# Innovative models of chronic care management: the case of Regione Lombardia

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**Summary**

**To date, there is much excitement to re-examine the reorganization of health systems and to re-direct the focus on the appropriateness. Chronic care management is affirming its importance in terms of economic and medical relevance. In this article, the research goal is to provide a rationalization of the main organizational models which are springing for the systems of primary care with a focus on chronicity. The effort is aimed at identifying the paradigms from which derive the various initiatives scattered around institutions and territories. In fact, in this work we try to contribute in terms of theoretical positioning. Then, the focus is on CREG model of Regione Lombardia: a new organizational model for taking care of chronic patients.**

*KEY WORDS: chronic care management; networks of care; intermediate care; transitional care; self-management; education; integration; collaboration; support; follow-up; prevention; CREG.*

## Introduction

For many years, there has been a puzzling approach to the healthcare system from the standpoint of management, thinking of it in terms of cost and focusing on inputs and outputs rather than appropriateness of care (1). Healthcare does not strictly mean well being but health is a result of many aspects which cannot be simply compressed in the healthcare system[1]. Chronic pulmonary disease (COPD/BPCO), for example, cannot be cared only in the moment of acute infections but the patient lifestyle is part of the problem. With respect to chronic ills and primary care, it is undergoing a process of rediscovery of social resources and what is out of the hospital. There is a huge amount of management attempts to redesign the supplying system of care (2). In fact, the promotion of out of hospital services improves appropriateness of care in the management of chronic diseases (3) and it contributes to reduce the workload currently supported by some structures of the hospital, such as the emergency room or the radiology department (4). Further, it allows the strategic change of role for the hospital system, which loses its characteristics of generalist, to become more and more professionally competent, specialized and technologically equipped[2] (5). As stated by the Institute Of Medicine (2001), if the fundamental problem is the design of the system, then improvements in care "cannot be achieved by further stressing current systems of care. The current systems cannot do the job. Trying harder will not work. Changing systems of care will.". Here, the proposal is to conceive organizational solutions developed by different territorial contexts as answer to rising levels of chronic diseases. We first focus on the relevance of the chronic diseases; then, we try to contribute in terms of theoretical positioning selecting prototypes of models and finally we focus on the CREG model, developed by Regione Lombardia.

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## The importance of managing chronic care

Chronicity is characterized by long duration and disease is considered chronic if it lasts for a long time or for the life time. The most common chronic diseases in the European Region are heart disease, stroke, cancer[3], respiratory disease, diabetes and mental health

[1] Such as living style, working hours, stress problem, pollution, social environment, junk food, smoking and so on.
[2] Since 2003, PNSs (Piano Nazionale Sanitario) focus specifically on this dimension pushing towards a new rule of territorial services and a specialization of the hospital (for instance, PSN 2003-2005; PNS 2006-2008).
[3] Here, cancer is treated as a chronic disease because WHO includes cancer in its predictions and economic calculations. However, it is acknowledged that cancer has a different disease pathway and that some considerations of cancer as chronic disease may be not relevant.

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problems (6). Worldwide, BPCO is rising and has great medical and social impact. Data from the World Health Organization (WHO) claim COPD as the 5th cause of mortality and the 12th most common cause of disability. Furthermore, smoking and environmental pollution are the most important risk factors (7).

Let us focus deeper on some other striking numbers. It will simply follow the potential impact that a reorganization of chronic care can lead to. According to the World Healthcare Organization, Chronic diseases cause 86% of deaths across the 53 Member States in the WHO European Region. Worldwide, chronic diseases now affect more people than infectious diseases and are responsible for most of the disease burden in Europe. Across low-, medium- and high-income countries, 50-80% of the health budget is spent on chronic diseases. Without intervention, this percentage will continue to rise, as risk factors such as tobacco use, unhealthy diet and lack of physical activity remain prevalent. Thus, the costs to health services are too high, and lost productivity has considerable economic costs (8). In the United States, one hundred million persons have at least 1 chronic condition. Half of these individuals have more than one chronic illness. 88% of people aged 65 years or older have 1 or more chronic illnesses, and 1/4 of these have 4 or more conditions. Chronic illness accounts for three quarters of total national health care expenditures (9, 10).

Turning to Italy, according to Istat Database (2012), 38.6% suffer from at least one chronic disease, mostly women are affected (41.4%). The most common diseases are arthritis (16.7%) and hypertension (16.4%). By analyzing the historical trend of the last 12 years you can see that the number of diabetics and hypertensive is going steadily grown, respectively, from 3.9% to 5.5% and from 11.8% to 16.4%. The 76.4% of pensioners suffer from at least one chronic disease. Regione Lombardia states that almost 30% of the regional population lives with a chronic disease. This population consumes more than 70% of the total expenditure for the regional Healthcare system.

## Conceptual models of chronic care management

Since the mid nineties, several groups of researchers[4] have redefined the approach to chronic disease models of care by moving away from a reactive approach, based on the paradigm 'of expectation' of the acute event, toward a proactive approach, based on paradigm of prevention[5], avoidance or postponement of the progression of the disease, on the patient's empowerment and the qualification of the health care team (health and social). This is the new framework into which each institution is developing its own model as answer to the chronic diseases.

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Here, our research goal is to provide a theoretical framework to interpret models which are springing for the systems of primary care with a focus on chronicity. It is an inductive process, starting from the observation of the *plethora* of organizational solutions that are proliferating (11).

First, Table 1 shows the three main models summarizing their characteristics. Then, comments follow.

### *Structural Model*

The main characteristic of the Structural Model is to reach integration through structural driver. On one hand, having a physical point lead to put together physicians and other operators, on the other hand, it helps people in perception of the service. People usually think of the hospital in the space as the access point to the service. Realizing a new non-hospital structure allows people to identify the new organization and it aims to come up with intensive relationship between professionals themselves and between professionals and patients. However, it is important to underline that physical integration is not successful just because people are forced to stay together but what we can summarize in the label "social capital" is essential.

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Thus, in a suitable space, professionals can associate in multi-functional groups supported by secretarial services and nursing, in order to provide complete social-health care and prevention programs. Because of their working jointly, they can generate some economies such as an extension of daylight services, more intensive activity in certain phases, for example to promote continuity of care after discharge from the hospital, the possibility of semi-specialist advices through professional exchanges between associated doctors with different expertise.

### *Chronic Care Model*

The main focus is on the potential rule which can be played by the community. The vision aims to shift some burden of activities from the healthcare actors towards the patient and the social environment. The key is the self empowerment of the patient and community. "The patient must be the pilot, because the other possible pilot, the health care professional, is only in the plane a few hours every year, and this plane rarely touches ground. If chronically ill patients must pilot their planes, then the role of health care is to ensure skilled pilots,

[4] Katon et al., 1995; Wagner et al., 1996; Wagner, 1996; Von Korff et al., 1997.
[5] Secondary prevention.

Table 1 - The main different models of chronic care managements.

| Model | Objectives | Key Characteristics | Main logic | Setting | Boundary conditions |
|---|---|---|---|---|---|
| **Chronic Care Model** | Support to patient empowerment<br><br>Partnership with community resources<br><br>Cost saving | Self management<br><br>Decision support<br><br>Community resources<br><br>Prevision | Shift the burden from the health system to the community (outsourcing of services) | Multisetting: home, community, health structures (for acute phase and post-acute phase) | Professionals' culture (physicians and managers) and patients' culture<br><br>Local services and social capital of the community |
| **Network Model** | Decrease the heterogeneity of care<br><br>Create a care system interconnected by network between different settings<br><br>Strengthen the integration of professionals in care pathways | Professional integration<br><br>Information system<br><br>Intensive relationship | Empower the network<br><br>Increase the effectiveness of the system | Home | IS: elements of integration and standardization; sharing of information; the ability of operators and professional (user friendly tools) |
| **Structural Model** | Create structures for the institutionalization of chronic patients bridging between care setting with structural investments and single point of care | Intensive relationship<br><br>Physical integration | Simplify service access by eliminating space barriers<br><br>Increase the effectiveness of the system | Intermediate structures and ambulatories | Physical and geographical accessibility |

safe planes, flight plans that safely get the pilots to their destinations and air traffic control surveillance to prevent mishaps and keep them on course" (10). Christine Hancock writes for The European Observatory on Health Systems and Policies: "for any country facing an unprecedented burden on its health care system, it will be important to recognize the seriousness of the current and future problems and to use new ways of working with all stakeholders to find solutions. Patients and their families need to be partners rather than passive recipients; all staff, not just doctors, need to be viewed as part of the solution and encouraged to innovate and search for better ways of delivering appropriate care". To be defined as CCM-based, an intervention had to integrate changes that involved all or at least most of the six areas of the model: self-management support, decision support, delivery system design, clinical information systems, health care organization, and community resources. Let's turn to define one by one the six elements (10):

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*Self-management*: for chronic conditions, patients themselves become the principal caregivers. Management of these illnesses can be taught to most patients, and substantial segments of that management – diet, exercise, self measurement and medication use – are under the direct control of the patient. Self-management support involves collaboratively helping patients and their families acquire the skills and confidence to manage their chronic illness.

*Decision support*: evidence-based clinical practice guidelines provide standards for optimal chronic care and should be integrated into daily practice through reminders. Guidelines are reinforced by physician leading educational sessions for practice teams.

*Delivery system design*: the structure of medical practice must be altered, creating practice teams with a clear division of labor and separating acute care from the planned management of chronic conditions. Physicians treat patients with acute problems and train team

members. Non-physician personnel are trained to support patient self-management and ensure appropriate follow-up. Planned visits are an important feature of practice redesign.

*Clinical Information System*: computerized information has 3 main goals: as reminder systems that help primary care teams comply with practice guidelines; as feedback to physicians, showing how each is performing on chronic illness measures; and as registries for planning individual patient care and conducting population-based care.

*Healthcare Organization*: if an organization's goals and leaders do not view chronic care as a priority, innovation will not take place. The reimbursement environment of a provider organization has a major impact on chronic care improvements, which are more likely to survive throughout the long term if they increase revenues or reduce expenses. If purchasers and insurers fail to reward chronic care quality, improvements are difficult to sustain.

*Community resources and polices*: to improve chronic care, provider organizations need linkages with community-based resources, such as exercise programs, senior centers, and self-help groups. Community linkages are especially helpful for small physician offices with limited resources.

The 6 components of the chronic care model are interdependent, building upon one another. As its ultimate goal, the chronic care model envisions an informed, activated patient interacting with a prepared, proactive practice team, resulting in high-quality, satisfying encounters and improved outcomes (12). The Chronic Care Model has been widely adopted by worldwide and intervention strategies introduced in the health systems of different countries such as Canada, Netherlands, Germany, UK, Australia and others (4, 13).

***Networking model***

Network, as the term is used in the literature, typically refers to multiplex arrangements for solving problems that cannot be achieved, or achieved easily, by single organizations or persons. Generally speaking, the capacities required to operate successfully in network settings are different from the capacities needed to succeed at managing a single organization. The conditions that give rise to network forms are quite diverse. In only a minority of instances, the genesis of network forms is driven by a concern for minimizing transaction costs. Jones, Hesterly and Borgatti (1997) (14) identify three antecedents of networks which are: customized exchanges with a high human asset specificity; complex tasks under intense time pressure; frequency of exchanges. These three features are certainly identifiable in the process of providing care for complex and chronic illnesses. On one side the necessity of "boundary spanning" requires the presence of professionals or nurses working across different stages of the process, acting as "case managers" and fostering the transfer of the knowledge in each case. On the other hand the complexity of this kind of diseases requires the interaction among specialists of different medical disciplines. The third item is also important, since the frequency of exchanges impacts directly the human behaviour: the interpersonal relationship is much more solid and effective if it is long term oriented and the day-by-day count of mutual benefits is substituted by reciprocal trust. Networks creates incentives for learning and the dissemination of information, thus allowing ideas to be translated into action quickly. Lastly, an intuitive predictor of network relationships is the presence of pre-existing collaborative initiatives between the institutions of the network, which is often described as *social capital* (15). The network form of organization has developed as a common phenomenon in the healthcare sector in many countries, and in others (like Italy) is getting a foothold. From a clinical viewpoint the care of chronic illnesses, due to the complexity of the cases, requires a shift from individual consultation to multidisciplinary and networking practice, involving many health care providers working in different units of the same organization or even in different organizations, since the integral process of care is rarely provided by a single organization.

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In the network model, the main focus is on the connection between all the actors of the services and the patient. The key element is the Informational System and the subject which coordinates the network. Here, stress has to be on the integration and continuity of care. Through this model, performances first provided in day hospital are now included in a planned route, characterized by the provision of a complex and organized outpatient services to be given in a hospital or equivalent structure under the coordination of an informed doctor. Moreover, the development of day hospital and day surgery services are strongly influenced by the territorial capacity to take care of patients in order to face their special health needs (e.g.: pain management, control of symptoms associated with procedures, etc.). In this sector, the link territory-hospital and the ability of the network to create healthcare services increase the appropriateness of the system. The advantages are represented by a better appropriateness of the services and quality of clinical practice, by an increase of the number of performance with a reduction of the waiting lists, by an improvement in the continuity of care and therefore the degree of patient satisfaction. The innovative element of the model seems to be represented by the focus on the need to develop a tool of coordination and integration, a sort of connective net, between the all actors (general practitioners, hospitals, clinics, pharmacies, districts, social professionals) already existing and operating in favor of patients with chronic diseases. Briefly, do not miss the actors, rather it lacks the coordination which is introduced by this model.

**The experience of Regione Lombardia – CREG Model**

CREG (Chronic Related Group) can be defined as an innovative way to care patients with chronic diseases.

The innovative element which lead actors to focus on the lifetime horizon and think in terms of prevention is the CREG-tariff. Against a payment of a default quota of resources, it must be ensured all services outside the hospital (outpatient, prosthetics, pharmaceutical, home care...) required for good clinical and organizational management of chronic diseases. The set of activities, services and benefits provided in the package represented by CREG must be specific to the disease (or set of diseases[6]) and is aimed at ensuring the essential levels included in the various pathways of care. From the structural point of view, CREG is composed by three technological elements and an organizational platform: the first technological element is represented by the ability to identify the chronic illness; the second one is the PDT (*Percorsi Diagnostico Terapeutici*) that is to say standard guidelines for any disease or set of diseases, and the third one is a system of remuneration. Before to follow with describing these elements, let's summarize the history of the model. In the first part of the 2011, the legal framework of the model was completed for starting the test. An official act of the *Direzione Generale Sanità* of Regione Lombardia stated the group of diseases (CReG) and the related tariffs. Particularly, there were defined diseases of priority interest, and some ASL (Bergamo, Como, Milano città, Milano Melegnano 2, Lecco) in which to apply the specified path. Chronic Obstructive Pulmonary Disease (COPD/BPCO) has considered one of the disease of main interest[7]. The aim of the test has been to put the emphasis on the administrative, organizational, and management aspects, with the intent of identifying critical aspects, opportunities and operational solutions (16). Thus, in the second part of 2011, the ASLs named above have published the call for assigning the rule of *gestore* of CReG. After that, from January to March 2012 patients have been assigned. So far, we may say that the test period is still going on. There are little evidence about the results of the model and in the next months first data will be available for further considerations. Let's turn to the elements of the model.

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### *BDA (Banca Dati Assistito)*

To specifically address chronicity, the first step is to individually identify those who are chronic patients. You would be able to assess which is the seriousness of the disease, its development time and what are the most important personal characteristics (gender, age, complications...). Moreover, you would know what could affect the evolution in terms of consumption of health care resources. Some chronic patients will be more mild and consume fewer resources, while others will be more serious and will need more health activities: distinguishing the first from the latter is crucial, both for a proper management of the patient in her health needs (consumption pharmaceuticals, outpatient activities...) and welfare (aids, home care, day care centers, residential...), and for an adequate allocation of resources (CREG rate).

From 2002 in some ASL, and since 2004 throughout the region, it has been used a powerful information tool (BDA - *Banca Dati Assistito*) that is able to lead to the individual subject all her health activities (such as hospitalizations and outpatient pharmaceutical consumption). Taking advantage of these individual information, in connection with the database that records exemptions for pathology and using some algorithms, you can not only identify chronic diseases characterizing the individual citizen, but it is also possible to assess the level of health that qualifies every chronic patient. You can think of that as a judgment regarding the care pathway, the needs for care, the potential consumption of resources that can characterize the individual subject.

Each homogeneous set of pathologies may result into a potentially CREG, although practice reasons have limited the number of possible combinations[8]. It has been adopted the following approach: it was carried out a sorting of the individual pathologies depending on the relevance in clinical care that is to say the consumption of resources of each pathology. Then, all combinations of them have been ordered by putting ahead the more relevant pathologies; finally, it has kept only the first two diseases of each combination (as previously ordered), and integrating this with the total number of chronic diseases that a person is suffering. In doing that, more than 150 CREG categories have been defined.

### *PDT (Percorsi Diagnostici Terapeutici) and Guidelines*

The diagnostic and therapeutic pathways of care are the appropriate requirement care required by each disease. In the original intent of the model, procedures for different pathologies have to be shared and standardized at the regional level. Chronic patients, individually considered, are widely different from each other and they present levels of demand strongly diversified: in this respect, the approach to the care pathway defined by PDT and guidelines is an important element of standardization. The main goal is to reduce as far as possible the unjustified and inappropriate variability, both when it leads to med-

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[6] Chronic diseases rarely occur alone: the chronic subject is often weaker than a normal subject, characterized by a condition that requires a mix of interventions which means an inevitable increase in costs.

[7] The basic tariff for BPCO *cardiopatia-vasculopatia* is 2.262 Euro and any other disease which is combined adds 579 Euro on the basic tariff.

[8] and therefore the number of CREG.

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***Payment System***

CREG is characterized by a predefined set of resources, a fee which should be appropriate to remunerate all aspects of care that have been agreed in the PDT[9]. Here, the mechanism works like the repayment system for the hospital activities in acute cases, namely the DRG (Disease Related Group). For each group of pathology (CREG) is assigned an inclusive rate[10]. With respect to the remuneration, there are two methodological elements which have to be drown: how to establish the rate of CREG and how to manage the financial aspects related to the provided activities. The amount corresponding to the CREG[11] is paid in part and in advance to the 'operator'[12] while it is subtracted the amount of the specific activities as they are provided. In other words, the operator collects the Delta among the tariff and the costs of services provided by providers. The path adopted leads to the identification of two rates: a base fee, to be allocated to each CREG, and an increase in tariff to be assigned to each further chronic disease.

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Again, the key aspect of the CREG, is represented by identification of the "subject" that guarantees the continuity of the path, interacting with all the actors involved in the management of the disease and ensuring the necessary administrative, organizational and managerial skills. In the CReG model, this function will be given to those persons (e.g.: general practitioners, NGO, foundations, hospitals and so on) identified and governed by the ASL (*Azienda Sanitaria Locale*, equivalent to the Local Health Authority), which will be in charge for ensuring the full support of patients recruited to the path of CREG. The most important expected outcome is in terms of the adequacy and appropriateness of care. That is through two channels: first, patients (hypo consumers) who usually give up their pathway are leading to adherence to the PDTA; secondly, by avoiding the inappropriate medical consumption. This approach will also allow chronic individuals to maintain regular their chronicity, saving through avoiding the occurrence of all those unwanted and harmful health effects such as hospitalizations and disabilities resulting from inadequate process of care.

## Conclusion

In this article we have presented a classification of paradigms of models which are alternative to the hospital system of care for primary care. The focus is mainly on the chronic care because of the relevance of these pathologies (as stated above, BPCO is one of the main important) and their impact in terms of health level and economic sustainability of the system. The three paradigms identified are the structural model which rely on a physical integration; network model which rely on a subject which is the coordinator of the services and responsible for the virtual integration among services and patients; the CCM (the brand is so strong that we decided to adopt its label to identify the category) which bet on the self empowerment of the patients, supported by multifunctional team and social resources. Then, we have focused on CREG model of Regione Lombardia: a version of network model for chronic patients. The operator (*gestore*) is the innovative subject that due the mechanism of remuneration is incentivized to shift from "emergency approach" to "prevention approach". Take care of BPCO patient in the moment of the acute event is not the main goal in the new model. Preventing the negative event (avoiding connected costs) is the strategy. So far there are not yet data which can inform about the clinical results. Making clear that results may be postponed in the next years, this assessment is the object of future analysis in order to come up with a complete evaluation of the model.

## Authors' contribution

The Authors' names are listed in alphabetic order. Authors equally contributed to the paper.

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[9] Only hospital activities and the current founding for GPs (MMG) are excluded from compensation.
[10] It considers not only the consumption for outpatient activities, pharmaceuticals with oxygen too, prosthetics and supply of principals, the integrated home care and any other health services provided by the PDT, but also other non-strictly health plans such as transportation for patients undergoing dialysis.
[11] Above indicated as "rate".
[12] Which is the entrepreneurial subject that coordinates the activities and it is responsible for caring for the patient.

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