Box 3: Hospital for chronic and palliative care (HACLE): The example of Hospital Pare Jofré

In the Valencia Region, there are different hospitals for chronic and palliative patients, commonly referred to with the acronym HACLE (other synonyms for the same type of hospitals are long-stay geriatric hospitals and social-sanitary centres). They aim to provide specialised health care to fragile older people with unbalanced chronic diseases, ill older people with chronic and terminal diseases and people with chronic mental disorders. The novelty of these hospitals is based on their organizational and philosophical model. The patients with advanced chronic diseases often suffer from clinical and nutritional impairment and emotional disorders. In addition, those in the end of life stage face problems of ethical decision-making, inappropriate consumption of resources and unnecessary suffering. These hospitals provide places where patients “can sometimes be cured, sometimes improve their functionality and always improve their quality of life” (12).

Hospital Pare Jofré

Hospital Pare Jofré in Valencia is a HACLE built on 2005 and offers 125 beds (75 in internal medicine area and 50 in mental health area). The internal medicine area is structured in three units: convalescence, long stay and palliative. In the Hospital Pare Jofré, the role of highly qualified multidisciplinary professional teams is crucial. The team defines therapeutic objectives using common basic methodology, focusing on a multidimensional bio-psycho-social assessment of patients and family that may lead to an appropriate care plan. The patient’s and the family’s needs, opinions and wishes are taken into consideration in planning the care with a continuous re-evaluation of the situation, aiming to improve the quality of life. The approach to this care model is based mainly on the ‘humanisation of medicine’ concept by Daniel Callahan, which considers fundamental, for patients with advanced chronic diseases, to achieve an adequate diagnostic and therapeutic proportionality, considering the patient and family opinions or wishes, also in relation to get a worthy death at the end of life (12).

4. Integration and patient-centredness: Case management

Background

In order to develop successful services for people with multiple chronic conditions, efficient and innovative ways of organizing, integrating and managing care are needed. In this respect, one key element is how to coordinate collaboration between diverse actors who interact with patients. In the integrated care model, part of the Strategy for Chronic Care in the Valencia Region, an innovative case management approach has been developed and implemented with positive results. It was based on an evaluation of home care (2005-2006) (13), which showed the total separation of the health and social sector but also the problems in work division between health care systems, in particular in the continuity of care between health care centres in community and hospital-at-home units (HHUs). *“People did not want to be discharged from hospital-at-home services, because they*

did not trust and did not want to go to primary care centres” (project manager). The target population, the highly complex home care patients, consists of two groups: chronic patients with high complexity and those in need of palliative care. Both of these groups need care that is customized to the needs of individual patients. Before the integrated care model was implemented, some patients were already in the care process but needed more integration of services provided by different agents. Others, the so-called “hidden” patients, when discharged from hospital or HHU, were unknown for any community resource in terms of their health status, domiciliary condition and overall complexity, and therefore no health care was provided at home after discharge. These “hidden” patients navigated without control around the health system, developing their own circuits comprising exclusively emergency services and acute hospital care.

There was a clear need to increase cooperation between these two separate lines of care, primary and hospital care, to address the issue of fragmentation between the different care providers, to enhance quality and continuation of care, and to implement an active search for bringing into light “hidden” patients. The final aim of the integrated care model and the improved case management approach is indeed to help these patients and their family carers, so that they manage to cope at home for most of the time, without the need of hospital resources but with constant monitoring and proactive intervention if needed (10). The underlying idea here is that *“the best therapeutic environment for these patients is their own home”* (nurse case manager).

Case management approach

The main agents involved in the integrated care model are the primary health care teams (PHCT) working in health care centres, implementing home care programme (HCP), and the HHUs. The key elements of the model are two separate nurse case managers. A HNCM and a CNCM work at the interface between hospital, HHUs and home care. This collaboration integrates primary and secondary care in an efficient way at the practical level (Fig. 2).

In the community setting, the CNCM is responsible for mobilizing the ‘intervention’ (starting the collaborative care process for a new patient) and for arranging the care at home. The tasks of a HNCM are related to hospital admissions and discharges. The HNCM is responsible for planning the hospital discharge so that continuity of care is guaranteed during and after the patient’s stay in hospital or HHU.

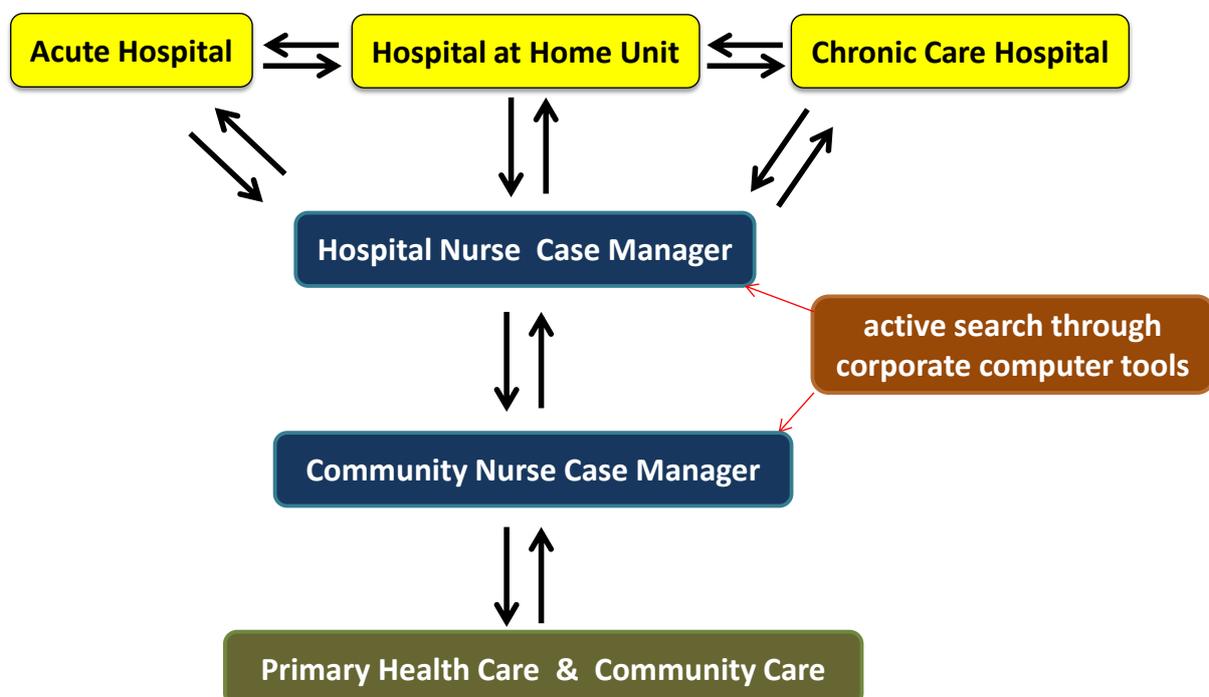
The collaborative work process in the community setting is organized in two phases: the intensive phase and the support phase. The intensive phase starts from a comprehensive assessment of the case made by the CNCM including patient, carers and environment. After sharing this first assessment with the reference professionals in the PHCT (general practitioner, family nurse and/or

health social worker for what concerns patients' social needs), the team can decide to develop new activities to deepen the knowledge of the case.

After mapping the needs of the patient, a joint production of the Action Plan is produced together with both case managers and PHCT professionals, including medication revision. A health social worker is involved in the planning, if needed. Accordingly, a tailored individual Care Plan for the patient is developed, adapting to the preferences of each patient and family. It also includes information for the training of patient and/or his/her family carers.

In the support phase (implementation of the Action Plan at home), the primary health care professionals in the health care centre (PHCT implementing HCP), a family doctor and family nurse, take the main responsibility for follow-up. Each home visit by PCHT includes evaluation according to the Plan, training in self-care, adherence to treatment and continuous monitoring according to the needs of the patient. Support and coaching for both the patient and his/her carer at home are at the core of the home care help provided. During this phase, the CNCM supports PHCT professionals without disassociating from the case. The Action Plan is appraised and adapted according to the changes in the patient' or carer's situation. A concrete example of how HNCM and CNCM work is provided in Box 4, referring to the experience of La Plana department.

Figure 2: The interaction between different services in the integrated care model



Box 4. Hospital and community nurse case managers: The example of La Plana department

In the health department of La Plana (190,000 inhabitants), all health care providers (health care centres, auxiliary doctor's offices in most rural areas, HaH, acute care hospital and chronic care hospitals) have been integrated under one management and under one budget. Interviewing both a hospital and a community nurse case managers (HNCM and CNCM) working in La Plana, they said that their *"aim is to provide a comprehensive quality of care adapted to the needs of each patient and coordinated with the rest of the public health resources. We offer proactive, long-term and permanent care with the help of care providers, the family and the environment."*

The HNCM (situated in the main hospital of La Plana) and the CNCMs (situated in five health care centres) work in close collaboration with each other in order to guarantee integrated and continuous care for patients. Both use tablets to access corporate information systems either in hospital or in patients' home. Nurses work together; they have common goals and similar functions, but they work in different spheres (10). During home visits, the CNCM makes evaluation and updates the Care Plan, trains the patient and eventually the family carers on self-care and adherence to treatment, monitors eventual social needs to be reported to social workers. In case of hospitalisation, the HNCM coordinates health and social services, plans hospital discharge and guarantees the continuity of care by linking with destination (by means of a specific report through the EHR and contacting by email, mobile phones etc.).

The main focus of HNCM is people entering the La Plana Hospital and those accessing the HaH service. In principle, this latter one may admit patients directly from the community thus replacing acute hospital (substitution pattern), or act as a service transition from hospital to community (complementary pattern). In both cases, it provides hospital-level and high-intensive care at home. In the short- or medium-term, the Care Plan should forecast the discharge of patient from HaH because of improved condition and the possibility to self-care. In that case, the CNCM takes over the responsibility over the patient (even if he/she was already involved in the monitoring process during the HaH together with the HNCM) and the Care Plan is updated for matching new conditions.

CNCM organises periodical group sessions with family carers for training, emotional support and improving self-care competences: weekly workshops are conducted per 8-10 weeks, each workshop lasting around 2 hours.

HNCM and CNCM are supported in their activity by social workers for what concerns eventual social needs of patients. There are health social workers, either at the hospital or at the health centres, who do joint visits and assessments of patients. Unfortunately, health social workers do not manage any budget from the health system for assisting patients in need: they can report cases to social workers employed by municipalities or regional welfare departments and ask the activation of social services.

Results and challenges

The care process includes a continuous monitoring of the case. The case managers are thus always aware of the situation of the particular patient and receive an alert from their information system if changes take place. All the information (patients' clinical documents, diagnoses, analytical tests) is shared through EHRs and is used by all actors involved in the process (see more details in the *e-Health* section). The work and cooperation of the case managers is supported by additional ICTs, such as tablets to monitor patients both in a hospital and at their homes.

The results of the dual-case manager model from the patient perspective are promising. These two roles of nurses form a two-way link between organizations, which previously operated separately. Their intervention is needed in particular in the case of hospital and HaH admissions and discharges, which are the critical points in the continuity of the care process. By close collaboration and by sharing their knowledge of both hospital and home care contexts, they enable seamless continuity of care. This kind of 'shared care' (10) improves patient-centredness: the assessment of health and social needs and the wishes of patients contribute to build an holistic view of patient's situation, which is sustained by a personal relationship of each case manager with patient and carer, as well as between the two case managers. Patients receive individualized and continuous care and family carers get support in taking care of them.

According to the interviewed case managers, *"in the process of a complex case, several agents participate in a perfectly coordinated way"*. The case managers felt that they *"bring together and standardize the contribution of all the agents involved in the chronic patient care"*. The care is more proactive than previously. At the beginning, in particular doctors in the hospital showed some reluctance to cooperate; they wanted to keep the power over the patient to themselves. The case managers stated that nowadays their role is respected and other professionals trust them. The case managers also felt that both patients and their carers feel more emotionally protected within the health system due to the case manager model: *"they usually encounter bureaucratic barriers in the health system, but these are resolved by the nursing case managers to the extent possible"* (case manager).

However, despite these promising experiences, changes in the attitudes of professionals in general are still needed. *"The culture of professionals is to work 'in a solo way', it is difficult to change it...Our professionals are used to stay in the buildings, it is difficult for them to go to the homes of patients... Professionals work separately, they are specialists; the whole person [patient] is thus fragmented"* (project manager).

Furthermore, a remarkable shortcoming in the integration of care is the separate roles of health and social services. The health services are coordinated by the Valencia Health Agency, whereas the

social services are the responsibility of each municipality and the regional welfare ministry (nursing homes). There are health social workers in both hospitals and health centres who collaborate with social workers from municipalities and regional welfare ministry, but there are issues due to the separate systems and the social interventions to implement in case of recognised social needs. In addition, the quality of and access to social services differ in different municipalities and they do not properly support, for example, the HaH function, which was developed within the regional health system. Table 1 describes the level of implementation of the integrated care model for complex cases in the Valencia Region (VC).

Table 1: Deployment of the integrated care model for complex cases in the Valencia Region

INVOLVED RESOURCES, WORKFORCE AND COVERED POPULATION	2015 1st semester
No. Health Departments involved	19
No. EAP involved	58
No. HHU involved	19
No. Hospital Nurse Case Managers (HNCM)	23
No. Community Nurse Case Managers (CNCM)	56
Total No. Nurse Case Managers	79
VC population with Case Management Service available	1.390.392
% VC population with Case Management Service available	30%

5. E-health: Stratification and drug management systems

Established information systems and new investments

ICTs constitute a fundamental pillar of the Strategy, since they provide the operative tools for improving care organisation and management. In recent past, the main achievement of the Valencia Region is represented by the SIP (System for Identification of Patients), which enables connecting different types of data related to inhabitants, such as individual accesses to health resources (at hospital or in the community) and medication in the Region. Linked to the electronic Health Card, the SIP system associates to each user both a general practitioner and a nurse, who are responsible for monitoring patient's health status over time and react in case of need. Integrated with the SIP, other three important information systems were implemented all over the regional territory since the early 1990s. The first one is called SIA-ABUCASIS and offers both primary care and outpatient EHRs, covering overall 3,400 health facilities (primary care centres, speciality care centres, hospitals and pharmacies) and is being used by about 20,000 clinicians and managers (14). The second one is

GAIA, an electronic system for clinical drug prescribing and delivery, complementary to SIA-ABUCASIS and covering over 95% of drug prescriptions in the Region (14). Furthermore, during the last decade a new information system ORION-CLINIC has been developed for hospitals, and efforts have been done to integrate corporate systems. Finally, most recently some systems were piloted with the aim to improve the distance monitoring of patients living in the community, like Valchronic (in Elx and Sagunt departments) and Gechronic (in the Valencia-La Fe department).

In the framework of the Strategy for Chronic Care, many investments were done for boosting the implementation of two additional tools that are radically changing the daily practice of health professionals: the SCP-CV and the PRM-CV. These ICT-based tools serve as DSSs for care professionals in order to take responsible decisions over a patient's health, to record every health problem and treatment occurred during the life course, to constantly monitor the patient's condition, and to intervene when it is likely to change.

Population stratification system

The SCP-CV is an information system which aims to stratify the population according to the Kaiser Permanente Risk Stratification Model (9) and the Clinical Risk Groups (CRGs) system (15, 16). It captures resource utilisation by each patient and other data in order to identify people with chronic and multimorbidity conditions and to assign them to one of the overall 1,079 clinical groups. The system then merges them into homogeneous groups according to: (a) the number and type of diagnostics by using a classification of 9 statuses (i.e., 1= healthy, 3= single minor disease, 7=dominant chronic disease in three or more organ systems, 9= catastrophic conditions); (b) the severity level of the chronic conditions by using a classification of 6 levels. This tool also identifies patients with pharmaceutical expenditure deviations according to their morbidity.

The final output is the assignation to each patient of a morbidity profile and risk mark visible in main corporate applications, which alerts care providers to the most complex cases that need more attention. The system allocates citizens to one of four different segments of the population as suggested by the Kaiser Permanente Risk Stratification Model (see Fig. 3 for the Model and Tab. 1 for the actual population stratification). On the bottom of the pyramid there is the main part of the population, people in good health who should receive health promotion interventions, mainly for prevention, fostering healthy behaviours and addressing risk factors. The second stage is constituted by low-complexity patients, who should be empowered to self-care and self-management. The third segment includes chronic patients with moderate complexity, where disease management is necessary. Finally, at the top of the pyramid there is a minority in need for specific case

management: this group is constituted by chronic patients with higher complexity and palliative patients.

The SCP-CV is also helpful for recognising automatically if an individual health status has changed (e.g. because of new hospital treatment or medication) since data are periodically updated. In addition to this profiling system, some health departments (like in La Fe) have developed internal predictive models that can estimate the future health condition and health resource utilisation per each single patient, which can help formulating appropriate reactions and possibly re-organisation of care providers. Furthermore, in the health department of La Fe, Big Data analytic methods are also used to identify complex patients, current or future heavy consumers of hospital resources. These tools are used not only by doctors and nurses in hospitals, but also by general practitioners and professionals in health centres.

Figure 3: Kaiser Permanente Risk Stratification Model

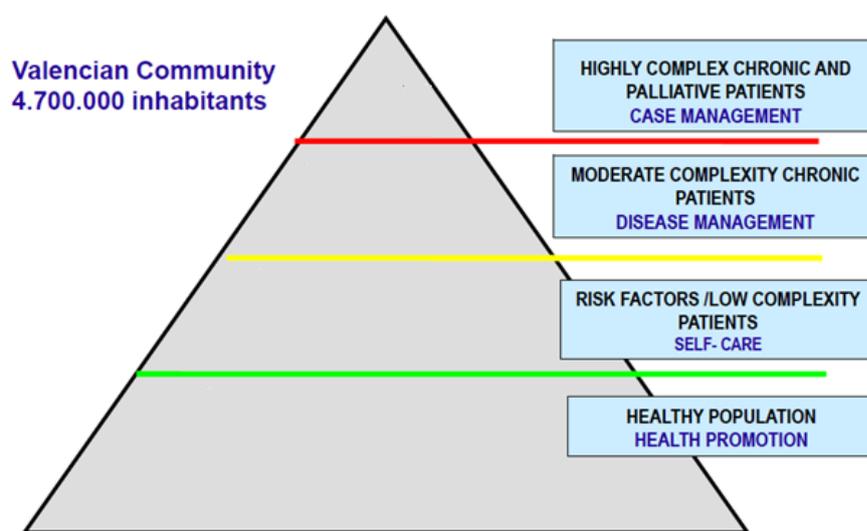


Table 2: Stratification of the population in the Valencia Region (data updated to April 2015)

LEVEL (KAISER)	Description	Patients	% Population
Level 0	Healthy	2.485.689	52,72%
Level 1	Low risk	1.543.471	32,74%
Level 2	Moderate risk	559.479	11,87%
Level 3	High risk	126.205	2,68%
Total population		4.714.844	100,00%

The advantages of the patient classification systems from the perspective of patient-centredness are several (10). Patient classification helps identifying patients (names, address, telephone etc.) who need special attention and direct resources to them. The identification can be done at different

levels (from regional to individual level), which makes it possible for professionals to direct actions to the most important patient segments. It also enables contact with and monitoring of individual patients.

Drug monitoring system

Another important e-Health tool implemented in the Valencia Region and closely linked to SPC-CV is the *Problemas Relacionadas con los Medicamentos* (PRM-CV) system. This is an information system for monitoring drug therapies and was part of the REFAR project, funded by the Valencian regional government with funds from the Spanish Ministry of Health and Welfare. The project started in 2009 for preventing health problems related to the use of drugs. The main objectives of REFAR were to improve adherence in chronic patients with multimorbidity and polypharmacy, to review medication and use of drugs, as well as to improve patient knowledge regarding the use of drugs and their indications. Specifically, the project aimed at:

- identifying patients with greater difficulty in order to track treatments;
- checking if users know the usefulness of drugs;
- monitoring the adherence to treatments;
- removing the expired medicines from personal kits;
- increasing the effectiveness and efficiency of pharmacological treatments;
- identifying drug-related problems.

The project had two sub-initiatives mainly conducted by pharmacists: REFAR-AR, with the goal of conducting a systematic review of treatments and reviewing drug and health care products use; REFAR-EA, which implemented health education and support tools for increasing treatment adherence.

Based on the information produced the PRM system, pharmacists select patients to be controlled by nurses and eventually doctors. They interview patients at increased risk, mainly the patients with polypharmacy. The patient brings all medicines he/she uses to the interview, and nurses review them one by one. The nurse can change the drug therapy according to defined standards, if it is not appropriate to patient's condition. Also, they evaluate the social environment and cognitive status of these patients. For patients with more difficulties, nurses teach them how to manage their medication, or even give them a practical pillbox for medicines, supplied with instructions.

Some preliminary cost analysis was conducted in relation to the impact of the PRM and the REFAR project. In the period 2012-2014, more than 200,000 patients with polypharmacy were reviewed

and over 99,000 drug treatments were changed, leading to an impressive reduction of public expenditure in drugs from 19.5 million Euros in 2012 to 7.3 million in 2014. Between 2011 and 2013 there was also a significant decrease (-10%, -34,300 patients) of older people treated with polypharmacy (defined as more than 5 drugs prescribed).

The PRM is currently under further development and will continue to be employed by enlarging the current sample size to the whole population. This will allow all physicians to monitor appropriateness of drug therapies (e.g., checking eventual incompatible drugs and patient's allergies) and to review them periodically in order to avoid potential discordances between specialists (in case of people with multimorbidity) and optimise resources.

6. Conclusions and observations

Benefits and innovation

The Strategy for Chronic Care gave specific guidelines how chronic care should be addressed within the regional health system, based on previous policies and actions implemented by the Valencia Region. This framework provided a solid basis for achieving ambitious objectives.

There are two main innovative aspects which deserve attention within the Strategy implementation. The first one concerns the integrated care model which relies on a strong collaboration and integration of actors in the regional health system. In particular, the case management approach, with the availability of nurse case managers in hospitals and in the community, supports the idea of care services designed for and around the patient, guaranteeing the continuity and quality of long-term care. This model is carried out through a deep involvement of health professionals in training and re-organising care processes with new tasks and tools.

The second driver of innovation is constituted by ICTs and, in particular, information systems developed for stratifying the population according to their morbidity profiles and monitoring their conditions and drug use. These are promising instruments that can be exploited by professionals working at hospitals, health centres and other community facilities for proactive interventions in complex patients.

Furthermore, concerning the financial aspect, the Strategy is implemented by the Valencia Region mainly through ordinary funds of the regional health system, which is financed mostly by general taxation (94%). Some technical projects within the Strategy benefited from funding from the regional, national or European sources or by ad hoc resource allocation of single health departments. Anyway, having a single health management for all hospital, and primary health services within an individual health department, allows designing medium- and long-term

sustainability plans. The will to continue implementing the actions of the Strategy in the near future is reinforced by the evidence of having contributed significantly to health care resource optimisation and appropriateness of chronic care, which are crucial outputs and outcomes of the Valencia Region policy in the field.

Challenges

Few potential issues can be identified. Although they have been addressed so far to a certain extent, there is probably need to keep pay attention to them and improve efforts in these directions. First, attitudes and behaviours at work by care professionals are essential for creating a collaborative environment where all actors are involved with the goal of providing the best possible care to the patient. Some professionals might be still reluctant to the implications of the integrated care model, including the change of their daily practice through new care patterns and instruments. Extensive, continuous training of all professionals involved (doctors at hospital, general practitioners, nurses, healthcare assistants, social workers etc.) on how to conduct their work in the new model could help addressing this issue.

Furthermore, the integration between health and social services still suffers from a separation of responsibilities in these sectors. The possibility to find new ways of collaboration between health facilities (where health social workers are employed) and municipalities and regional authorities (offering proper social services through their own social workers) should be further discussed, in order to improve the link between the needs assessment of patients (including social needs) and the provision of social services.

Finally, great efforts were made in developing useful information systems for the whole Valencia Region, which optimize the standardisation of care organisation and management. On this basis, some health departments and hospitals are implementing additional ICT tools for targeting specific issues and tasks, which work well with the general information systems (e.g., SIP, SIA-ABUCASIS, SCP-CV) but are not connected with other facilities. If the development of information systems is not monitored and guided at higher lever, there might the risk of fragmentation of some patient data, collected by some health facilities and not by others within the same Region. Efforts in strengthening interoperability and transferability of these additional information systems could be put in place.

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Colophon The ICARE4EU project and the selection of 'high potential' programmes

The ICARE4EU project aims to identify, describe, and analyse innovative integrated care practices for people with multimorbidity in European countries, and to disseminate knowledge and experiences from these practices to all European countries in order to support further implementation of effective and sustainable care approaches for European citizens with multimorbidity (www.icare4eu.org).

Multimorbidity is defined in this project as *the presence of two or more medically (somatic or psychiatric) diagnosed chronic (not fully curable) or long lasting (at least six months) diseases, of which at least one is of a primarily somatic nature.*

In 2014, country experts in 31 European countries identified programmes at a national, regional or local level that focus(ed) on providing care for adult (or older) people with multimorbidity, or contain(ed) specific elements for this target group. Programmes had to comprise a formalized cooperation between two or more services, of which at least one medical service; and they had to be evaluated - or had an evaluation planned - in some way. Detailed information about these programmes was collected via a survey to be completed by the programme coordinator. In this way, country experts identified 178 programmes, of which 101 (from 24 countries) were considered eligible for analysis by the project team.

As a next step in the project, these 101 programmes were evaluated by the project team based on quantitative and qualitative criteria. For each programme, five quantitative scores were computed, a general score (assessing general aspects such as its evaluation design, perceived sustainability and transferability) and four scores that provided an indication of its level of 1) patient-centredness, 2) integration of care, 3) use of eHealth technologies and 4) its innovativeness in financing integrated care services. Subsequently, members of the project team qualitatively assessed these four aspects again for a selection of programmes that had high quantitative scores. The qualitative evaluation was based on the available descriptive information gathered by the survey (e.g. description of the aims of the programme, the reported strengths and weaknesses) and already published evaluation reports. This resulted in a short list of so called 'high potential' programmes. To decide whether or not to select a programme of this list for further study, the project team checked with the country expert and/or verified information by contacting the programme coordinator. In this way, eight programmes were selected for a site visit; all programmes positively responded. The eight programmes that were visited were operational in Belgium, Bulgaria, Cyprus, Denmark, Germany, Finland, the Netherlands and Spain.

This case report is based on information about the programme 'Strategy for Chronic Care in Valencia Region'. For this case report, the previously collected survey data were verified and enriched by data from qualitative interviews with: the programme managers, a hospital nurse case manager, a community nurse case manager, and a family carer. Furthermore, we had the chance to meet and spoke to several doctors, staff and managers in different sites (hospitals and health centres), accessing also to internal (e.g., presentations) and external documents (e.g., books, papers) as additional sources of information. All interviews were conducted by two members of the ICARE4EU project team, and were recorded. Interviewees received the draft text of the case report for validation, and approved the final report. All interviewees signed a written agreement to publish this case report.

Appendix 1 Some characteristics of the health care systems in Spain

The Spanish National Health System (NHS) is constituted by an organised set of health services from the central government administration and the regions (autonomous communities-AC-) which integrate healthcare functions they are responsible for (17). The NHS has a universal coverage and it is mainly based on the public offer of services.

At regional level, each one of the seventeen regions establishes its own health plan, organises services and manages its budget, according to common regulation and guidelines provided by the national Ministry of Health. Despite the decentralisation process was initiated long ago (for instance: Catalonia in 1981, Andalusia in 1984, Basque Country and Valencia in 1988), the process was completed all over the country only in 2002. The Spanish Ministry of Health, Social Services and Equality (MSSSI) has, therefore, a limited role, since its main task is mainly to assist national coordination and cohesion, though it has no authority over the ACs.

In order to face the increasing demand of care by patients with chronic diseases, the decentralized Spanish national health system has been undergoing a transition from a care delivery model based on an acute, urgent and single disease approach towards a high-performing integrated care model based on chronic care, with the aim to avoid fragmentation, gaps or overlap in care provision. After the Sevilla Declaration in January 2011, in which some consensus was reached between regional authorities and representatives of practitioners and patients in how to address the challenge of chronic care, the Ministry of Health, Social Services and Equality (Ministerio de Sanidad, Servicios Sociales e Igualdad, MSSSI) delivered the *Strategy for addressing chronic disease in the National Health System* in 2012 (17). This document sets goals and recommendations for the national health system in order to switch the care model from one focused on a specific disease to a more holistic one that places people at the centre and addresses their life course and multiple health needs. Concerning other regional policies, the Basque Region launched an ambitious strategy for tackling chronic care in 2010, whereas Andalusia and Catalonia Regions launched their respective strategies in 2012, and Valencia in 2014.

The issue of chronic care has been addressed in Valencia Region by different policy programmes since the mid 1990s. These include the implementation of the Programme for caring old, chronic and terminal patients (*Programa de atención al paciente anciano, crónico y terminal*) (PALET) (1995), the Plan for improving home care (*Plan de mejora de la atención domiciliaria*) (PMAD) (2004-2007), the Plan for caring senior and chronic disabled people (*Plan de atención a las personas mayores y enfermos crónicos*) (2007), and the Plan for palliative care (*Plan de cuidados paliativos*) (2010) (6).

Appendix 2 List of abbreviations and acronyms

AC	Autonomous Communities
CCM	Chronic Care Model
CNCM	Community Nurse Case Manager
CRG	Clinical Risk Group
DSS	Decision Support System
EHR	Electronic Health Record
GAIA	System for clinical drug prescribing and delivery
HACLE	Hospital for chronic and palliative care
HaH	Hospital at Home
HCP	Home Care Programme developed by PHCT
HHU	Hospital at Home Unit
HNCM	Hospital Nurse Case Manager
ICCC	Innovative Care for Chronic Conditions
ICT	Information and Communication Technology
MHU	Mental Health Unit
PHCT	Primary Health Care Team
PRM-CV	Drug-related problems system in Valencia Community
REFAR	Project on preventing health problems related to the use of drugs
RHBU	Rehabilitation Unit
SCP-CV	Patient classification system in Valencia Community
SIA-ABUCASIS	System for primary care and outpatient EHRs
SIP	System for identification of patients
VC	Valencia Region

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