



# A COMPILATION OF GOOD PRACTICES

- First Edition -

EUROPEAN INNOVATION PARTNERSHIP ON ACTIVE AND HEALTHY AGEING

## Prescription and Adherence to Medical Plans



Action Group A1

## A COMPILATION OF GOOD PRACTICES

### Action Group on Prescription and adherence to medical plans

*This publication was prepared by the European Commission, DG SANCO, based on the material sent by members of the Action Group A1 in June-July 2013. The main contributors were Stefano Vettorazzi, Jorge Pinto Antunes, Isabelle Dève, and Marianne van den Berg, under the supervision of Maria Iglesia Gomez, Head of Unit Innovation for Health and Consumers.*

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Action Group A1





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## EXECUTIVE SUMMARY

Inappropriate prescription and poor adherence to pharmacological and non-pharmacological medical plans is an issue of public health concern.

In its 2003 report on medication adherence<sup>1</sup>, the World Health Organization (WHO) stated that "increasing the effectiveness of adherence interventions may have a far greater impact on the health of the population than any improvement in specific medical treatments".

Evidence also suggests that the use of drugs in older people is often inappropriate, not only because of the complexities of prescribing, but also as a result of those factors related to patients, to physicians, and to health care systems<sup>2</sup>.

Inappropriate prescription and poor adherence has also significant implications for the expenditures of healthcare and is estimated to incur costs of approximately €80 billion a year<sup>3</sup>.

Because barriers to medication adherence are complex and varied, solutions to improve adherence must be multifactorial.

The main aim behind this collection was therefore to ascertain which solutions were proving to be effective in overcoming some of the existing barriers to inappropriate prescription and adherence.

Another reason was to get information on what European Innovation Partnership's partners belonging to the Action Group A1 are working on, thus providing a broad picture of interventions undertaken at community level, in the hospital, clinical, and home settings, within research centres, and the academia, aimed at better tackling adherence-related issues.

Finally, the good practices were collected also to provide valuable contribution to the current policy debate on how to achieve a more sustainable provision of care and to promote healthier lives among the ageing European population, therefore contributing to setting the scene for future work at EU level.

This booklet is a mapping exercise involving 30 partners, corresponding to 50 different organisations, which resulted in 75 initiatives being submitted, providing evidence and insights of recent experiences already implemented (or in their pilot phase). The booklet is structured as follows:

- The [First Chapter](#) (the European Innovation Partnership on Active and Healthy Ageing) provides concise information on the Partnership, on the Action group on Prescription and adherence to medical plans (one of the 6 Action Groups of the partnership), and highlights some of the issues around adherence.
- The [Second Chapter](#) (the collection of good practices) provides the rationale behind the collection, explains the methodology applied, and highlights some of the main findings.
- The [Third Chapter](#) draws some conclusions.
- The [Fourth Chapter](#) illustrates the 60 good practices which were selected for inclusion in the booklet.

This collection enabled a better understanding of some of the solutions/approaches that could be implemented in order to tackle more effectively the issue of inappropriate prescription and poor adherence to pharmacological and non-pharmacological medical plans.

This exercise, facilitated by the Commission, should be seen as an effective way by which the European Innovation Partnership on Active and Healthy Ageing is contributing to the current policy debate on how to achieve a more sustainable provision of care and to promote healthier lives among the ageing Europeans.

<sup>1</sup> Sabaté E. Adherence to Long-Term Therapies: Evidence for Action. Geneva, Switzerland: World Health Organization; 2003.

<sup>2</sup> Spinewine A, Schumacher KE, Barber N, Hughes C, Lapane KL, Swine C, Hanlon JT. Appropriate prescribing in elderly people: how well can it be measured and optimised? Lancet 2007; 370(9582):173-84. [http://dx.doi.org/10.1016/S0140-6736\(07\)61091-5](http://dx.doi.org/10.1016/S0140-6736(07)61091-5)

<sup>3</sup> Osterberg L, Blaschke T. Adherence to medication. The New England Journal of Medicine 2005; 353(5):487-497. <http://dx.doi.org/10.1056/NEJMr050100>



## 1. THE EUROPEAN INNOVATION PARTNERSHIP ON ACTIVE AND HEALTHY AGEING

European Innovation Partnerships (EIPs) form part of the Innovation Union<sup>4</sup> and are designed to provide a framework to bring together all relevant stakeholders across policies, across sectors and across borders to speed up innovations that address a major societal challenge, and gain competitive advantages for growth and job creation in Europe.

The first (pilot) EIP was announced on 4 February. It seeks to address the challenges brought about by the significant changes in the European Union's population structure.

These profound changes present a key challenge to society, with the ageing of the population having serious implications for public policies and budgets.

At the same time, changes in the demographic profile of the EU will also impact on labour and product markets, families and individuals.

The European Innovation Partnership on Active and Healthy Ageing (EIP on AHA) has three main objectives:

- to enable EU citizens to lead healthy, active and independent lives while ageing;
- to improve the sustainability and efficiency of social and healthcare systems;
- to boost the competitiveness and markets for innovative products and services that respond to the ageing challenge.

The EIP on AHA is focused on prevention and health promotion, integrated care as well as active and independent living for older persons.

Its overarching target is to increase by two years the average number of healthy life years at birth within the EU population by 2020, an indicator

which is based on the concept of disability-free life expectancy.

The Partnership brings together about 1,000 partners across all EU Member States, and other non EU Countries, working in 6 Specific Action Groups.

They are representing 516 multi-stakeholder<sup>5</sup> commitments<sup>6</sup>, from local to international levels, committed to implementing innovative solutions to improve the quality of life and health outcomes of older people living with chronic conditions, through a holistic approach, including enhanced self-care, personalized care, better adequacy of treatment, increased adherence to safe and effective care plans.

### 1.1. The Action Group on Prescription and Adherence to medical plans

In response to the Strategic Implementation Plan of the European Innovation Partnership on Active and Healthy Ageing, the Commission launched an invitation for commitments on 4 February 2012 to contribute to the Partnership; the Action Group on "Prescription and Adherence to treatment" formed on June 2012 following this invitation; a second invitation for commitments was launched on 14 January 2013.

At present, this Action Group brings together 63 'main' partners coming from 10 EU Member States<sup>7</sup> and representing 68 multi-stakeholder commitments from 31 different Countries.

The Action Plan from this Action group identifies five general objectives, and several actions to be achieved by action's partners, as summarized in the table illustrated below in the following page:

<sup>4</sup> Europe 2020 Flagship Initiative Innovation Union, [COM\(2010\) 546 final](#)

<sup>5</sup> Health and care organisations; academia; industry; enterprises and public authorities, from local to international level.

<sup>6</sup> A Commitment is a set of measurable and concrete activities at local, regional or national level performed by those stakeholders who have joined the Partnership

<sup>7</sup> Namely: Belgium, Germany, Ireland, Italy, Poland, Portugal, Spain, Sweden, the Netherlands, and United Kingdom.

## Action Group on "Prescription and adherence to medical plans"



OBJECTIVES	ACTIONS
1. Improve patient adherence to care plans, including medication and healthy habits.	Decision support tools (including mobile devices); Dispensing and Prescribing; Interventions; Monitoring
2. Empower the patients and caregivers to take care of their health and to be independent	Counselling; Education/Information; Online services; Social networks
3. Deliver improvements in the health care system to promote adherence	Electronic prescription; Best-practices; Service models; Training
4. Contribute to the research and methodology on ageing and adherence	Evidence; Guidelines
5. Foster communication between different partners/actors in the healing and caring process to improve adherence	Data repository; Networking

- lack of new therapies helping overcoming the complexity of medication regimens; lack of a critical mass of competitive interdisciplinary research groups dedicated to translational medicine; lack of identified biomarkers to monitor health status and defects on cell pathways that must be corrected to guarantee health longevity, as far as the objective of contributing to the research and methodology on ageing was concerned;
- need to implement new organisational models for proactive care; need to bring together key players across health care patients associations, professional organizations and technological sectors; lack of evidence on the key interventions to be combined in multidimensional methods for improving adherence in chronic health problems, as far as the objective of delivering improvements in the health care system was concerned.

### 1.2. The prescription and adherence issue

The co-occurrence of multiple diseases is a major feature of the older population, making this group one of the heaviest users of medicines<sup>8</sup>.

In fact, 40% of people aged 65 and over consume between five and nine medicines per week; this number is even higher for 18% of this population where the consumption rate can be of more than 10 medicines weekly. The highest overall prevalence of medication use was among women aged at least 65 years, of whom 12% took at least 10 medications and 23% took at least 5 prescription drugs. On average, this group consumed four to five prescription medicines at any given time.

Polypharmacy is common in older people, as they typically show multimorbidity, the co-occurrence of multiple chronic diseases, which usually requires them to take multiple medications.

Polypharmacy (together with age-related physiological changes and a larger number of coexisting conditions) has been associated with an increased risk of adverse events and older adults are nearly seven times as likely as younger

The Action Plan on "Prescription and Adherence to treatment" identifies some gaps as those to be addressed in order to improve prescription and adherence, such as:

- lack of health literacy; lack of tools to improve adherence and ability to score adherence and its outcomes; lack of screening tools for adherence; lack of product innovation including packaging and drug formulation, as far as the objective of improving patient's adherence to medical plans was concerned;
- lack of training of General Practitioners to monitor adherence to treatment protocols; poor knowledge by patients of how to prevent or slow down progress of disease; lack of time and competences of health professionals to address issues of patient motivation; lack of tools to empower patients to monitor their own progress, as far as the objective of empower the patients and caregivers was concerned;

<sup>8</sup> [http://www.who.int/medicines/areas/priority\\_medicines/BP7\\_3Elderly.pdf](http://www.who.int/medicines/areas/priority_medicines/BP7_3Elderly.pdf)



persons to have adverse drug events that require hospitalization.

Polypharmacy and multimorbidity also raise challenges regarding adherence. Adherence diminishes with an increased number of drugs and of doses per day and the complexity of treatments: 79% of patients take their "once a day" dose, but only 51% of those supposed to take four doses do so; among patients with chronic illness, approximately 50% do not take medications as prescribed.

In addition to polypharmacy, attention must be also paid to the appropriateness of the prescribing, as studies have found that between 55 and 59% of the medicines used by the older people are prescribed without indication or with a less than optimal indication, exposing patients to unnecessary risks, impairing adherence, and increasing healthcare costs.

Potentially inappropriate medication (PIM) prescribing in older adults is quite prevalent and is associated with an increased risk for adverse drug events, morbidity, and utilization of health care resources. PIM prescribing can be even more problematic in the acute care setting.

Therefore, tackling inappropriate prescription, by means of information generation/dissemination improvement, medication review or e-prescription, is of paramount importance.

Poor adherence to pharmacological and non-pharmacological medical plans is a global issue of major public health concern, because it is a widespread phenomenon and can be a barrier to safe and cost-effective use of medicines and services, severely compromising the effectiveness of treatment and therapy.

For instance, the failure to adhere to pharmacological medical plans could lead to the individual not taking the prescribed drug, taking it at the wrong time or missing doses.

Poor adherence has also significant implications for the costs of healthcare and is estimated to incur costs of approximately €80 billion a year<sup>9</sup>, in a context where growth in health spending per capita in the EU-27 slowed or fell in real terms

already in 2009 in those EU countries hardest hit by the economic crisis.

Indeed, a comprehensive approach aimed at improving adherence in older age-classes is therefore required, based on a multi-step strategy, to organize and understand the available evidence, to develop plans for the future, and to apply intervention programs to measure the impact of new strategies on major clinical and epidemiological outcomes.

The EIP on AHA makes therefore adherence a critical issue in population health, from the perspective of both quality of life and of health economics.

<sup>9</sup> Osterberg L, Blaschke T. Adherence to medication. The New England Journal of Medicine 2005; 353(5):487-497. <http://dx.doi.org/10.1056/NEJMr050100>



## 2. THE COLLECTION OF GOOD PRACTICES



### 2.1. Rationale

Evidence suggests that the use of drugs in older people is often inappropriate, not only because of the complexities of prescribing, but also because there are many factors contributing to poor medication adherence, including those related to:

- patients (e.g. suboptimal health literacy, lack of involvement in the treatment decision-making process, symptoms of anxiety and depression, obedience and motivation, preferences for medication regimen characteristics);
- physicians (e.g. prescription of complex drug regimens, communication barriers, ineffective communication of information about adverse effects, and provision of care by multiple physicians);

- health care systems (e.g. office visit time limitations, limited access to care, and lack of health information technology).

Because barriers to medication adherence are complex and varied<sup>10</sup>, solutions to improve adherence must be multifactorial.

One of the reasons behind the collection was therefore to ascertain which solutions, if any, were proving to be effective in overcoming some of the existing barriers to adherence, or filling some of

<sup>10</sup> ABC Project. Ascertaining Barriers for Compliance: policies for safe, effective and cost-effective use of medicines in Europe (1.1.2009-30.6.2012, funded from the FP7 Theme Health, 2007-3.1-5 with a contribution of 2,2m€) which highlighted, among the others, the importance of health literacy to support medication adherence and compliance (<http://abcproject.eu/index.php>).



the gaps identified by the Action Plan, as mentioned before.

Another reason behind the exercise was to get information on what European Innovation Partnership partners were working towards implementing innovative solutions in the field of active and healthy ageing and, at the same time, to provide visibility to a broad picture of interventions undertaken at community level, in the hospital, clinical, and home settings, within research centres, and the academia, aimed at better tackling adherence-related issues.

Practices were also collected with a view to contributing to the current policy debate on how to achieving a more sustainable provision of care and to promote healthier lives among the ageing European, therefore contributing to setting the scene for future work at EU level.

Finally, but not less importantly, the good practices were collected with a view to contribute to the general debate on chronic diseases, in particular the discussions towards identification of options for a better and future-oriented response to the challenges for health and social systems associated to the increased prevalence of chronic diseases.

## 2.2. Methodology

This collection of good practices was facilitated by the European Commission within the framework of the activities under the Action Group on "Prescription and Adherence to treatment". The exercise was launched at the 4<sup>th</sup> meeting of the Action Group, which took place in Brussels on 10 June. In that occasion, partners were invited to provide examples of implemented actions or planned initiatives which were already in its pilot phase.

Thirty partners, corresponding to 50 different organisations, provided evidence on 75 initiatives; these were screened by the Commission, according to the following exclusion criteria:

- projects/initiatives not started yet;
- insufficient information on the initiative;

- objectives and/or activities falling within the scope of the on Action Plan on "Prescription and Adherence to treatment";
- target population;
- membership of the European Innovation Partnership.

The good practices selected were not peer reviewed and the work presented did not go through any kind of validation or quality assessment.

The selected good practices were then clustered, based on their type of intervention, around the following areas:

- 1.adherence to medical plans;
- 2.user empowerment/information;
- 3.polypharmacy;
- 4.research and methodology.

This clustering is in line with the main objectives of the action plan and the areas identified for future collaborative work by the partners of the Action Group on "Prescription and Adherence to treatment".

The good practices in the cluster 'adherence' focus on solutions like smartphone applications or teleservices that incorporates reminders of medication's intake, monitor if people take medication, pharmaceutical plans.

The cluster 'user empowerment' represents good practices on patient information and education.

The 'polypharmacy' cluster is putting more emphasis on the interaction of different medication, adverse effects of medication, appropriate prescription and reducing medication errors by using tools like e-prescription and medication reviews.

Finally, the 'research and methodology' cluster focus, among the others, on the use of databases and clinical data warehouse.

## 2.3. Main findings

According to the information provided by partners, the good practices contributed to the 5 objectives of the action plan (see [chapter 1.1](#)) as illustrated in the following page:

## Action Group on "Prescription and adherence to medical plans"



COUNTRY	Good practices selected	Objective 1.	Objective 2.	Objective 3.	Objective 4.	Objective 5.
IRELAND	2	2	1	1	2	1
ITALY	15	14	9	11	10	8
PORTUGAL	4	3	2	0	2	0
SPAIN	28	23	16	17	16	15
SWEDEN	1	1	0	1	1	1
THE NETHERLANDS	4	4	4	4	2	4
UNITED KINGDOM	6	6	5	5	5	5
<b>Total</b>	<b>60</b>	<b>53</b>	<b>37</b>	<b>39</b>	<b>38</b>	<b>34</b>
<b>In % over the Total</b>		<b>26%</b>	<b>18%</b>	<b>19%</b>	<b>19%</b>	<b>17%</b>

By implementing their initiatives, partners were able to get evidence relating to the different objectives of the European Innovation Partnership Action Plan on Prescription and Adherence to medical plans. In what follows, we highlight some of the evidence gathered together by partners in the implementation of their initiatives which seems to be most promising in terms of tackling some of the issues which adherence entails.

- As regards the **improvement of patient adherence to care plans**, including medication and healthy habits, the examples from the good practices demonstrate that inappropriate prescriptions can be reduced by the use of decision support tools and dispensing tools, for example through the development and implementation of virtual pillbox tools.
- Also, the examples from the good practices illustrate how implementation of a computer-based prescription support system aimed at collecting and storing drug information and to automatically provide it, in order to reduce or avoid inappropriate prescriptions, is associated with a significant reduction of potentially inappropriate medications (PIM) and potentially severe drug-drug interactions (DDI).
- The good practices in this area also demonstrate how shorter treatment times can have a positive impact on adherence, highlighting the importance of minimising treatment burden; similarly, shorter treatment times using medical device also seem to correlate with higher levels of True Adherence, that is the number of doses that were completed, providing some evidence that the

patient may be more likely to take a treatment if the associated intrusion into day-to-day activities is lessened.

- As a result of the widespread use of drugs, iatrogenic disease is a major health emergency, and is associated to a substantial increase in morbidity and mortality. In this context, the use of databases that result from large observational studies can yield critical information about the efficacy and safety of drugs in 'unselected' populations whose characteristics reflect the real world. Statistics are showing that most of patients staying in nursing homes are frail and affected by multi-morbidity, resulting in a common condition of polypharmacy. These features make interventions in this setting potentially of large impact, and the frequent occurrence of adverse health outcomes makes the use of databases that result from large observational studies extremely suitable for statistical analyses, yielding critical information about the efficacy and safety of drugs in 'unselected' populations whose characteristics reflect the real world.
- As far as the **empowerment of patients and caregivers** is concerned, the selected good practices provide examples of promotion of adherence in clinical practice, through multidisciplinary in-hospital interventions as well as through education programmes performed in-hospital to chronic patients.
- The examples suggest that structured training programmes on self-management, in which chronic patients are trained with the objective of improving their understanding of their condition



and their skills to take better control of their health seem to be important.

- The practices now collected provide also interesting examples of lifestyle interventions plans and web-based programs encouraging the adoption of healthy behaviours, and health literacy tools aimed at supporting self-management, improving adherence.
- As regards the **delivery of improvements in the health care system to promote adherence**, the implementation of pharmaceutical care program seems to be associated with better outcomes; the involvement of pharmacists, both in hospitals and on the territory, as educators and point of reference in the follow-up of patients suffering from chronic diseases seems to be also associated with an improved patient journey, an improved patient safety with reduced adverse drug events, and reduced medicines wastage, leading to overall efficiencies.
- The good practices also reveal how clinical medication review seems to be an important tool to improve adherence.
- As regards research and methodology, the good practices illustrate how an approach based on the use of Comprehensive Geriatric Assessment on a systematic scale may significantly impact the quality of care in hospitalized patients, as well as in other settings (e.g. nursing homes), as regards adherence.



### 3. CONCLUSIONS

This collection of good practices provided the opportunity to show the added value of enabling a better understanding of some of the solutions/approaches that could be implemented in order to tackle more effectively the issue of prescription and poor adherence to medical plans and medication.

This exercise, facilitated by the European Commission, should be seen as an effective way by which the European Innovation Partnership on Active and Healthy Ageing is contributing to the current policy debate on how to achieve a more sustainable provision of care and to promote healthier lives among the ageing Europeans.

At stakeholders' level, the collection has provided visibility to a broad picture of interventions undertaken at community level, in the hospital, clinical, and home settings, within research centres, and the academia, aimed at better tackling adherence-related issues, enabling an improved networking at EU level among those stakeholders working on the same areas.

By contributing to it, partners have also been able to start developing collaborative work on areas not entirely covered by their respective commitments, thus enabling them to start a process leading to a better coordination of their respective initiatives and a better networking at EU level.

In terms of results achieved, and suggestions for future work, the following can be highlighted:

- The implementation of pharmaceutical care program seems to be associated with better outcomes; in particular, the involvement of pharmacists, both in hospitals and on the territory, as educators and point of reference in the follow-up of patients seems to be also associated with an improved patient safety with reduced adverse drug events.
- Specifically, approaches based on the use of Comprehensive Geriatric Assessment on a systematic scale may significantly impact the quality of care in hospitalized patients, as well

as in other settings (e.g. nursing homes), as regards adherence.

- Inappropriate prescriptions can be reduced by the use of decision support tools and dispensing tools, as well as by the implementation of computer-based prescription support systems aimed at collecting and storing drug information and to automatically provide it, in order to reduce or avoid inappropriate prescriptions.
- The use of databases that result from large observational studies are extremely suitable for statistical analyses, and are capable of yielding critical information about the efficacy and safety of drugs in 'unselected' populations whose characteristics reflect the real world.
- ICT, such as mobile devices for sending reminder phone calls and text messages, can be leveraged to engage patients in treatment and improve health outcomes; some of the good practices demonstrated clinically and statistically significant improvements in chronic medication continuation using, for instance, mobile devices. In particular, patients using disease-specific medical devices to support them in their therapies seem to be more likely to take a treatment.

The examples of good practices collected within the framework of the European Innovation Partnership also provide evidence about how close collaboration among healthcare providers and integrated models of care and advance care planning programmes promotes improved clinical medication review, reconciliation and adherence in chronic patients and contributes to reductions of potential inadequate and unsafe prescriptions per patient, as well as to prevention of unnecessary hospital admissions, ultimately resulting in improvements in the health care system to promote adherence.

The good practices also raise interesting tracks in the area of research on adherence. One of the most challenging issues in the years ahead will be to achieve a better understanding of the complex relationship between multimorbidity, polypharmacy and adherence to clinical practice guidelines and medications.



Health care delivery and quality measurement, as well as the majority of existing guidelines (including recommended medications) are still designed for people with single diseases. Thus, evidence for treating patients affected by multimorbidity is worryingly weak, leading to variations in care and less than optimal health outcomes. As a result, some of the good

practices contained in the booklet are working on prescription databases, health data repositories, and monitoring of administrative health databases (mainly prescription and hospitalization data flows) in order to set up a knowledge base to be used by stakeholders involved in the health care system.



## 4. GOOD PRACTICES

The selected good practices were clustered according to the following thematic areas:

1. Adherence to medical plans;
2. User empowerment/information;
3. Polypharmacy;

### 4. Research and methodology.

A fifth, residual, cluster was added to include a few good practices that was not possible to assign to the previous 4 areas; it is made of good practices that can be assigned to objectives 3 ("deliver improvements in the health care system to promote adherence") and 5 ("foster communication between different partners/actors in the healing and caring process to improve adherence") of the Action plan (see [chapter 1.1](#)).

### 4.1. Adherence to medical plans

CONTRIBUTING PARTNER	INITIATIVE	COUNTRY	PAGE
<b>Aston University</b>	Developing a scale to assess anti-cholinergic burden	UNITED KINGDOM	<a href="#">52</a>
<b>Bio-Med Aragón / Anasa Tech</b>	Design and development of a service to show visual & audible reminders on the TV screen (HbbTV) and of HbbTV audio-visual content & questionnaires to be depicted on the TV screen	SPAIN	<a href="#">61</a>
<b>Bio-Med Aragón / Telemedicine and e-Health Research Group</b>	Design of an ontology-based telemonitoring system to support personalised intervention plans for chronic patient supervision & their adherence to care plans	SPAIN	<a href="#">64</a>
<b>Brocacef</b>	Integrated Pharmaceutical Compliance Programme	THE NETHERLANDS	<a href="#">127</a>
<b>CatSalut</b> (Catalan Health Service)	Implementation of a personalised dosification system in complex chronic patients	SPAIN	<a href="#">84</a>
<b>Consejería de Sanidad y Política Social, Region de Murcia</b>	FEDON	SPAIN	<a href="#">91</a>
<b>Consejo General de Colegios Oficiales de Farmacéuticos de España</b> (General Council of Pharmacists Chambers of Spain)	Adhiérete: assessment of pharmaceutical care services on adherence for elderly chronic and polymedicated patients (mHealth and Personalised Dosage Systems)	SPAIN	<a href="#">94</a>
<b>Daiichi Sankyo Italy</b>	My Hypertension Care	ITALY	<a href="#">99</a>
<b>Department of Health, Basque Country</b>	Virtual Pillbox	SPAIN	<a href="#">106</a>
<b>Fondazione Salvatore Maugeri IRCCS</b>	Promoting adherence in clinical practice	ITALY	<a href="#">114</a>
<b>Hospital Clinic</b>	Pharmaceutical Care Program	SPAIN	<a href="#">136</a>
<b>Inversión y Desarrollos Socio Asistenciales</b>	Basic Protocol For Adherence (BaP4Adherence)	SPAIN	<a href="#">167</a>
<b>Philips Home Healthcare Solutions</b>	I-neb Insight Online	THE NETHERLANDS	<a href="#">48</a>
<b>redIAPP. Primary Care Prevention and Health Promotion Research Network</b>	To evaluate the effectiveness of a nurse training program in motivational interview to improve patients adherence to medication	SPAIN	<a href="#">187</a>
<b>redIAPP. Primary Care Prevention and Health</b>	Mindfulness pills (learning and guide of mindfulness through app. extrapolated to other	SPAIN	<a href="#">190</a>

## Action Group on "Prescription and adherence to medical plans"



CONTRIBUTING PARTNER	INITIATIVE	COUNTRY	PAGE
Promotion Research Network	psychological therapies and drug therapies)		
Trinity College Dublin EngAGE Centre for Research on Ageing	Adherence and persistence to medication in community dwelling older populations	IRELAND	<a href="#">202</a>
University of Bologna	PersonalPharm	ITALY	<a href="#">33</a>
University of Coimbra, Faculty of Pharmacy	Multi-compartment dispensing and pharmacist's follow-up in the improvement of adherence to therapy in the elderly	PORTUGAL	<a href="#">217</a>
University of Florence and University Hospital Careggi	MONitoring of prescription and improving ADherence to anti-Osteoporotic treatments (MONADOS)	ITALY	<a href="#">231</a>

### 4.2. User empowerment/information

CONTRIBUTING PARTNER	INITIATIVE	COUNTRY	PAGE
Bio-Med Aragón/ Microhealth España	MicroHealth Hemophilia	SPAIN	<a href="#">58</a>
CatSalut (Catalan Health Service)	Citizen empowerment in drug utilization: advances in knowledge, accessibility and adherence	SPAIN	<a href="#">77</a>
Department of Health, Basque Country	Active Patient Program	SPAIN	<a href="#">103</a>
Life Supporting Technologies– Universidad Politecnica de Madrid	Design, development, deployment and evaluation of ICT services and tools for older people and chronic patients, as well as caregivers and care providers managing their health and wellbeing	SPAIN	<a href="#">170</a>
University of Bologna, Unit of Metabolic Diseases & Clinical Dietetics	FLIP: fatty liver inhibition of progression	ITALY	<a href="#">30</a>
University of Porto	CARAT	PORTUGAL	<a href="#">219</a>

### 4.3. Polypharmacy

CONTRIBUTING PARTNER	INITIATIVE	COUNTRY	PAGE
Agenzia Italiana del Farmaco (AIFA)	OPEN - Optimizing Prescription in Elderly patients in Nursing home	ITALY	<a href="#">36</a>
Azienda Provinciale per i Servizi Sanitari (Health Care Service Trust of the Autonomous Province of Trento)	Integrated management between hospital and territory of patients suffering from heart failure- the role of pharmacists in the community	ITALY	<a href="#">73</a>
Bio-Med Aragon / EpiChron Research Group on Chronic Diseases	Adherence to Clinical Practice Guidelines and Medications in Multimorbid Patients with Polypharmacy	SPAIN	<a href="#">54</a>
CatSalut (Catalan Health Service)	Multiple strategies for clinical medication review and reconciliation of the medication in complex chronic patients improving safety, efficiency and adherence	SPAIN	<a href="#">80</a>

# Action Group on "Prescription and adherence to medical plans"



CONTRIBUTING PARTNER	INITIATIVE	COUNTRY	PAGE
<b>COFARES</b>	FARMAD: effective monitoring of old and chronic patient adherence through community pharmacy	SPAIN	<a href="#">130</a>
<b>Department of Health of Health Social Services and Public Safety, Northern Ireland</b>	Medicines Management for Older Citizens	UNITED KINGDOM	<a href="#">109</a>
<b>Hospital Clinic Barcelona, Consorci Hospitalari de Vic</b>	Regional strategy for polymedicated & chronic patients	SPAIN	<a href="#">140</a>
<b>Hospital universitario de Getafe/Region de Madrid/Consejería de Sanidad</b>	EURNET-CLINITROP	SPAIN	<a href="#">144</a>
<b>Institut Català de la Salut (Catalan Health Institute)</b>	Geriatr-ICS Project. Chronicity Support and Adequacy of Prescribing in Nursing Homes	SPAIN	<a href="#">151</a>
<b>IDIAP-Institut Universitari d'Investigació en Atenció Primària Jordi Gol</b>	Security in elderly patients with multimorbidity and polypharmacy	SPAIN	<a href="#">160</a>
<b>IRCCS Institute of Neurological Sciences of Bologna, AUSLBO and Department of Biomedical and Neuromotor Sciences, University of Bologna</b>	Prescription and adherence in Parkinson's disease treatment	ITALY	<a href="#">18</a>
<b>IRCCS San Raffaele Pisana, the Geriatric and Physiatric Department, Catholic University "Sacro Cuore" (Rome), and AIFA (Italian Medicines Agency)</b>	Monitoring drug prescribing and health outcomes in older adults in Nursing Home. Implementation of a surveillance systems based on the Comprehensive Geriatric Assessment	ITALY	<a href="#">41</a>
<b>IRST IRCSS Istituto Scientifico Romagnolo per lo Studio e la Cura dei Tumori</b>	Novel approach for improvement of adherence to medical plans, medication and management of bioresources and pharma	ITALY	<a href="#">22</a>
<b>MEDIQ</b>	Integrated Pharmaceutical Compliance Programme	THE NETHERLANDS	<a href="#">124</a>
<b>NHS 24 (representing NHS Scotland)</b>	Chronic Medication Service: new medication and Review of High Risk Drugs	UNITED KINGDOM	<a href="#">174</a>
<b>NHS 24 (representing NHS Scotland)</b>	Indicators to monitor appropriate prescribing for patients and polypharmacy guidance for review of quality, safe and effective use of medication using patient specific prescribing data	UNITED KINGDOM	<a href="#">178</a>
<b>NHS 24 (representing NHS Scotland)</b>	Appropriate prescribing for patients and polypharmacy guidance for review of quality, safe and effective use of medication	UNITED KINGDOM	<a href="#">181</a>
<b>NHS 24 (representing NHS Scotland)</b>	National review of pharmaceutical care across Scotland	UNITED KINGDOM	<a href="#">184</a>
<b>redIAPP. Primary Care Prevention and Health Promotion Research Network</b>	The BENZORED study. Comparative efficacy of two interventions to discontinue long-term benzodiazepine use: a cluster randomised controlled trial in primary care	SPAIN	<a href="#">192</a>
<b>Region Skåne/Skåne County Council</b>	The Skåne model for medication review and reconciliation	SWEDEN	<a href="#">199</a>
<b>University of Turin, The Department of Drug Science and Technology (DSTF)</b>	Qualification of Elderly Polypharmacy - QUELYPHARM	ITALY	<a href="#">235</a>



#### 4.4. Research and methodology

CONTRIBUTING PARTNER	INITIATIVE	COUNTRY	PAGE
<b>C.I.R.F.F.</b> (Interdepartmental Research Center in Pharmacoeconomics and Drug utilization), Department of Pharmacy, University of Naples Federico II	Observatory on Administrative Health Data Flows	ITALY	<a href="#">87</a>
<b>IDIAP-Institut Universitari d'Investigació en Atenció Primària Jordi Gol</b>	SIDIAP database	SPAIN	<a href="#">156</a>
<b>IDIAP-Institut Universitari d'Investigació en Atenció Primària Jordi Gol</b>	Glycaemic Control and antihyperglycemic treatment of type 2 Diabetes in older than 65 year-old people in Primary Care	SPAIN	<a href="#">164</a>
<b>Institut Català de la Salut</b> (Catalan Health Institute)	ECAP (electronic medical records) programme with a collaborative module and active intelligence	SPAIN	<a href="#">148</a>
<b>IRCCS Istituto Ortopedico Rizzoli-Bologna</b>	Empower the patients and care givers. Deliver improvements in the health care system	ITALY	<a href="#">25</a>
<b>Pfizer Italy</b>	Moli-Sani	ITALY	<a href="#">45</a>
<b>redIAPP. Primary Care Prevention and Health Promotion Research Network</b>	Prescribe healthy life: optimizing multiple healthy lifestyles promotion in primary and community care through implementation research	SPAIN	<a href="#">195</a>
<b>University of Bologna, Unit of Metabolic Diseases &amp; Clinical Dietetics</b>	ARNO clinical data warehouse	ITALY	<a href="#">28</a>

#### 4.5. Other

CONTRIBUTING PARTNER	INITIATIVE	COUNTRY	PAGE
<b>Bio-Med Aragón / Telemedicine and e-Health Research Group</b>	Evaluation and alignment of telemedicine systems in the HealthCare domain: teledermatology experience in Aragón	SPAIN	<a href="#">67</a>
<b>Bio-Med Aragón / Telemedicine and e-Health Research Group</b>	Evaluation and alignment of telemedicine systems in the HealthCare domain: Tele-EEG experience	SPAIN	<a href="#">70</a>
<b>University College Cork School of Medicine, Centre for Gerontology and Rehabilitation</b>	'Let Me Decide' Advance Care Planning and Palliative Care Educational Programme	IRELAND	<a href="#">205</a>
<b>University Medical Center Groningen, University of Groningen</b>	Embrace: integrated care model based on the Chronic Care Model	THE NETHERLANDS	<a href="#">213</a>
<b>University of Porto</b>	iNeighbour TV	PORTUGAL	<a href="#">222</a>
<b>University of Porto</b>	SEDUCE	PORTUGAL	<a href="#">226</a>



**PRESCRIPTION AND ADHERENCE IN PARKINSON'S DISEASE TREATMENT**

**1. BACKGROUND INFORMATION**

<b>CONSORTIUM</b>	Agenzia Sanitaria e Sociale Regionale dell'Emilia-Romagna	
<b>ORGANISATION NAMES</b>	IRCCS Institute of Neurological Sciences of Bologna, AUSLBO and Department of Biomedical and Neuromotor Sciences, University of Bologna, Italy	
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Hospitals, Research centres, Academia	
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Italy	
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	Emilia-Romagna Region	
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	Bologna, Ravenna, Forlì-Cesena and Rimini Provinces	
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	About 4 M	
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	About 1.000	
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	Patients in hospitals, Patients visiting specialised physicians, Informal caregivers, Patients with a specific disease	
<b>TYPE OF PARTNERS INVOLVED</b>	Hospitals, Research centres, Primary care centres, Academia, Advocacy organisations patients/users	
<b>TOPICS/DISEASES ADDRESSED (KEYWORDS)</b>	Therapeutic drug monitoring; Parkinson's disease; health literacy; patient and caregiver empowerment	
<b>RELEVANCE TO A1 ACTION PLAN</b>		
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/>	Decision support tools (including mobile devices)
	<input type="checkbox"/>	Dispensing and Prescribing
	<input type="checkbox"/>	Interventions
	<input checked="" type="checkbox"/>	Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/>	Counselling
	<input checked="" type="checkbox"/>	Education/Information
	<input checked="" type="checkbox"/>	Online services
	<input type="checkbox"/>	Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/>	Electronic prescription
	<input checked="" type="checkbox"/>	Best-practices
	<input checked="" type="checkbox"/>	Service models
	<input type="checkbox"/>	Training
<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/>	Evidence
	<input type="checkbox"/>	Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/>	Data repository
	<input type="checkbox"/>	Networking



## 2. DESCRIPTION

### 2.1. Methodology, processes and target population

- 1) Therapeutic drug monitoring (TDM) of antiparkinsonian drugs (antiPD) performed in patients with Parkinson's disease (PD) by a battery of supervised pharmacodynamics tests, after the standardized intake of antiPD drug test doses.

This approach allows quantifying the relationship between antiPD drug doses and clinical effects (time to onset, duration and magnitude). The battery of tests includes:

- objective measurements of psychomotor (multiple choice reaction times) and motor (index finger tapping test, timed up and go test) performances;
- semi quantitative scoring of potential drug induced involuntary movements, one of the most invalidating adverse effect of chronic antiPD therapy;
- measurement of potential alteration in blood pressure, one of the main non motor symptoms of PD and related treatment effects;
- serial blood drawings for plasma concentration measurements of anti PD drugs.

- 2) Set up and controlled distribution of educational material on the principal pharmacological therapies for PD and the potential actions to optimize their efficacy, with particular relevance to adherence.

Patients with PD afferring to the neurological units of IRCCS Bologna are provided with educational material on PD pharmacological treatments developed by the multidisciplinary staff of the Laboratory of Clinical Neuropharmacology (including clinicians, clinical neuropharmacologists, nurses and a physiatrist) with a long-standing experience in PD treatment.

Patients' and neurologists' feedback about the efficacy of the educational material in promoting and improving treatment adherence is assessed by an ad hoc questionnaires and outcome indicators during ambulatory visit follow-up.

Direct target population: ambulatory PD patients.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

- 1.a Set up and implementation of innovative solutions through ICT-based at-home systems for quantitative measurements of PD symptoms and related treatment effects.

- 1.b Clinical validation of an at home "PD objective monitoring system" by single center, open, randomized, intrasubject "non inferiority" pilot clinical study of at-home vs in clinic delivered standardized pharmacodynamics test.

The main objective is to reach PD patients at home with TDM, to reduce expensive transfer and time-consuming hospitalisation of patients who require prolonged and repeated medical observations to find successful drug treatments.

2. Patients' empowerment to take more responsibility and control of their own health care by promoting and improving patients' knowledge and understanding of their pharmacological treatment, with particular relevance to adherence.

### 2.3. Organisations involved

1. Biomedical Engineering Unit, Department of Electrical, Electronic, and Information Engineering, University of Bologna;

2. Health Sciences and Technologies - Interdepartmental Center for Industrial Research, University of Bologna: Development of an innovative at home hardware platform with proper processing capability, a variety of connectivity options (including web communication between the patient and the health care provider), and a wide touch-screen interface. Other than a user friendly graphical interface, the software suite includes psychomotor tests, such as alternate finger tapping and multiple choices reaction times. Voice and/or video instructions are used to perform TDM sessions (i.e. time of drug intake; times of serial tests). The main unit is able to drive other external devices such as smartphones, wearable sensing units, and medication event monitoring systems. Wearable units can include a blood pressure monitor, an ECG module, and others.

3. Patients' Association "Iniziativa Parkinsoniani", Bologna: support to the activity of patient screening and recruitment by promoting the participation of its members to the pilot clinical study.

4. Hospital neurological units and primary care centres (Case della Salute) in the area of Bologna, Ravenna, Forlì-Cesena and Rimini Provinces: Patients' enrolment for the educational program on antiPD therapy.



## 2.4. Funding

Has the initiative already received some funding?	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

Assessment of PD symptoms severity in current clinical practice and research trials mainly relies on subjective rating scales administered by neurologists in the clinic.

Diurnal motor fluctuations are more difficult to assess objectively requiring long ambulatory visits; self-reporting by the patient home diaries are used, but reliability and compliance are often poor.

Simple and rapid tests of motor performances, such as the alternate finger tapping test have proved reliable tools to monitor objectively individual's bradykinesia and motor skills and can be applied to quantify the relationship between drug dose and clinical effect.

The aim of the good practice is to individualise drug treatment from the early disease stages in PD patients and modify it according to disease progression, searching for the minimum necessary drug dosing with time.

Gradual drug dosing changes, paralleling patients' objectively assessed clinical needs, can help to simplify pharmacologic treatment schedules, to make easier therapy adherence, to reduce the risks of both acute and chronic adverse effects and delay the development of a severe disability.

This individualized therapeutic treatment approach coupled with patient empowerment and health literacy activities is focussed on the promotion of patient centred cares.

### 3.2. Evidence on the impact and outcomes

- 1.Reduced number of antiPD drugs and or daily dosage used over intra-patient follow-up in our PD patients compared with published material on PD populations.
- 2.Reduced incidence and severity of potential drug related adverse effects (especially dyskinesia, psychiatric symptoms) compared with available data on chronically treated PD populations.

### 3.3. Formal or informal evaluations

Both formal (reduced number of antiPD drugs and or daily dosage used over intra-patient follow-up in our PD

patients compared with published material on PD populations) and informal (reduced incidence and severity of potential antiPD drug related adverse effects) evaluations have been performed.

### 3.4. Success criteria used to determine if the initiative is working well

- 1.Reduced drug use (both number of drugs and matched daily doses)
- 2.Reduced ambulatory visits
- 3.Reduced number and duration of hospital admissions
- 4.Reduced costs of homecare

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

- Rationalize antiPD therapy from the beginning of treatment in individual patients.
- Establish harmonised guidelines and protocols for the best use of interventions in patients at different stages of the disease, to avoid or at least delay the development of late motor and psychiatric complications. These effects would decrease the economic costs associated with PD, prolonging capacity for work, enhancing the functional independence of patients and reducing expenditure for medical assistance, drug treatment and hospitalisation.
- Standardise and harmonise patients' clinical and therapeutic follow-up among different clinical centres, both at national and European level.
- Test the efficacy of therapeutic, both pharmacological and surgical treatments and of putative agents aimed at halting or slowing disease progression.

## 5. FURTHER INFORMATION

Link to web pages:

<http://www.dibinem.unibo.it/it/risorse/files/allegati-neurologia/Modulistica-Laboratori/laboratorio-neurofarmacologia/opuscolo-informativo-monitoraggio-terapeutico-della-levodopa>



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NOVEL APPROACH FOR IMPROVEMENT OF ADHERENCE TO MEDICAL PLANS, MEDICATION AND MANAGEMENT OF BIORESOURCES AND PHARMA

## 1. BACKGROUND INFORMATION

CONSORTIUM	Agencia Sanitaria e Sociale Regionale dell'Emilia-Romagna
ORGANISATION NAME	Istituto Scientifico Romagnolo per lo Studio e la Cura dei Tumori (I.R.S.T. IRCSS)
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Hospitals, Pharmacists, Research centres, Local public authorities, Primary care centres, Nurses, Informal caregivers, Specialised physicians, Day care centres, General practitioners, Regional public authorities
COUNTRY INVOLVED IN THE NOTABLE PRACTICE	Italy
COUNTRY INVOLVED IN THE GOOD PRACTICE	Emilia Romagna Region
REGION INVOLVED IN THE GOOD PRACTICE	Vasta Romagna Area
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	The size of the population is equivalent to over 1 M inhabitants (about 25% of the regional population)
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	2,000-3,000 oncology patients
GOOD PRACTICE DIRECT TARGET GROUP SIZE	Patients in hospitals, People visiting general practitioners, General practitioners, Patients visiting specialised physicians, Specialised physicians, Informal caregivers, Older people receiving care/living at home, People collecting prescriptions from pharmacies, Pharmacists, Patients with a specific disease, People in nursing homes, Patients' groups, Nurses, Other (Institutions, Information technology Analysts, psychologists, Communication Professionals, Primary care educator)
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Hospitals, Pharmacists, Nursing homes, Research centres, Local public authorities, Primary care centres, Nurses, Informal caregivers, Specialised physicians, General practitioners, Regional public authorities
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Oncology, oncological drugs, oral innovative cancer drugs, patient treatment adherence, clinical outcomes, toxicity, empowerment, home based therapies, interaction, drugs accountability, IT solutions for traceability and adherence
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input checked="" type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input checked="" type="checkbox"/> Service models <input checked="" type="checkbox"/> Training

## Action Group on "Prescription and adherence to medical plans"



<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking

## 2. DESCRIPTION

### 2.1. Methodology, processes and target population

Specific procedure was shared with all hospital Pharmacies and Health Departments for the regulation of direct distribution of oral cancer drugs electronically prescribed in the Istituto Scientifico Romagnolo per lo Studio e la Cura dei Tumori (I.R.S.T.).

Specific patient empowerment informative programs for the appropriate drugs use are on-going together with Pharmacists, Specialized Physician, Public Relation services, Nurses and Psychologists.

Moreover two pharmacovigilance projects are on-going involving six Hospitals in the Emilia Romagna Region, the Forlì and Cesena Primary care and General Practitioners (GPs), and prospectively Community Pharmacies will be involved too; within these projects informative tools on oral drugs taken at home interactions were shared among Physicians, GPs and Patients.

Also critical indicators have been identified (such as therapy interruption or significant changes in the administration drug schedule within the first 2 months of therapy) to monitor risk levels and adherence at the same time.

Specific lessons for general practitioners on the interactions and toxicity of cancer drugs have been performed; the traceability of the entire process -inside and outside the hospital- is in progress.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

### 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

On Area Vasta Romagna network specific embedded software (Log 80) is managing the whole therapeutic process (ISO 9001/2000) with referral to oncology drugs.

Active drug accountability system to measure the residual amount of oral drugs within a cycle of care.

All prescriptions and special dispensations are electronically tracked and logistics systems allow you to connect with units in the area to deliver drugs at a controlled temperature also.

### 2.3. Organisations involved

1. Agenzia Sanitaria e Sociale Regione Emilia Romagna – ASSR;
2. IRCCS Istituto Ortopedico Rizzoli;
3. IRCCS Arcispedale S.Maria Nuova – Reggio Emilia;
4. IRCCS Istituto per le Scienze Neurologiche di Bologna;
5. IRST Istituto Scientifico Romagnolo per lo Studio e la Cura dei Tumori;
6. Università degli Studi di Bologna – Alma Mater Studiorum.

I.R.S.T. participates in Regional programs for the definition of routes and pharmacological tools for reconciliation and prevention of medication errors, cross linked with the use of the Regional Databases to intercept critical situations and measure the impact of interventions.



### 3. INNOVATION, IMPACT AND OUTCOMES

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#### 3.1. Key innovative elements of your good practice

The innovativeness of the system consists in the sharing of some critical aspects of the process of care with General Practitioners and patients themselves using the Romagna oncology network, the logistics and institutional network together with other informational tools interlinked one to the other.

#### 3.2. Evidence on the impact and outcomes

From local data on 153 consecutive cancer patients, 89 drug interactions were detected: 6 G3, 81 G2, 2 G1. Regarding to the mechanism these were classified in: pharmacokinetic (60, 67.4%); pharmacodynamics (22, 24.7%), interactions with unknown mechanism (7, 7.9%). Dose reduction and therapy interruption data during the first two months of therapy are significant (over 10%).

#### 3.3. Formal or informal evaluation

Both formal and informal evaluations have been performed: drug interaction; pharmacokinetic and pharmacodynamics; interaction with unknown mechanism. Impact of the training program is on-going through completed questionnaires from the same patients before and after training interventions.

#### 3.4. Success criteria used to determine that the initiative is working well

Reduction of unused pills  
Reduce phenomena of treatment discontinuation  
Improving concordance to prescription

### 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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The project will lead to the following: drastic reduction in number of unused pills, improved concordance with regard to prescriptions and patient adherence, increased ADR reporting also by patients, reduced phenomena of dose reduction or treatment discontinuation.

This will improve patient knowledge with specific communication tools. Results will thus be usable by Regional Healthcare Decision Makers and will be transferrable to a National Oncological Pharmaceutical Social Network.

### 5. FURTHER INFORMATION

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## 1. BACKGROUND INFORMATION

<b>CONSORTIUM</b>	Agenzia Sanitaria e Sociale Regionale dell'Emilia-Romagna	
<b>ORGANISATION NAME</b>	IRCCS Istituto Ortopedico Rizzoli, Bologna	
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Hospitals, Pharmacists, Research centres, Local public authorities, Primary care centres, Nurses, Informal caregivers, Specialised physicians, Day care centres, General practitioners, Regional public authorities	
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Italy	
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	Emilia Romagna Region	
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	Emilia Romagna Region	
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	(over) 1 M inhabitants (about 25% of the total regional population)	
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	All patients	
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	Older people in general population, Patients in hospitals, People visiting general practitioners, General practitioners, Patients visiting specialised physicians, Specialised physicians, Informal caregivers, Older people receiving care/living at home, People collecting prescriptions from pharmacies, Pharmacists, Patients with a specific disease, People in nursing homes, Patients' groups, Nurses, Other (Institutions, Information technology Analysts, psychologists, Communication Professionals, Primary care educator)	
<b>TYPE OF PARTNERS INVOLVED</b>	Hospitals, Pharmacists, Nursing homes, Research centres, Local public authorities, Primary care centres, Nurses, Informal caregivers, Specialised physicians, General practitioners, Regional public authorities	
<b>TOPICS/DISEASES ADDRESSED</b> (KEYWORDS)	Data repository, Data mining, Data collection, Epidemiology, Electronic Health Records (EHR), eHealth	
<b>RELEVANCE TO A1 ACTION PLAN</b>		
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring	
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input type="checkbox"/> Social networks	
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input checked="" type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input checked="" type="checkbox"/> Service models <input checked="" type="checkbox"/> Training	
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input type="checkbox"/> Guidelines	



<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository
	<input checked="" type="checkbox"/> Networking

## 2. DESCRIPTION

### 2.1. Methodology, processes and target population

One of the biggest challenges for researchers and clinicians and National Health Service is to understand how specific genetic, environmental, clinical and diagnostic factors by an extreme complexity of the underlying dynamics, lead to specific diseases.

The analysis of scientific data such as molecular mechanisms, diagnosis and treatments will suggest:

- hints for the research on the patho-physiological bases of diseases;
- identification of selected cohorts of patients presenting a higher risk for specific diseases, and thus provide a cue for increased vigilance;
- develop "targeted" treatment protocols for each patient based on the genetic signature of the disease.

However, until now, there has been no complete system to easily collect, classify, and analyse family histories for patients suffering from defined diseases.

ICT tools like Health Record or Data repository for Medical Images do not merge different types of data, and do not provide a complete vision of complex diseases; moreover most of this information traditionally sits in different hospitals on different databases, and even in different formats.

To solve this inefficiency, we have developed a platform sufficiently broad and generic to provide an exhaustive data access point for selected diseases.

The platform integrates diverse types of -omics data, clinical data, and biobank information; this platform contains services to create disease specific reference profiles, and thanks to a clinical genomics analytics engine supporting the generation of evidence-based information in the context of clinical guidelines and patient data.

### 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

Finally, using this tool could accelerate the development of clinical decision support services by care delivery organizations at the point of care.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

Our aim was to enable the clinician to tap into data, information, and knowledge from diverse types of clinical, genetic, and -omics data sources as well as biobanks.

We have provided clinicians the capability to easily query these disparate sources of information via an intuitive interface. The platform is acting as a unified resource for all types of patient data (clinical, genetic and imaging data) providing a patient-centric view as well as a research-oriented perspective.

Large number of variables and the complexity of the data stored in these novel technologies guarantee patients clustering from a variety of angles, helping clinicians to discover and better understand correlations between genotypic and phenotypic data and providing guidance to evaluate possible personalized therapy.

### 2.3. Organisations involved

1. Agenzia Sanitaria e Sociale Regione Emilia Romagna (ASSR)
2. IRCCS Istituto Ortopedico Rizzoli, IRCCS Arcispedale S. Maria Nuova, Reggio Emilia
3. IRCCS Istituto per le Scienze Neurologiche di Bologna
4. I.R.S.T. Istituto Scientifico Romagnolo per lo Studio e la Cura dei Tumori, Università degli Studi di Bologna – Alma Mater Studiorum.



### 3. INNOVATION, IMPACT AND OUTCOMES

#### 3.1. Key innovative elements of your good practice

Integration of information collected on patients in different centres guarantee an extensive gathering of these information and allowing to properly monitor all clinical aspects of specific disease (or group of disease) and providing important clues to improve diagnosis, appropriate treatments and integrated and personalized protocols.

#### 3.2. Evidence on the impact and outcomes

One potential scenario of this analysis is a more precise, evidence-based assessment of each patient underlying risk of acquiring the disease.

Personalized therapy.

Moreover validated "evidence-based" scientific data on larger and homogeneous cohorts of patients will, in turn, facilitate the currently difficult clinical research.

#### 3.3. Formal or informal evaluation

Patients' satisfaction analysis

Cost Effective study

Epidemiological analysis

#### 3.4. Success criteria used to determine that the initiative is working well

Improving guidelines for Rare diseases' patients

More appropriate therapy for Skeletal Dysplasia

Patients' empowerment and satisfaction

### 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

Scientific and diagnostic data services (analysis and visualisation) are dependent on cross-repository

interoperability, and the flexible dissemination of material.

However, the scale of scientific data and the extent of its distribution may have knock-on effects in terms of the migration and processing of data in the most effective fashion.

The ability of repositories to host external services (storelets in cloud terminology) and to autonomously migrate data according to predetermined schedules are key areas of consideration.

Precise specifications of functionality will be offered, with specific reference implementations for external cloud and grid services.

The richness of clinical information could be used for:

- better understanding of the data leading to improved patient care,
- better guidance to health policies,
- indicators to improve health expenditure,
- provision of information to the pharmaceutical industry for research and development purposes.

This patient-centric strategy can enable the evaluation of a disease in all its major components and the correlation of different variables that are co-implicated in the pathogenesis.

### 5. FURTHER INFORMATION

Links to web pages: <http://www.ior.it/en/laboratori-tecnopolo/lab-clibi/clibi-laboratory>

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phone: +39-051-6366062.



## 1. BACKGROUND INFORMATION

<b>CONSORTIUM</b>	Agenzia Sanitaria e Sociale Regionale dell'Emilia-Romagna	
<b>ORGANISATION NAME</b>	<b>Unit of Metabolic Diseases &amp; Clinical Dietetics, University of Bologna</b>	
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Hospitals, Academia	
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Italy	
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	32 Local Health Units	
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	9 Italian Regions: Liguria, Trentino-Alto Adige, Veneto, Emilia-Romagna, Toscana, Lazio, Umbria, Campania, Puglia	
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	Approximately 10 M	
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	10 M	
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	Older people in general population	
<b>TYPE OF PARTNERS INVOLVED</b>	Academia	
<b>TOPICS/DISEASES ADDRESSED</b> (KEYWORDS)	Diabetes, dyslipidaemia, drug use	
<b>RELEVANCE TO A1 ACTION PLAN</b>		
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring	
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks	
<input type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training	
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines	
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository <input type="checkbox"/> Networking	



## 2. DESCRIPTION

### 2.1. Methodology, processes and target population

The ARNO clinical Data Warehouse contains the prescriptions of drugs, laboratory and instrumental examinations, specialist consultations as well as the reports of hospital admissions of all inhabitants living in the area covered by the ARNO observatory. These pieces of information are merged with the population registry. Ten-year longitudinal data are available in 22 Local Health Units (LHU), covering more than 7-million inhabitants.

The proponent has access to the ARNO Observatory, a population-oriented database set up in 1987 and has progressively grown to cover a population of nearly 10 million people, living in 32 LHUs of 9 Italian Regions (over 92 million prescriptions/year).

Target population: a subset of the Italian population, namely: elderly, frail with polipharmacotherapy, and migrants from low-income Countries (identified by the Fiscal Code and Nationality).

### 2.4. Funding

Has the initiative already received some funding?

☐

YES

☒

NO

Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument

☐

YES

☒

NO

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

Although limited to pharmacologically-treated conditions, this database provides a unique opportunity to study the prevalence of specific diseases and their prescription patterns in the course of the years.

### 2.3. Organisations involved

1. CINECA, Casalecchio di Reno, Agenzia Sanitaria e sociale regione Emilia Romagna – ASSR
2. IRCCS Istituto Ortopedico Rizzoli, IRCCS Arcispedale S. Maria Nuova – Reggio Emilia
3. IRCCS Istituto per le Scienze Neurologiche di Bologna
4. I.R.S.T. Istituto Scientifico Romagnolo per lo Studio e la Cura dei Tumori
5. Università degli Studi di Bologna

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

Identification of cost of care in specific health areas (diabetes, rheumatic diseases – identified by treatment with glucose-lowering drugs or biologic drugs).

Identification of possible inequalities between different Italian areas and/or inequalities between Italians and migrants.

More appropriate therapy prescription and drug administration.

### 3.2. Evidence on the impact and outcomes

A few data are available in specific cohorts

### 3.3. Formal or informal evaluation

Comparison with data from the literature

### 3.4. Success criteria used to determine that the initiative is working well

Define the prevalence of specific diseases

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

Data on inequalities between Italian and migrants might be used as a formal evaluation of the impact of the universalistic Italian system vs. different standard of care.

## 5. FURTHER INFORMATION

Link to web pages:

<http://osservatorioarno.cineca.org>

Contact persons:

Giulio Marchesini ([giulio.marchesini@unibo.it](mailto:giulio.marchesini@unibo.it)),

Marisa De Rosa ([amo@CINECA.IT](mailto:amo@CINECA.IT))



## 1. BACKGROUND INFORMATION

<b>CONSORTIUM</b>	Agenzia Sanitaria e Sociale Regionale dell'Emilia-Romagna	
<b>ORGANISATION NAME</b>	<b>Unit of Metabolic Diseases &amp; Clinical Dietetics, University of Bologna</b>	
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Hospitals, Academia	
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Italy	
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	Emilia-Romagna Region	
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	25% of total population	
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	Approximately 6 M	
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	Patients with/at risk for the metabolic syndrome	
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	General practitioners, Patients with a specific disease	
<b>TYPE OF PARTNERS INVOLVED</b>	Academia, General practitioners	
<b>TOPICS/DISEASES ADDRESSED</b> (KEYWORDS)	Educational support to people with the metabolic syndrome	
<b>RELEVANCE TO A1 ACTION PLAN</b>		
<input type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input type="checkbox"/> Monitoring	
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input type="checkbox"/> Social networks	
<input type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training	
<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines	
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking	



## 2. DESCRIPTION

### 2.1. Methodology, processes and target population

In order to tackle metabolic diseases in the community we urgently need to spread awareness of the problem, at the same time facilitating patients-physicians interaction.

These new, Internet-based tools are rapidly entering every-day life and web communication is likely to become the way to interact more and more in the future.

Any person entering the system with easy access and successful completion of the program may be a pivotal link for the entry of many more persons.

The system is expected to be exponentially used in the future, providing the community sound, evidence-based information.

The progressive use of the system will amplify the message to reach larger and larger segments of the population at risk. The final goal is the reduction of the prevalence of the metabolic syndrome and the related cardiovascular risk.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

We have already developed an educational model for Non-Alcoholic Fatty Liver Disease (NAFLD/NASH)

under a FP7-EU HEALTH grant; it may be translated into a program to be used by individuals at high cardiovascular risk (obesity, type 2 diabetes, dyslipidaemia) to improve their lifestyle and reduce the burden of future complications.

The available EU program is based on 5 modules, to progressively engage individuals towards healthy lifestyle changes. They span from motivation along the stage of change by Prochaska, to the principles of healthy diet and physical activity, to maintenance and to clinical and psychological benefits.

### 2.3. Organisations involved

1. Organizations of General practitioners
2. Agenzia Sanitaria e Sociale Regione Emilia Romagna – ASSR
3. IRCCS Istituto Ortopedico Rizzoli
4. IRCCS Arcispedale S.Maria Nuova – Reggio Emilia
5. IRCCS Istituto per le Scienze Neurologiche di Bologna
6. IRST Istituto Scientifico Romagnolo per lo Studio e la Cura dei Tumori
7. Università degli Studi di Bologna – Alma Mater Studiorum.

### 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
<input checked="" type="checkbox"/> 7th Framework Programme for Research and Innovation				

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

All these items will be focused to prevention of CV risk. The recommendations for exercise therapy, based on the statements of international societies for exercise, are:

- Motivational module, explaining the reasons for changing (explain the benefits of diet and regular exercise);
- Self-efficacy: Plan a step-by-step training program with the patient;
- Pleasure: Suggest two to three different types of attractive aerobic physical activities;

- Support: Invite family members to share the exercise sessions with the patient;
- Comprehension: Understand whether the patient has a really positive attitude toward the behavioural change;
- Lack of impediments: Help the patient overcome a solution for obstacles to physical activity;
- Diary: Invite the patient to record the type and times of physical activity.

### 3.2. Evidence on the impact and outcomes

Reduce the number of progression of liver disease in NAFLD; improved implementation of lifestyle changes;



develop guidelines on the management of liver diseases

The system is expected to be exponentially used in the future, providing the community sound, evidence-based information, not biased by the health market.

### 3.3. Formal or informal evaluation

The dissemination has to take place across the health network starting from general practitioners, who are at the front line and can easily intercept subjects at risk well before the development of events.

To this purpose, a specific dissemination plan will be set-up to engage a limited number of active GPs in the study, providing training, technical assistance or other support to improve their job and facilitating the enrolment of individuals at risk into the web-based program.

### 3.4. Success criteria used to determine that the initiative is working well

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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The program has the potential for being cost-effective and possibly disseminated to large populations.

## 5. FURTHER INFORMATION

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### Link to web pages:

<http://www.sanistilidivita.eu/index.php>

### Contact person:

Giulio Marchesini ([giulio.marchesini@unibo.it](mailto:giulio.marchesini@unibo.it)),  
University of Bologna



## 1. BACKGROUND INFORMATION

<b>CONSORTIUM</b>	Agenzia Sanitaria e Sociale Regionale dell'Emilia-Romagna	
<b>ORGANISATION NAME</b>	University of Bologna	
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Research centres	
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Italy	
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Emilia-Romagna Region	
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	Bologna	
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	979.277 citizens	
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	232.483 citizens	
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	Older people in general population, Patients in hospitals, Formal caregivers, Informal caregivers, Older people receiving care/living at home, People in care homes, Pharmacists, Patients with a specific disease, People in nursing homes	
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	Pharmacists, Research centres, Local public authorities, Informal caregivers, Academia, Regional public authorities	
<b>TOPICS/DISEASES ADDRESSED</b> (KEYWORDS)	Chronic diseases, elderly people, compliance and right use of medications	
<b>RELEVANCE TO A1 ACTION PLAN</b>		
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring	
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input type="checkbox"/> Social networks	
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input checked="" type="checkbox"/> Service models <input checked="" type="checkbox"/> Training	
<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines	
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking	



## 2. DESCRIPTION

### 2.1. Methodology, processes and target population

The progress made in medicine over the years is widely recognized and irrefutable.

To cope with certain chronic diseases often there is no other solution than a medication perpetuated over time, typically lasting the entire life span of the individual, clinical situation that is especially identified in the elderly and in geriatric patients forced to undergo daily intake of drugs.

The self-managed cares are characterized by different problems and often weigh heavily on their effectiveness; on the other hand the improved living conditions have meant that more and more people would reach old age in a considerable state of health in their own homes.

With more and more people used to live alone the institutions do not always have the necessary resources to care for all, and so a low "compliance" inevitably reduces the effects of treatment, with a potential relapse in terms of medical expenses and health care of the National Health System, in this way this good practice aligns with what is established by the World Health Organization: "Preventing chronic diseases: a vital investment".

PersonalPharm has as primarily target that category of people whose chronic situation or old age causes a significant degrade of the mnemonic state. In view of the fact that when a person is forced to take drugs every day, can make confusion or forgetfulness, even unintentionally or due to the disease, it would be a good aid have a smart-tool that recall the commitment time to take a certain drug.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

PersonalPharm main objective is to help the individual to taking daily medication both for diseases due to old age, and because suffering from chronic diseases.

PersonalPharm is a web app that can run on all different hardware and software available platforms (pc, tablet, smartphone rather than iOS, Android, Windows), and its main characteristic is to notify the right time to assume the drugs according to the regularity provided by the treatment.

It is an innovative system that adds a level of control and support for the elderly; it can be initialized by a caregiver who can take care of several patients at the same time. In practice the system is able to:

1. alert at fixed times: according to the posology it must alert during the day at the appointed time to take a certain medicine, it shows the name and the image of the drug in order to reduce the possibility of error and to be more simple for those people with limited cognitive abilities;
2. adopt a form of control if detected the action "not taking": a series of warnings will be activated, before to the same elderly (e.g. an SMS on the phone), then if the situation is critical, to a relative. The caregiver can monitor the situation in real-time every time he wants, in that way the feedback about the treatment is more realistic and reliable.
3. send a recharging request: a warning message will be sent to the trust pharmacy, which will be able to prepare the new supply of drugs. The older people are typically habitual and they establish a relationship of trust with their pharmacist thus PersonalPharm can strengthen this relationship.

The tangible savings would undoubtedly be in favour of the National Health System. Even the PersonalPharm system could be easily integrated with the ePrescription, closing in a natural way the cycle described earlier: the system detects the imminent depletion of the drug and inform the physician who prepares a new recipe, the pharmacist receiving the e-mandate prepared by the doctor (ePrescription) and can proceed preparing a new refill and calling the elderly that can go to his pharmacy to pick up the ready refill.

Moreover a home dispenser could be coupled with the system, in order to deliver the right medicines in accordance with the system alerts.

Finally, we are now looking for some implementation:

Connection with smart devices (PC, tablet, smartphone) and various sensors (e.g.: temperature, pressure, blood glucose, oxygenation) to monitor several vital parameters.

Integration with Pharmacy and/or healthcare providers databases to optimizing procedures and reduce costs.

### 2.3. Organisations involved

1. IRCCS Istituto Ortopedico Rizzoli,
2. IRCCS Arcispedale S.Maria Nuova – Reggio Emilia,
3. IRCCS Istituto per le Scienze Neurologiche di Bologna



4. IRST Istituto Scientifico Romagnolo per lo Studio e la Cura dei Tumori

5. Università degli Studi di Bologna – Alma Mater Studiorum.

## 2.4. Funding

Has the initiative already received some funding?	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

PersonalPharm guarantee stay at home of the patients ensuring a greater control of his state of health and lead to an improvement in his health conditions. Key innovative element is the usability of chosen devices like smart tablet, TV or smart phone that are already in patient's daily practices.

of bulk drugs which allow the Health System to reduce the cost and this would benefit a group of people that is often found in financial difficulties.

### 3.2. Evidence on the impact and outcomes

Administration of drugs controlled and monitored such a caregiver could take care of several people with difficulty.

Streamline the bureaucracy in favour of more safe and efficient digitized procedures.

Health care costs reduction and de-hospitalization.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

The model presented in this project could easily be exported to other regions and adopted at the state level.

Of course, for a full use of the system the health data stream should be standardized and normalized, or at least changed the coding of drugs in different states.

Probably the most difficult aspects to manage are the administration of drugs and the various regulations in force on the subject, but typically the idea of use a monitoring application is easy to export and to adoption.

### 3.3. Formal or informal evaluation

The program will be formally evaluated in terms of efficacy, effectiveness, improve of quality care, adherence and satisfaction.

Informal evaluations: evaluation of collected and elaborated data, as well as evaluation of impact of dissemination of the project results will be periodically performed.

## 5. FURTHER INFORMATION

### Link to web pages:

<http://www.youtube.com/watch?v=PJIHdG6Yo68> (video);

<http://memo-slide-show.appspot.com> (prototype)

### Contact persons:

Danilo Montesi ([danilo.montesi@gmail.com](mailto:danilo.montesi@gmail.com))

Flavio Bertini ([fl.bertini@gmail.com](mailto:fl.bertini@gmail.com))

Maurizio Gabbrielli ([gabbri@cs.unibo.it](mailto:gabbri@cs.unibo.it))

### 3.4. Success criteria used to determine that the initiative is working well

Adopting a system like PersonalPharm may have an economic advantage: could be a promoter for the sale



OPEN - OPTIMIZING PRESCRIPTION IN ELDERLY PATIENTS IN NURSING HOME

## 1. BACKGROUND INFORMATION

<b>CONSORTIUM</b>	AIFA (Italian Medicine Agency)
<b>ORGANISATION NAME</b>	<b>AIFA (Italian Medicine Agency)</b>
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	National public authorities
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Italy
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Lombardy Region
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	Hospital acute geriatric ward and nursing homes in Brescia
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	134 hospitalized patients and 4 specialized physicians in the pilot project and 900 nursing homes residents and 30 physicians in the main project
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	134 hospitalized patients and 900 nursing homes residents
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	Patients in hospitals, General practitioners, specialised physicians, People in nursing homes
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	Hospitals, Nursing homes, General practitioners
<b>TOPICS/DISEASES ADDRESSED</b> (KEYWORDS)	prescription appropriateness, computerized prescription support system, training, older persons
<b>RELEVANCE TO A1 ACTION PLAN</b>	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input type="checkbox"/> Monitoring
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input checked="" type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking



## 2. DESCRIPTION

Due to the ageing of the population, physicians today face a challenge: the management of elderly patients affected by multimorbidity and prescribed with polypharmacy. While polypharmacy is necessary to treat multiple chronic diseases, it represents a risk factor for adverse drug events.

The project 'OPEN' (Optimizing Prescription in Elderly resident in Nursing home) was designed to help physicians working in nursing homes to manage polypharmacy in the elderly.

Its aims are:

1. To assess and improve the drug prescription appropriateness in the elderly residents in nursing homes through the use of a computerized prescription support system (INTERCheck®).
2. To evaluate the effectiveness of an educational program combined with the use of the software to improve the appropriateness of prescribing. The study was approved by the Ethical Committee of ASL (Local Health Authority), Brescia.

### 2.1. Methodology, processes and target population

The project is based on a computer software (Intercheck) which provides information about the presence of inappropriate medications according to criteria validated in the literature, drug interactions, dosages of drugs in patients with renal failure, the whole anticholinergic load and an estimate of the risk of side effects through the Adverse Drug Reactions (ADR) risk score.

#### Step 1

August 2013: the study design and information were sent to physicians working in nursing homes in Brescia (Italy) and enrolment of 30 volunteer physicians; random selection of 30 patients per physician adhering surface; review of medication prescriptions by a physician skilled in the use of the software; analysis of the data, in particular evaluation of the prevalence of inappropriate drug prescriptions and drug-drug interactions.

#### Step 2

September and October 2013: physicians were trained on 'drug prescription appropriateness' (3 sessions of 3 hours each); training on the use of the software will follow.

#### Step 3

After 2-months of training: other 20 patients per physician will be randomly selected and the review carried out by the same operator.

#### Step 4

December 2013: meeting with the physicians and presentation of the final results of the study; discussion on the usefulness of the computerized system and on its possible deployment in all the nursing homes in Brescia.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

A computer-based prescription support system (INTERCheck®) was developed in order to collect and store drug information and to automatically provide it, in order to reduce, or avoid, inappropriate prescriptions.

INTERCheck® is standalone software developed in Java language with an embedded database which stores information about explicit criteria for potentially inappropriate medications; anticholinergic load; potential drug-drug interactions; dose adjustment in case of renal impairment and the calculation of the GerontoNet ADR Risk Score<sup>11</sup>. The latter is a method to identify elderly patients who are at increased risk of adverse drug reactions.

In addition, INTERCheck® keeps track in the database of all user instances by storage of alerts and risks detected in each drug prescription; the database of drugs, and all related information is automatically updated by using an internet connection.

### 2.3. Organisations involved

1. The University of Brescia contributed to the design of the main study and carried out the pilot project.
2. The Mario Negri Pharmacological Institute, Milan, developed the electronic tool (Intercheck) and keeps it continuously updated.
3. The Brescia Solidale Foundation participated in the design of the study and the collection of the data of the main project.

<sup>11</sup> Onder G, Petrovic M, Tangiisuran B, et al. Development and validation of a score to assess risk of adverse drug reactions among in-hospital patients 65 years or older: the GerontoNet ADR risk score. Arch Intern Med. 2010 Jul 12;170(13):1142-8



## 2.4. Funding

Has the initiative already received some funding?	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

1. The education of physicians at a Computerized Prescription Support System (CPSS) to improve prescription appropriateness.
2. The multiple features of the CPSS: explicit criteria for potentially inappropriate medications; anticholinergic load; potential drug-drug interactions; dose adjustment in case of renal impairment and the calculation of the GerontoNet ADR Risk Score.
3. The possibility of assessing the efficacy of the CPSS in different health settings.

#### Results

In the observational period the number of patients exposed to at least one PIMs remained unchanged at both admission (n=29, 39.1%) and discharge (n=28, 37.8%). In the intervention phase 25 patients (41.7%) were exposed to at least one PIMs at hospital admission and 7 (11.6%) at discharge ( $p<0.001$ ). Similarly, the number of patients exposed to at least one potentially severe DDI decreased from 27 (45.0%) to 20 (33.3%),  $p=0.703$ , and the number of new-onset potentially severe DDIs decreased from 37 (59.0%) to 9 (33.0%),  $p<0.001$ .

### 3.2. Evidence on the impact and outcomes

Evidence from the pilot project "Prevention of inappropriate prescribing in hospitalized older patients using a Computerized Prescription Support System (INTERcheck®)".

#### Objective

To evaluate: first, the applicability of INTERcheck® in elderly patients hospitalized in a geriatric ward in Northern Italy, in order to review their pharmacological profile; second, the effectiveness of this system in reducing the use of Potentially Inappropriate Medications (PIMs), potentially severe Drug-Drug Interactions (DDIs) and the anticholinergic burden in daily practice.

#### Methods

Two samples of elderly patients (aged 65+ years) hospitalized in a geriatric ward in Italy were enrolled throughout 2012.

During the first wave (observational), the medication prescriptions at both hospital admission and discharge of 74 patients were analysed with INTERCheck® without any kind of inference based on the software information.

In the second phase (intervention) all the prescriptions of 60 patients were reviewed and changed at discharge according to INTERCheck® suggestions. The study was approved by the Ethic Committee of the Spedali Civili, Brescia.

#### Conclusions

The use of INTERCheck® was associated with a significant reduction of PIMs and potentially severe DDIs; a computerized prescription support system combining different prescribing quality measures should be taken into account as an important strategy to optimize medication prescription in elderly patients.

### 3.3. Formal or informal evaluation

Formal evaluation of both the pilot and the main project's design has been done by the Ethical Committee of the Civili Hospital in Brescia and by the ASL (Local Health Authority) of Brescia, Italy. Moreover, the results of the pilot project were evaluated and published in a peer-review international journal<sup>12</sup>.

### 3.4. Success criteria used to determine that the initiative is working well

After the first educational meeting with the general practitioners working in nursing homes, the degree of appreciation for the project and the electronic tool was very high.

<sup>12</sup> Ghibelli S, Marengoni A, et al. Prevention of inappropriate prescribing in hospitalized older patients using a computerized prescription support system (INTERCheck). *Drugs & Aging*, 2013 Oct; 30(10):821-828 (<http://link.springer.com/article/10.1007/s40266-013-0109-5>)



Due to the high request from different wards and institutions after the publication of the pilot project, it will soon be possible to download INTERCheck® online.

#### 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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This good practice could be easily transferred to other regions as well as countries due to the easy functioning of the CPSS and fast training for using it, the language translation being the only necessary change to be made to the electronic tool.

Although experience in geriatric pharmacotherapy is desirable, it is unrealistic to expect that the majority of clinicians have enough knowledge about drug-related appropriateness and interactions when prescribing older people with multimorbidity.

In Europe several large-scale epidemiological studies used different criteria to quantify the prevalence of inappropriate prescribing in older people in primary, secondary and long-term care have shown that PIMs prevalence is high (Onder et al. 2003<sup>13</sup>).

A reliable CPSS with instant feedback to the prescriber could improve prescribing quality, reduce ADRs and improve adherence to medications.

#### 5. FURTHER INFORMATION:

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**Link to web pages:**

<http://www.sigg.it/public/doc/congresso/57/22/SALA%20BLUE/909/1340-GhibelliS/INTERCHECK.pdf>

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<sup>13</sup> Onder G, Landi F, Cesari M, et al. Inappropriate medication use among hospitalized older adults in Italy: results from the Italian Group of Pharmacoepidemiology in the Elderly. Eur J Clin Pharmacol 2003 Jun; 59 (2): 157-62.



Figure 1

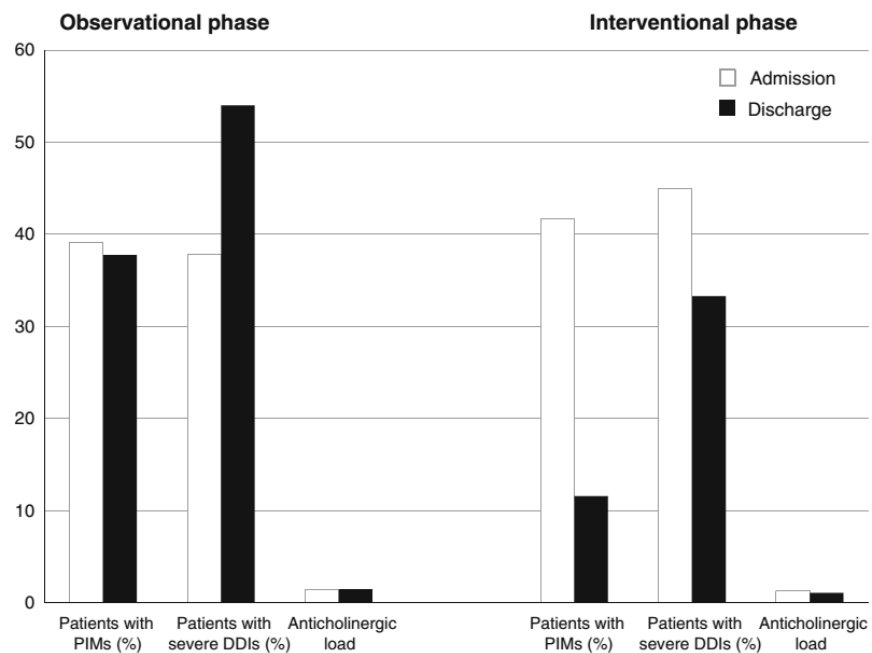
Example of a suggestion for better prescription by the Computerised Prescription Support System

Digoxin					
Interacting drug	Clinical relevance	Possible effects	Mechanism	Quality of evidence	Clinical judgement
Furosemide	High	Increased risk of toxicity of digoxin (nausea, vomiting, cardiac arrhythmias)	hypokaliemia and hypomagnesemia induced by furosemide increase the inhibition of the sodium/potassium ATPase mediated by digoxin	Excellent	Increase the dietary introduction of potassium

Figure 2

Main results of observational and interventional phases of the study

Fig. 1 Main results of observational and interventional phases of the study. *DDIs* drug–drug interactions, *PIMs* potentially inappropriate medications



Source:

Ghibelli S, Marengoni A, et al. Prevention of inappropriate prescribing in hospitalized older patients using a computerized prescription support system (INTERCheck). *Drugs Aging*, 2013 DOI 10.1007/s40266-013-0109-5



**MONITORING DRUG PRESCRIBING AND HEALTH OUTCOMES IN OLDER ADULTS IN NURSING HOME.  
IMPLEMENTATION OF A SURVEILLANCE SYSTEMS BASED ON THE COMPREHENSIVE GERIATRIC ASSESSMENT**

## 1. BACKGROUND INFORMATION

CONSORTIUM	AIFA (Italian Medicine Agency)		
ORGANISATION NAMES	IRCCS San Raffaele Pisana, Geriatric and Physiatrie Department, Catholic University "Sacro Cuore" (Rome), and AIFA (Italian Medicines Agency)		
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Nursing homes, Research centres, Academia, authorities, Private companies	National	public
COUNTRY INVOLVED IN THE GOOD PRACTICE	Italy		
REGION INVOLVED IN THE GOOD PRACTICE	Puglia, Lazio, Sardegna, and Umbria Regions		
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Central and Southern Italy		
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	12.2 M		
GOOD PRACTICE DIRECT TARGET GROUP SIZE	About 5.000 older Nursing Homes residents		
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	General practitioners, Specialised physicians, People in care homes, People in nursing homes		
TYPE OF PARTNERS INVOLVED	Hospitals, Nursing homes, Academia, National public authorities, Private companies		
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Decision support tools, electronic prescriptions, medical personnel training, scientific evidences collection, multidimensional approach, comprehensive geriatric assessment, complex older adults, multi-morbidity, polypharmacy.		
RELEVANCE TO A1 ACTION PLAN			
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/>	Decision support tools (including mobile devices)	
	<input checked="" type="checkbox"/>	Dispensing and Prescribing	
	<input checked="" type="checkbox"/>	Interventions	
	<input checked="" type="checkbox"/>	Monitoring	
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/>	Counselling	
	<input type="checkbox"/>	Education/Information	
	<input type="checkbox"/>	Online services	
	<input type="checkbox"/>	Social networks	
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input checked="" type="checkbox"/>	Electronic prescription	
	<input checked="" type="checkbox"/>	Best-practices	
	<input type="checkbox"/>	Service models	
	<input type="checkbox"/>	Training	
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/>	Evidence	
	<input type="checkbox"/>	Guidelines	
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/>	Data repository	
	<input type="checkbox"/>	Networking	



## 2. DESCRIPTION

Long-term care is a well-planned and well-organized set of services and care processes, targeted at the multi-dimensional needs/problems of an individual client.

Among various residential options, nursing homes (NH) are characterized by an integrated intervention for severely dependent individuals, and accommodate about the 20% of the estimated dependent population.

This subset of population is commonly affected by a combination of chronic diseases and, consequently several drugs are simultaneously inducing a condition known as polypharmacy.

The drugs most commonly used are usually those to treat cardiovascular diseases and especially hypertension, followed by analgesics, sedatives, and gastrointestinal drugs such as laxatives and gastro protective agents.

As a result of the widespread use of drugs, iatrogenic disease in NH is a major health emergency, and is associated to a substantial increase in morbidity and mortality. The patient population of NH most often includes frail individuals, suffering from multiple diseases, with reduced functional reserve and cognitive performance.

In this context, the use of databases that result from large observational studies can yield critical information about the efficacy and safety of drugs in 'unselected' populations whose characteristics reflect the real world.

Comprehensive Geriatric Assessment (CGA) is defined as a multidimensional, interdisciplinary diagnostic process to determine the medical, psychological and functional capabilities of frail older people in order to develop a coordinated and integrated plan for treatment and long-term follow up.

Several data elements including socio-demographic variables, numerous items characterizing physical, cognitive, and emotional status as well as all clinical diagnoses are evaluated; information about an extensive array of signs, symptoms, syndromes, and treatments is provided.

Geriatric assessment has been used in geriatric medicine since the 1980s, with the aim of identifying current health problems and to guide interventions to reduce adverse outcomes and to optimize the functional status of older adults.

A leading experience in the field comes from the study SAGE (Systematic Assessment of Geriatric drug use via Epidemiology) which provided information about

two millions subjects residents in NH in the US<sup>14</sup>; the study addressed several topics, with special concern for the patterns of drug consumption, the quality of prescribing and medical care, drug safety.

Several publications have addressed major concerns such as the use of analgesic drugs, the safety of antipsychotics in patients affected by dementia, the use of cardiovascular drugs in patients affected by hypertension and heart failure. In the US, the use of the CGA is requested to all NH and a database of 5 million individuals has been accumulated in the last 10 years.

### 2.1. Methodology, processes and target population

The IRCCS San Raffaele Pisana (Rome, Italy) and the Geriatric and Physiatrie Department, Catholic University "SacroCuore" (Rome, Italy) have started ad hoc projects monitoring large populations of NH residents in various Italian regions; the main aim of the projects was to evaluate the use of drugs and the occurrence of iatrogenic diseases in the elder population resident in Italian NH through the generation and implementation of a systematic surveillance system.

Given the large number of information collected, several other objectives were planned; among them, the identification of factors associated to the use of drugs and those that may predict iatrogenic diseases, the comparison of different therapeutic strategies including the reduction of polypharmacy, the identification and management of inappropriate prescribing, especially in those patients affected by multi-morbidity, and finally, the evaluation of how inappropriate prescribing may impact the use of economic resources and the occurrence of major health outcomes (re-hospitalization, physical and cognitive performance, disability, mortality, etc.).

The availability of these structured networks allows also to experimenting the use of electronic instruments such as Computerized Prescription Support System (CPSS) to assist prescribing.

The projects leaded by the IRCCS San Raffaele Pisana, named with the acronym Sc@rabeo, started on January 2012 and collect now data of nearly 1,000 residents in the 17 NH of the San Raffaele group. Residents from this institution have a mean age of

<sup>14</sup> Bernabei R, Gambassi G, Lapane K, Landi F, Gatsonis C, Dunlop R, Lipsitz L, Steel K, Mor V. Management of pain in elderly patients with cancer. SAGE Study Group. Systematic Assessment of Geriatric Drug Use via Epidemiology. JAMA. 1998 Jun 17; 279(23):1877-82. Erratum in JAMA 1999 Jan 13;281(2):136.



80.95 years and are mostly females (69.1%). There is a large prevalence of dementia (58.3%) and a low level of independence (61.1% of residents have a limited level of independence or are totally dependent). Only 31.4% of residents reports frequent/occasional pain.

The Catholic University "SacroCuore" has a long experience mostly concentrated on the NH of the Umbria region, and have accumulated a database of nearly 4,000 residents. Residents are older than those of the San Raffaele (over 47.1% of them is > 85 years), but the proportion of females is very similar (69.4%). Alzheimer and Dementia is the most common pathological condition, but also diabetes (21.7%) or cerebrovascular diseases (20.7%) have a high prevalence. Also these residents have limited independence (46.6% need intensive assistance) and have low cognitive performance (40.5% in the lowest rank).

Subjects participating to both projects receive a complete assessment at admission, and are re-assessed every three month or in case of a clinically relevant event, until death of the date they are dismissed from the NH. Both projects have been approved by competent IRB's.

Data from CGA and from clinical records are uploaded on structured databases that allow a straightforward interrogation providing basic information about epidemiological trends in each NH and information about individualized therapeutic plans for each resident.

This system allows a strict control of the prescribing quality and a continuous monitoring of the effect of inappropriate prescribing on major health outcomes.

The programs illustrated involve at some extent general practitioners, which in many NH are in charge of drug prescribing.

## 2.2. Specific health/ICT/innovation and/or social/economic objectives

This example of good practice may contribute to the research and methodology on ageing and adherence. The target population includes older persons resident in nursing homes, with special care for dependent patients, i.e., older persons with disability, polymedicated patients, patients with multimorbidity and those with selected chronic diseases (e.g. COPD).

The associated to innovation of this practice is mostly linked to the deployment and validation of strategies for the management of old, fragile, patients. The use of the CGA on a systematic scale, may significantly impact the quality of care in hospitalized patients, although also other settings may benefit of this approach.

## 2.3. Organisations involved

IRCCS San Raffaele Pisana, Italy;

Università Cattolica del Sacro Cuore at Policlinico Gemelli of Rome;

AIFA - The Italian Medicines Agency;

## 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument (please tick below):	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

Similar programs have proven in US and other European countries to be efficient in reducing disability and mortality in institutionalized older persons. We planned to implement that experience with a special attention to the quality of prescribing and the management of polypharmacy and multi-morbidity, as early interventions to reduce late stage events.

No direct evidence of the impact of this approach in term of beneficial impact of health outcomes has been produced yet, but extensive literature has been published based on the database managed by the Catholic University, and manuscripts are in preparation based on the more recent experience of the San Raffaele network.

The permission to follow-up residents participating to the project now included into the informed consent will allow to properly assessing the mid- and long-term effects of inappropriate prescribing, polypharmacy, multi-morbidity, etc. The availability of large number allows performing clinical studies to compare different therapeutic strategies.

## 3.1. Key innovative elements of your notable practice

The deployment of a large scale validation practice in nursing homes offers the possibility to quantify benefits



attributable to CGA and systematic surveillance on major health markers, such as death rates, re-hospitalization and survival, but also on the quality of prescribing, quality of life, and psychological performances.

This practice offers the perfect framework for validating innovative procedures, such as computer assisted prescribing or priority selection in the treatment of complex patients.

### 3.2. Evidence on the impact and outcomes

The availability of a comprehensive approach to all data patients in a large number of nursing homes allows the direct evaluation – at fixed periods of time – of mortality and re-hospitalization rates, and other parameters.

### 3.3. Formal or informal evaluation

The expected changes in the project benchmarks have been assessed before the start of the practice, and so are the sources for data collection and assessment.

### 3.4. Success criteria used to determine that the initiative is working well

The criteria for defining as a success the changes in the selected benchmarks are statistically and clinically significant improvements.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

The protocol of this project benefits from the large experience of studies such as the WHO Study on global AGEing and adult health (SAGE<sup>15</sup>) mostly developed in the US but now largely adopted in Europe and most Western countries; therefore, the

implementation of networks of nursing homes should not present major difficulties.

The topics addressed by the project as a whole, and in particular on the improvement of the pharmacological treatment, i.e., mostly focused on appropriate prescribing, drug safety, and complex elder patients in nursing homes, are among priorities in all European countries.

Statistics from the two partners presenting this project shows clearly as most of these patients are frail and affected by multi-morbidity, resulting in a common condition of polypharmacy. These features make interventions in this setting potentially of large impact, and the frequent occurrence of adverse health outcomes makes the database extremely suitable for statistical analyses.

## 5. FURTHER INFORMATION

Link to web pages: [www.sanraffaele.it](http://www.sanraffaele.it); [roma.unicatt.it](http://roma.unicatt.it); [www.agenziafarmaco.gov.it](http://www.agenziafarmaco.gov.it)

### Contact persons:

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Elisa Gregorini ([e.gregorini@aifa.gov.it](mailto:e.gregorini@aifa.gov.it)), The Italian Medicines Agency – Rome, Italy, phone: +39-06-59784852.

<sup>15</sup> The WHO Multi-Country Studies unit coordinates the Study on global AGEing and adult health (SAGE) as part of an on-going program of work to compile comprehensive longitudinal information on the health and well-being of adult populations and the ageing process. The core SAGE collects data on adults aged 50 years and older, including a smaller comparison sample of younger adults aged 18–49 years, from nationally representative samples in six countries: China, Ghana, India, Mexico, Russian Federation and South Africa.



## 1. BACKGROUND INFORMATION

<b>CONSORTIUM</b>	AIFA (Italian Medicine Agency)
<b>ORGANISATION NAME</b>	<b>Pfizer Italy</b>
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Private companies, Large-sized industry
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Italy
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	Molise Region
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	Molise Region
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	320.000 (2010 data)
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	25.000
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	Older people in general population, People in day care centres , Patients with a specific disease
<b>TYPE OF PARTNERS INVOLVED</b>	Hospitals, Specialised physicians, Day care centres
<b>TOPICS/DISEASES ADDRESSED</b> (KEYWORDS)	Chronic disease, elderly patients, clinical and economical outcome
<b>RELEVANCE TO A1 ACTION PLAN</b>	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

### 2.1. Methodology, processes and target population

MOLI-Sani is a longitudinal prospective cohort Study including 25.000 subjects resident in Molise promoted by "Università Cattolica del Sacro Cuore, Centro di Ricerche e Formazione ad Alta Tecnologia nelle Scienze Biomediche" based in Campobasso, and supported by Pfizer Italia.

It is focused on the recruitment of a highly representative number of subjects, followed up yearly up to 5 years, in order to collect and analyse:

- Demographic characteristics, QoL and Psychosocial aspects.
- Prevalence and incidence rate of the most common diseases particularly focused on the chronic conditions (Diabetes, Cardiovascular, Oncology, Alzheimer Disease, etc.).
- Prevalence and incidence rate of risk factors, habits (diet and physical exercise) and behaviours that may affect or be correlated with the health condition of the subjects.
- Prescriptions and adherence to treatments.
- Genotype profile.
- Hospital Discharge Reports (SDO) and Regional death registries linkage.

The enrolment of subjects (basal visit) has been completed in August 2010; all the visits and active analysis connected with the basal visit have been performed by "Cattolica University" of Campobasso and "San Timoteo" Hospital of Termoli.

For the scope of this study, it is expected to perform only a follow-up visit in all the subjects over 65 affected by chronic diseases; health economic data will be also collected.

### 2.2. Specific health/ICT/innovation and/or social/economic improvement objectives

The study is specifically designed and focused on understanding and improving the clinical and epidemiological aspects for improving health state in the target population, particularly elderly people affected by chronic diseases.

In the prospective phase of the study is possible to evaluate the correlation among risk factors, socio behavioural aspects, demographic characteristics, specific genetic evaluation, and adherence to treatment, life style behaviours and the outcomes of chronic diseases; the socio economic impact of these correlations will also be assessed.

### 2.3. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

Uniqueness of the characteristics of the study population with low levels of inter-regional mobility.

Observation and monitoring of the risk factors, the behaviours and the outcome of educational/therapeutic interventions in the long time

available detailed demographic and clinical data, availability database of the genetic profile of the subjects involved.

### 3.2. Evidence on the impact and outcomes

The MOLI-Sani database contains very robust data in more than 10,000 elderly patients affected by chronic diseases and it is possible in the follow-up to correlate these data with disease progression and clinical and economic outcome.

The study design of the follow-up has to be completed according to the objectives of the adherence program;

### 3.3. Formal or informal evaluation

Available final evaluations of basal characteristics of all subjects regarding cardiovascular risk factors (including diabetes) and cancer risk factors, screening and basic haematochemical screening.

Available formal evaluation of follow-up for specific subgroups (with cardiac disease).



### 3.4. Success criteria used to determine that the initiative is working well

Expected high retention rate of the study and high quality of the results (measurement of interventions) accordingly.

### 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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Data of the study could be also extrapolated and transferred at national level and regional level.

The study could be extrapolated by itself as a model and could be created a new database on the other regions / countries.

Challenges: economic impact and long-time for enrolment, for follow-up and for evaluation.

In addition the acquired data could be extrapolated to the general population (at national / regional level) and

to the other countries where the socio-demographic conditions can be overlapped.

Challenges: not perfectly overlapping of socio-demographic data, differences of lifestyles and of health care at national and regional level.

In order to transfer the model, the structure could be replicated customizing the specific characteristics of the region / country assessed.

### 5. FURTHER INFORMATION

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Links to web pages: <http://www.moli-sani.org>

#### Contact persons:

Dott.ssa Benedetta Donati ([mbdonati@moli-sani.org](mailto:mbdonati@moli-sani.org)),  
IRCCS Neuromed Institute;

Dott. Giovanni Papello ([Giovanni.Papello@pfizer.com](mailto:Giovanni.Papello@pfizer.com)),  
Pfizer Medical Department



## 1. BACKGROUND INFORMATION

ORGANISATION NAME	Philips Home Healthcare Solutions
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Private companies, Large-sized industry
COUNTRY INVOLVED IN THE GOOD PRACTICE	United Kingdom; pending release 2013/2014: France, Germany, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Austria
REGION INVOLVED IN THE GOOD PRACTICE	All
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Western Europe
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	357 M
GOOD PRACTICE DIRECT TARGET GROUP SIZE	29,724 for cystic fibrosis (Spain 2,200; United Kingdom 8,284; Austria 686; France 4,533; Germany 6,835; Italy 5,064; The Netherlands 1,275; Norway 200; Sweden 362; Portugal 28). In addition, there are 10-15 patients per million populations with pulmonary arterial hypertension that can also benefit from treatment using this system.
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Patients visiting specialised physicians, Specialised physicians, Patients with a specific disease
TYPE OF PARTNERS INVOLVED	Hospitals, Specialised physicians, Medium-sized industry, Large-sized industry
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Cystic fibrosis and pulmonary arterial hypertension patients
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input checked="" type="checkbox"/> Service models <input type="checkbox"/> Training
<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

Patients with chronic disease are well-known not to comply with their prescribed medication regime; this lack of adherence is compounded in the case of inhalation therapy, where lack of understanding or ability may lead to poor compliance with the recommended technique of use<sup>16</sup>.

This intervention is designed to improve both when and how patients take inhaled medications.

### 2.1. Methodology, processes and target population

I-neb Insight Online is designed for use with the I-neb Adaptive Aerosol Delivery (AAD) nebuliser (Philips Respironics, UK) in the treatment of patients with either Cystic Fibrosis (CF) or pulmonary arterial hypertension.

The I-neb nebuliser contains a data logger that can be connected to a computer; thus, the system can be used to monitor adherence and compliance, facilitate access to this data for physicians, patients, and homecare providers, and provide treatment-related feedback and support. Patients using I-neb Insight Online can also utilise a breathing trainer within the software, which enables the interactive practice of long, slow inhalations, thereby minimising treatment times.

Data collected via the system are uploaded to a central server, where it is accessible to the patient, the patient's healthcare provider, and a dedicated patient support team<sup>17</sup>. The patient support team is able to monitor compliance with inhalation technique and aspects of device performance. At a subsequent consultation the physician can examine patterns of dosing, for example frequently missed doses at a particular time of day, or on specific days of the week.

The transparency of information provided by I-neb Insight Online not only offers an opportunity for the physician to engage in a more informed discussion with the patient regarding behavioural modification aimed at improving adherence, but may facilitate modification of the treatment burden to a mutually agreeable level. It may also help the physician make more informed clinical decisions on the relative efficacy of prescribed medication against the patient's adherence levels.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

Clinicians have reported that open routine monitoring can help support patients in maintaining long-term inhalation therapy, while use of the information recorded can facilitate the tailoring of treatment regimens to the individual, which can also improve adherence<sup>18</sup>.

As such, I-neb Insight Online can be seen as uniquely multifaceted, reflecting the needs of the patient, identified from real-time adherence and compliance data.

By improving and sustaining adherence levels, patients' health can be maintained thereby improving their quality of life and reducing the healthcare resource burden of such chronic diseases.

### 2.3. Organisations involved

Zambon SpA, Bayer, specialist hospital care centres in the countries listed in section 1.

<sup>16</sup> Pritchard J.N. Improving Adherence to Inhaled Therapies; Telemonitoring of Dosing Frequency and Technique. J. Patient Compliance 2012; 2(4) 28-31.

<sup>17</sup> Spencer T, Daniels T, Pollard K, Agent P, Morgan G, Madge S, Bilton D, Peckham D. I-neb Insight Online – A telemedicine option in the treatment of cystic fibrosis. J. Cystic Fibrosis 2012; 11 (Suppl 1), S78.

<sup>18</sup> McCormack P, Southern K, McNamara PS. New nebulizer technology to monitor adherence and nebulizer performance in cystic fibrosis. J Aerosol Med Pulm Drug Deliv. 2012; 25(6):307-9.



## 2.4. Funding

Has the initiative already received some funding?	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

Insight Online is the first service launched within Europe that can provide remote access to up-to-date adherence, compliance, true adherence, and device operation data, for the identification of treatment issues. It allows informed dialogue between health care provider and patient to support the creation and maintenance of good adherence behaviours and habits.

### 3.2. Evidence on the impact and outcomes

A recent randomised controlled trial in CF patients using I-neb in a breathing mode that provided feedback to patients during treatment showed that longer, slower inhalations were associated with a reduction in treatment times of more than 40%<sup>19</sup>.

In the same study, the shorter treatment times also had a positive impact on adherence highlighting the importance of minimising treatment burden. Similarly shorter treatment times using I-neb Insight Online have also been shown to correlate with higher levels of True Adherence, that is the number of doses that were completed<sup>20</sup>, providing more evidence that the patient may be more likely to take a treatment if the associated intrusion into day-to-day activities is lessened.

In the previously mentioned handling study, use of I-neb Insight Online in adult CF patients was associated with 98% compliance, and 69.4% adherence, resulting in a mean True Adherence of 68%.

This compares very favourably with the recently reported adherence level of 36%, also recorded in adult CF patients using retrospective data downloads

obtained from the I-neb AAD System<sup>21</sup>; thus, the combined benefits of reduced treatment time and the ability to intervene based on time-stamped data provide a clear opportunity to improve adherence.

### 3.3. Formal or informal evaluation

The success of this intervention has been demonstrated in a number of studies that have been published in peer-reviewed journals. Some of these are attached as footnotes.

### 3.4. Success criteria used to determine that the initiative is working well

As described above, there have been significant and sustained improvements in adherence. Recently, a case study was reported in which following use of this system combined with motivational interviewing, a cystic fibrosis patient reduced from 56 days of hospital administered intravenous antibiotics in one year to zero in the subsequent year<sup>22</sup>.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

This system is currently available in the UK, and will be rolled out across Europe over the coming months. This has involved translation of the software into major European languages other than English. It then needs a patient support team to be set up (often using the device homecare provider). New hospital centres are set up with secure access on-line and appropriate training programmes set up for patients and physicians.

While such a comprehensive telemedicine system has not yet been developed and trialled for use in other respiratory disorders, the potential impact of I-neb Insight Online on True Adherence in CF suggests that similar systems may also aid treatment optimisation in conditions such as asthma and COPD.

<sup>19</sup> McCormack P, McNamara PS, Southern K. A randomised controlled trial of breathing modes for adaptive aerosol delivery in children with cystic fibrosis. *J. Cystic Fibrosis* 2011; 10(5):343-349.

<sup>20</sup> Spencer T, Dyche T, Nikander K, Smith NJ, Pritchard JN. The association of true adherence, inhalation time and treatment time for patients using the I-Neb AAD system in either TBM or TIM. In: Dalby RN, Byron PR, Peart J, Suman JD, Young PM. (Eds). *Respiratory Drug Delivery 2012*. Phoenix, Arizona. Davis Healthcare International Publishing, River Grove, Illinois 2012; 3, 679-684.

<sup>21</sup> Daniels T, Goodacre L, Sutton C, Pollard K, Conway S, Peckham D. Accurate assessment of adherence: Self-report and clinician report vs electronic monitoring of nebulizers. *Chest* 2011; 140(2):425-432.

<sup>22</sup> Hinchcliffe R. (in press) 36th Eur. Cystic Fibrosis Conf., Lisbon, 2013.



## 5. FURTHER INFORMATION

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**Link to web pages:**

<http://www.youtube.com/watch?v=A7BM0ao-0wA>

**Contact person:** Dr JN Pritchard, Philips Respirationics  
([John.Pritchard@philips.com](mailto:John.Pritchard@philips.com))



DEVELOPING A SCALE TO ASSESS ANTI-CHOLINERGIC BURDEN

1. BACKGROUND INFORMATION

ORGANISATION NAME	Aston University
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Pharmacists, Research centres, Academia, Specialised physicians
COUNTRY INVOLVED IN THE GOOD PRACTICE	UK and the USA.
REGION INVOLVED IN THE GOOD PRACTICE	West Midlands and East Anglia (UK), Indiana (USA)
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	West Midlands
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	West Midlands
GOOD PRACTICE DIRECT TARGET GROUP SIZE	60,000 (Approximately 750,000 people in the UK suffer from dementia)
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Older people in general population (whilst the intervention is primarily targeted for people with dementia and MCI (mild cognitive impairment), the intervention will benefit the wider older person population)
TYPE OF PARTNERS INVOLVED	Pharmacists, Academia, Specialised physicians
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Cognitive impairment, dementia
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input checked="" type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

Many commonly used medicines in older people possess anti-cholinergic activity. Anti-cholinergic burden is associated with cognitive impairment and will therefore worsen adherence to medication particularly in older people with dementia, or mild cognitive impairment.

cholinergic activity and ADLs (activities of daily living) or cognitive function.

The list of medications was reviewed by an inter-disciplinary team of experts in geriatric care and at a consensus meeting. Medicines were classified as having mild, moderate or severe activity.

### 2.1. Methodology, processes and target population

We have developed the Anticholinergic Burden Scale as a clinical tool to identify and order the anti-cholinergic activity of commonly used OTC (over-the-counter) and prescribed medications. The scale calculates a score that captures the cumulative anti-cholinergic burden associated with the total number of medications taken.

The MEDLINE database was searched to identify studies that measured the anti-cholinergic activity of medication and any association between anti-

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

This project aims to contribute to the research and methodology on ageing and adherence by producing guidelines on the use of medicines with anti-cholinergic activity.

### 2.3. Organisations involved

This is a collaborative project involving the Regenstrief Institute and the UEA working with Aston University with a commitment to regularly update the scale.

### 2.4. Funding

Has the initiative already received some funding?	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

This scale represents an innovative way to assess the cumulative anti-cholinergic burden and relate to impaired cognition, which can affect adherence; we have used the scale in two studies (both of which have been published).

The scale is also being used to guide a literature review, which will review the impact of anti-cholinergic activity in the four domains of cognition, physical function, mortality and delirium.

### 3.4. Success criteria used to determine that the initiative is working well

The success criteria will include regularly updating the tool and the uptake of the tool into both practice and research.

### 3.2. Evidence on the impact and outcomes

The results from both studies appear to indicate that the impact of anti-cholinergic burden is greatest in the earlier stages of dementia.

### 3.3. Formal or informal evaluation

The tool has been evaluated in epidemiological studies that have assessed the impact of anti-cholinergic burden on key outcomes including cognition and mortality. We are aware that future studies are also planning to use the tool.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

The stage is freely available and can therefore be used in other regions or countries. However, it will need to be tailored to the specific medicines available in each country

## 5. FURTHER INFORMATION

**Link to web pages:** [www.agingbraincare.org/tools/abc-anticholinergic-cognitive-burden-scale](http://www.agingbraincare.org/tools/abc-anticholinergic-cognitive-burden-scale)

### Contact point:

Ian Maidment ([i.maidment@aston.ac.uk](mailto:i.maidment@aston.ac.uk))



## ADHERENCE TO CLINICAL PRACTICE GUIDELINES AND MEDICATIONS IN MULTIMORBIDITY PATIENTS WITH POLYPHARMACY

### 1. BACKGROUND INFORMATION

<b>CONSORTIUM</b>	Asociación Bio-Med Aragón (BMA)
<b>ORGANISATION NAME</b>	<b>Bio-Med Aragón/EpiChron Research Group on Chronic Diseases</b>
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Research centres, Academia
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Spain
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	Aragón
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	Aragón Region
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	1,3 M
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	1,3 M
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	Older people in general population, Patients in hospitals, People visiting general practitioners, General practitioners, Patients visiting specialised physicians, Specialised physicians, People collecting prescriptions from pharmacies, Pharmacists, Patients with a specific disease, Patients' groups, other (Multimorbidity patients with polypharmacy)
<b>TYPE OF PARTNERS INVOLVED</b>	Hospitals, Pharmacists, Research centres, Primary care centres, Academia, Specialised physicians, General practitioners,
<b>TOPICS/DISEASES ADDRESSED</b> (KEYWORDS)	multimorbidity, polypharmacy, quality of care, pharmaco epidemiology, adverse drug events, frailty, patient complexity
<b>RELEVANCE TO A1 ACTION PLAN</b>	
<input type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input type="checkbox"/> Monitoring
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input checked="" type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking



## 2. DESCRIPTION

This good practice describes an on-going research line focused on better understanding the complex relationship between multimorbidity, polypharmacy and adherence to clinical practice guidelines and medications, which is being developed by the EpiChron Research Group on Chronic Diseases.

The overall goal of our multidisciplinary research group is to generate sound knowledge about the clinical epidemiology and the response of healthcare services to the real needs of the population with multiple chronic diseases and hence polypharmacy.

Albeit representing the rule rather than the exception, health care delivery and quality measurement, as well as the majority of existing guidelines (including recommended medications) are still designed for people with single diseases. Thus, evidence for treating patients affected by multimorbidity is worryingly weak, leading to variations in care and less than optimal health outcomes.

The general aim of the EpiChron Research Group is therefore to pave the way for the development of clinical guidelines and a care quality framework that is better adapted to patients with multimorbidity.

The specific research questions addressed by the EpiChron Group which relate to the present good practice are:

- Does GPs' adherence to single-disease clinical practice guidelines decline when caring for patients with several chronic diseases?
- Does GPs' adherence to single-disease clinical practice guidelines in caring for patients with multimorbidity lead to inappropriate care?
- Which measures of quality of care are of interest and achievable when caring for patients with complex comorbidities in order to improve their care?

We propose to work on these research lines together with other potential European research groups (some of which have already manifested their interest to collaborate) based on common methodologies and comparable databases, in order to achieve a deeper understanding about essential aspects related to adherence to clinical practice guidelines and medications among populations with multimorbidity.

### 2.1. Methodology, processes and target population

The EpiChron Research Group holds an Integrated Health Data Repository (IHDR) including all relevant demographic, clinical and drug information for all

patients living in the region of Aragon (1.3 M inhabitants).

Data from electronic medical records in primary care, hospitals, specialised care, and emergency departments have been matched by record-linkage through a unique personal identification code that is encrypted to protect patients' privacy.

All acute and chronic problems (duration > six months) are recorded for each patient. Health problems diagnosed in primary care are coded using the International Classification of Primary Care (ICPC), and those diagnosed in the hospital setting are coded based on the International Classification of Diseases 9th Revision Clinical Modification (ICD-9-CM). A mapping system converts codes from ICPC to ICD-9-CM.

All registered morbidities have a date of diagnosis, enabling the selection of diseases and combinations of diseases in time. Information of drug prescriptions includes type of medication, starting date and ending date and dose.

Data on drug dispensing by the pharmacy office is also integrated in the IHDR. Each active ingredient is coded using the Anatomical/Therapeutical/Chemical Coding System (ATC Classification).

The database also includes information for a set of primary care-based performance (process and outcome) indicators focused on specific diseases (i.e. hypertension, dyslipidaemia, diabetes, obesity, heart failure, COPD), and types of patients (e.g. older people, chronic dependent people).

Regarding the methodological expertise, one of the Group's objectives is to innovate in the use of statistical techniques that enable discovering disease and medication patterns in large medical datasets, and analysing their nested structure on a longitudinal basis.

Having access to high quality comprehensive data together with the Group's methodological strengths will enable for the study of specific types of patients, index diseases and patterns of multimorbidity and their relation with prescription profiles, quality of care, health services use, as well as pharmaco epidemiological issues related to adverse drug events.

The specific target population group of this good practice is composed of individuals with multiple chronic conditions within the European context. Special emphasis will be put on patients suffering from index conditions such as hypertension, diabetes and COPD, as well specific population groups such as frail older individuals.



## 2.2. Organisations involved

The present research line is developed collaboratively with other European groups, with whom we share research questions, analytic strategies, databases and scientific publications. Such organisations include:

- Dept. of General Practice of Maastricht University (Netherlands)
- Dept. of Primary Care and Public Health of Imperial College London (UK)
- Institute of General Practice of Johann Wolfgang Goethe University (Germany)
- ACG Team of Johns Hopkins Bloomberg School of Public Health (US)
- Dept. of Public Health and Primary Health Care of the University of Bergen (Norway)

Moreover, in the context of this Action Plan on Prescription and Adherence to Medical Plans, a new

collaboration opportunity has been recently established with the Center of Pharmacoeconomics (Faculty of Pharmacy, University of Naples), with which we are in the process of sharing information about our respective data repositories in order to initiate European-wide comparative studies.

## 2.3. Specific health/ICT/innovation and/or social/economic objectives

- a) To evaluate the association between adherence to medical plans and specific patterns of multimorbidity and polypharmacy.
- b) To monitor compliance with treatment in multimorbidity patients with highly prevalent index diseases.
- c) To monitor GP's adherence to clinical guidelines in multimorbidity patients with highly prevalent index diseases.

## 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

The following can be identified:

- There is a vast literature supporting the fact that adherence to current clinical practice guidelines and recommended medications for individual chronic conditions is poor. However, little work has been done on the role that multimorbidity and polypharmacy play in this non adherence, and whether this lack of fulfilment is or not justified when caring for patients suffering from multiple chronic conditions.
- This proposal responds to a widely acknowledged need to draw and integrate observational patient-level data from clinical/administrative records. Given the acknowledged limitations of clinical trials to capture the clinical complexity of multimorbid patients, adequately designed observational research can better accommodate the large, heterogeneous populations needed to examine healthcare performance and outcomes under real-world conditions.
- As a result of this good practice, innovative statistical techniques will be developed in order to unravel patterns of diseases and medications, and

their association with healthcare performance and outcomes indicators. Such methodologies, together with the definition of a common set of study variables will be shared with other collaborators in order to facilitate European-wide comparative studies.

### 3.2. Evidence on the impact and outcomes

The EpiChron Group's scientific impact in relation to the present research line relies partly on the various articles published in high impact journals. The following deserve special mention:

- Prados A, Calderón A, Hanco J, Poblador B, van den Akker M. Multimorbidity patterns: a systematic review. Accepted in J Clin Epidemiol.
- Calderón A, Gimeno LA, González F, Poblador B, Lairla M, Abad JM, Prados A. Patterns of polypharmacy: associations among prescription drugs using exploratory factor analysis. Accepted in PLoS ONE.
- Calderón A, Poblador B, González F, Gimeno LA, Abad JM, Prados A. Multimorbidity, polypharmacy, referrals, and adverse drug events: are we doing



things well? Br J Gen Pract. 2012;62(605):e821-e826.

- Prados A, Poblador B, Calderón A, Gimeno LA, González F, Poncel A, Sicras A, Alcalá JT. Multimorbidity Patterns in Primary Care: Interactions among Chronic Diseases using Factor Analysis. PloS ONE. 2012;7(2):e32190.
- Soljak M, Calderón A, Sharma P, Cecil E, Bell D, Majeed A. Does higher quality of primary health care reduce stroke admissions? National cross-sectional study in 52 million registered patients. Br J Gen Pract. 2011;61(593):e801-7.
- Calderón A, Carney L, Soljak M, Bottle A, Partridge M, Bell D, Abi-Aad G, Aylin P, Majeed A. Association of population and primary health care actors with hospital admissions rates for chronic obstructive pulmonary disease in England: national cross-sectional study. Thorax 2011;66(3):191-6.

### 3.3. Formal or informal evaluation and success criteria

- Peer reviewed articles.
- Conference invitations. The following deserve special mention:
  - Scientific Seminar of the Clinical Practice Guideline Programme in the Spanish National Health System. "Multimorbidity and Clinical Practice Guidelines". Ministry of Health. Madrid, Feb 2013.
  - International workshop. "Multimorbidity: a hidden epidemic that challenges European health services". 5th Annual European Public Health Conference. Malta, Nov 2012.
  - Symposium. "How to deal with multiple guidelines in a multimorbid patient". Goethe University. Frankfurt, Oct 2012.
- Membership in the Spanish Chronic Disease Health Services Research Network (REDISSEC).
- Participation in the Joint Action: Chronic Diseases and Promoting Healthy Ageing across the Life Cycle funded by the EAHC (CHRODIS-JA, IT 63551). WP6: Development of common guidance and methodologies for care pathways for multimorbid patients.

### 3.4. Success criteria used to determine that the initiative is working well

The main success criteria of the present Notable Practice will be the identification and scientific dissemination of specific patient profiles with high risk of low adherence to medical plans.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

Globally, in Europe mortality from chronic conditions such as cardiovascular and respiratory diseases is expected to increase by 15% over the next 10 years, which translates to 44 million deaths annually. However, the impact of chronic conditions goes far beyond mortality. The fact that chronic conditions rarely occur in isolation, but rather in the form of multimorbidity, raises many questions regarding their management based on current guidelines, such as the ones stated at the beginning of this document.

One of the best strategies to respond to these issues is to set up a cross-national database that integrates and monitors patient-level information on care performance and health outcomes in relation to specific patterns of diseases and consumed medications, as is proposed here.

Furthermore, research on multimorbidity and associated polypharmacy is in its infancy. Some of the organisations involved in this good practice (and others that will eventually join this Action Plan) are unique within Europe in their capability to address this topic given their sound experience in the characterisation and conceptualisation of complex aspects related to multimorbidity and polypharmacy, and their expertise in the management and analysis of large integrated databases.

## 5. FURTHER INFORMATION

### Link to web pages:

- The International Research Community on Multimorbidity IRCMo (Advisory Board member): <http://crmcspl-blog.recherche.usherbrooke.ca/>
- Scientific Seminar of the Clinical Practice Guideline Programme in the Spanish National Health System, Madrid Feb 2013: [http://www.guiasalud.es/jornadas\\_cientificas/13\\_jornadas/videos.html](http://www.guiasalud.es/jornadas_cientificas/13_jornadas/videos.html)
- Journal of Comorbidity (Editorial Team member): <http://www.jcomorbidity.com/index.php/test>
- Development of Clinical Practice Guidelines in Patients with Comorbidity and Multimorbidity (external reviewer): [http://www.semfyc.es/informativo/desarrollo\\_guias/](http://www.semfyc.es/informativo/desarrollo_guias/)

### Contact person:

Alexandra Prados Torres ([sprados.iacs@aragon.es](mailto:sprados.iacs@aragon.es)), coordinator of the EpiChron Research Group on Chronic Diseases



## 1. BACKGROUND INFORMATION

CONSORTIUM	Asociación Bio-Med Aragón (BMA)
ORGANISATION NAME	Bio-Med Aragón/ Microhealth España
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Private companies
COUNTRY INVOLVED IN THE GOOD PRACTICE	Spain and United States
REGION INVOLVED IN THE GOOD PRACTICE	All country
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	All country
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	600
GOOD PRACTICE DIRECT TARGET GROUP SIZE	2,500
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Patients visiting specialised physicians, specialised physicians, people collecting prescriptions from pharmacies, pharmacists, patients with a specific disease, patients' groups, nurses, other (tutors, caregivers)
TYPE OF PARTNERS INVOLVED	Hospitals, research centres, advocacy organisations patients/users
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Haemophilia, Von-Willebrand, bleeding disorders, health network, adherence, self-care,
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input checked="" type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input checked="" type="checkbox"/> Service models <input type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

The non-adherence problem is reaching epidemic proportions. The WHO suggests that 50% of all patients take their medication improperly. Non-adherence results in poor health outcomes and increased costs. New delivery models must foster collaboration between patients, medical professionals, family and caregivers. We started by serving the haemophilia community.

MicroHealth, through a state of the art mobile and web platform, helps haemophilia patients and providers to: trigger positive behaviour change; track treatment progress; build collaborative relationships; share knowledge with the community; and, most importantly, make well informed clinical decisions.

### 2.1. Methodology, processes and target population

The project is currently 100% focused on haemophilia care. In November 2012, during National Haemophilia Foundation's annual meeting, MicroHealth opened its platform to the general public in the bleeding disorders community. Since launch, our platform is quickly gaining traction and recognition in the haemophilia community.

Members can sign up into the project for free directly or by doctor recommendation. Caregivers can also create family accounts to manage their children's health. Patients receive real-time personalized infusion reminders and educational content that adjust to their individual care plan (e.g. prophylaxis, on-demand, or immune tolerance induction).

Users, at their own discretion, can designate who will be part of their Care Team and grant them access (or not) to their private health information. Clinicians using the platform's control panel can see, at a glance, which patients are reporting bleeds or low adherence; prioritizing effectively their clinical time. Nurses and doctors can also make timely interventions (e.g.

request an appointment or send motivational messages) to improve the patient's health outcomes.

Availability of patients' progress reports at the point of care fosters a productive patient provider discussion around critical issues, including:

- Symptoms and exacerbations management
- Patient adherence to drugs and lifestyle regimes
- Attitudes toward treatment barriers
- Preventive care

Additionally, MicroHealth offers a private health network that empowers users to share relevant insights with the whole haemophilia community.

MicroHealth is collaborating with several haemophilia chapters to promote and improve the tool.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

Members of our team conducted more than five years of medical research at Columbia University Medical Center to discover the most effective way to leverage ICT, such as mobile devices, to engage patients in treatment and improve health outcomes.

Results demonstrated clinically and statistically significant improvements in chronic medication continuation using our mobile intervention.

MicroHealth activities are influenced by this experience to trigger behaviour change and deliver timely exchange of medical information among patients, their families and healthcare professionals, based on ICT.

### 2.3. Organisations involved

MicroHealth España; several Regional Haemophilia Chapters and Associations; Health Providers.

### 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument:	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
<input checked="" type="checkbox"/> Cohesion and Structural Fund				

## 3. INNOVATION, IMPACT AND OUTCOMES

The main benefits for patients are better therapeutic outcomes (it is still common for haemophilia patients to develop disabling joint damage because of low

treatment adherence) and an improved psychosocial experience around their disease state.



Additionally, for those patients transitioning to a new treatment regimen, MicroHealth is a useful companion to guide the change in behaviour / habits. Finally, through MicroHealth, haemophilia patients can track private and secure information about their treatment progress, and share this data with designated health professionals online.

Benefits for professionals include instant access to pharmacodynamics data (which makes possible the individualization of dosing and scheduling of clotting factor concentrates) and time-sensitive clinical alerts that allow professionals to prioritize valuable clinical time.

### 3.1. Key innovative elements of your good practice

Personalized treatment algorithms and clinical data analytics are brought together under MicroHealth's umbrella to trigger healthy behaviour; track treatment progress; build relationships with caregivers and medical professionals; share knowledge; and, most importantly, make better clinical decisions.

### 3.2. Evidence on the impact and outcomes

More than 1,000 users have already signed up in MicroHealth Haemophilia around the world (there are around 20,000 patients with haemophilia in US).

More than 200 users have already downloaded MicroHealth Android App from Google Play. <https://play.google.com/store/apps/details?id=com.microhealth.hemophilia>.

We are aware of a large group of users looking forward to the incoming iOS app for iPhone/iPad.

Our Facebook Page has received more than '3,100 likes' and incorporates active patient's participation (<https://www.facebook.com/MicroHealth>).

Many people have already participated in our 'Keep Calm and Factor Up' and 'People against bleeds' shirts campaign. All profit is sent to the Haemophilia Chapter selected by the buyer. <http://microhealthnyc.myshopify.com/products/keep-calm-and-factor-up-t-shirt>.

We have received the interest of several Patient Associations and Health Providers to collaborate with the project. Patients are participating actively in the platform evolution suggesting new features.

We've received several user suggestions to translate the platform to Spanish, French, Italian, Polish, Hungarian, and Japanese languages.

### 3.3. Formal or informal evaluation and success criteria

MicroHealth Android app has been solid reviewed by 100% of our reviewers (9/9), <https://play.google.com/store/apps/details?id=com.microhealth.hemophilia>

### 3.4. Success criteria used to determine that the initiative is working well

Our main satisfaction is to know that patients consider MicroHealth is the best way to track their condition. They claim that MicroHealth really helps them to improve the adherence to their treatment. Things look work well when people encourage going on with new languages and supporting new mobile platforms. What is even more amazing is to meet patients offering altruistic help to make this happen.

It is also revitalizing to notice a growing interest and acceptance of Healthcare Providers and Industry. They are more and more convinced these technologies, based on clinical results, can become a perfect complement to traditional chronic treatments. Proof of this is the fact that we've already received proposals to take advantage of MicroHealth knowledge and experience to start new projects in other chronic conditions.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

MicroHealth's platform is available world-wide. In Spain, specific initiatives are being implemented (training, awareness dissemination) for the haemophilia community.

## 5. FURTHER INFORMATION

### Link to web pages:

Website: [www.microhealth.org](http://www.microhealth.org)

Learn more:

<https://microhealth.org/pages/learn-more.html>

Facebook: <https://www.facebook.com/MicroHealth>, <http://is.gd/haemophilia>

App:

<https://play.google.com/store/apps/details?id=com.microhealth.hemophilia>

### Contact person:

Javier Gonzalo ([spain@microhealth.org](mailto:spain@microhealth.org)), c/ Eduardo Ibarra 6, 50009 Zaragoza, Spain



DESIGN AND DEVELOPMENT OF A SERVICE TO SHOW VISUAL & AUDIBLE REMINDERS ON THE TV SCREEN (HBBTV) AND OF HBBTV AUDIOVISUAL CONTENT & QUESTIONNAIRES TO BE DEPICTED ON THE TV SCREEN

## 1. BACKGROUND INFORMATION

CONSORTIUM	Asociación Bio-Med Aragón (BMA)
ORGANISATION NAME	Bio-Med Aragón / Anasa Tech
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Academia, Regional public authorities
COUNTRY INVOLVED IN THE GOOD PRACTICE	Spain
REGION INVOLVED IN THE GOOD PRACTICE	Aragón, Madrid
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Europe
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	10 M
GOOD PRACTICE DIRECT TARGET GROUP SIZE	2 M
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Older people in general population, People visiting general practitioners, General practitioners, Formal caregivers, Patients visiting specialised physicians, Specialised physicians, Older people receiving care/living at home, People collecting prescriptions from pharmacies, Patients with a specific disease
TYPE OF PARTNERS INVOLVED	Micro-sized industry, Academia , Private companies, Regional public authorities
TOPICS/DISEASES ADDRESSED (KEYWORDS)	to improve and monitor adherence to treatment, to provide information about adherence to treatment
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input checked="" type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input checked="" type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input checked="" type="checkbox"/> Service models <input checked="" type="checkbox"/> Training
<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking



## 2. DESCRIPTION

Universal Design helps counteract discrimination against people with functional disabilities while improving life for the entire population. It emerged from earlier barrier-free concepts, the broader accessibility movement, and adaptive and assistive technology and also seeks to blend aesthetics into these core considerations.

One of the main purposes of European ICT policy in general is to have an information society that is for everyone. The fact that large parts of society use digital solutions means that the consequences of being excluded are greater, and this particularly applies to the elderly and people with disabilities. Trying to reduce this digital gap therefore is an important goal to achieve. Fully accessible online content may contribute to this goal. One way to accomplish this is integrating text-to-speech on websites and other connected technologies, such as connected TV, cellular and tablets. With this functionality people that have difficulties reading can have the content read aloud to them.

Hybrid TV or Connected TV is a new technological paradigm characterized by the use of TV screens able to receive and play content coming from both broadcast networks and Internet.

HbbTV is a standard specification (ETSI TS 102 796) for Connected TV systems in order to ensure interoperability between TV sets, operators and multimedia content providers.

This initiative proposes taking advantage of this technology to provide assistive services for elderly people at home and, particularly, reminders for treatment adherence, either using the TV screen to show a visual reminder or an automatically speech-enabled reminder.

The TV set is an excellent option to provide services for elderly people. On the one hand, it is a widely deployed ICT device and, on the other hand, it offers a friendly, familiar interface for people that are not confident when using other kind of devices (smartphones, laptops, PC, etc.). Moreover, Connected TV adds new advantages to conventional TV, as a personalized, always-on and broadband interaction channel.

### 2.4. Funding

Has the initiative already received some funding?

☒ YES ☐ NO

Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument

☐ YES ☒ NO

### 2.1. Methodology, processes and target population

Anasa Tech has been working with Text-to-speech technologies for over a decade now, using worldwide leader ReadSpeaker online services to allow visitors to Government and Corporate websites to understand the content, which can be listened to apart from or instead of being read.

Senior citizens, either visually impaired, with limited literacy skills and/or in need of assistance greatly benefits from these kind of services, that can be used in any kind of devices: personal computer, mobile, tablet, game consoles, etc.

The TV set is an excellent alternative to provide content and services for elderly people. Even though the introduction of phones and tablets and other easily used devices are getting more traction among senior citizens, the TV is still the most important source of content in elderly people's households.

This population will be able to access and/or receive digital textual content in the new TV sets, following the HbbTV standard.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

Anasa Tech, together with the Universidad Politécnica de Madrid, has already proved the technical viability of this approach in the supply of job search information to disabled unemployed population. The technology is ready, so we can bridge the digital divide providing audio content in a device that is king in many households, and which is naturally used by elderly people.

Being able to complement audio with image in a large enough screen is key to inform citizens that are having more issues with their senses.

### 2.3. Organisations involved

1. Universidad Politécnica de Madrid;
2. Anasa Tech;
3. ReadSpeaker.



### 3. INNOVATION, IMPACT AND OUTCOMES

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#### 3.1. Key innovative elements of your good practice

Information provided through TV (visual and audio), but also available through other means (smart phones, tablets, computers, game consoles, etc.).

#### 3.2. Evidence on the impact and outcomes

More than 20 million monthly audios are currently served worldwide through the ReadSpeaker platform, in 35 languages, mainly through a computer or mobile device. Introduction of this technology in the living room is still in its early phases.

#### 3.3. Formal or informal evaluation and success criteria

Still in its design stage.

### 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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ReadSpeaker technology is available in 15 out of 24 official EU languages and in up to 50 countries and 35 languages worldwide. It is being used by elderly organizations in Europe, such as [Spanish Elderly and Social Affaires Institute](#) or the [French Health and Social](#)

[Affairs Ministry](#), and by some [European Commission sites](#).

This is just a small sample of the thousands of Public Administration and corporate entities that use ReadSpeaker for their day-to-day communication with their constituents. ReadSpeaker is an online service with very high availability, provided fully from the cloud, and designed following the accessibility standards, that can be integrated in any online content. Thus the transferability of the technology to other organizations and regions is part of its design, and will be used using Connected TV and/or computer, tablets or mobile phones.

### 5. FURTHER INFORMATION

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#### Link to web pages:

[www.readspeaker.com](http://www.readspeaker.com);  
<http://138.4.47.33:2103/came/php/LEYES/legislacion3-1.php>

#### Contact person:

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**DESIGN OF AN ONTOLOGY-BASED TELEMONITORING SYSTEM TO SUPPORT PERSONALISED INTERVENTION PLANS FOR CHRONIC PATIENT SUPERVISION & THEIR ADHERENCE TO CARE PLANS**

## 1. BACKGROUND INFORMATION

<b>CONSORTIUM</b>	Asociación Bio-Med Aragón (BMA)
<b>ORGANISATION NAME</b>	<b>Bio-Med Aragón / Telemedicine and e-Health Research Group</b>
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Research centres, Academia
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Spain
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	Aragon
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	Any
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	Chronic and multi-chronic people
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	Chronic and multi-chronic people
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	Older people in general population, Older people receiving care/living at home, People in care homes
<b>TYPE OF PARTNERS INVOLVED</b>	Primary care centres, General practitioners
<b>TOPICS/DISEASES ADDRESSED</b> (KEYWORDS)	Decision support, telemonitoring, chronic-profiles
<b>RELEVANCE TO A1 ACTION PLAN</b>	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

### 2.1. Methodology, processes and target population

The goal of this work was to contribute to personalized clinical management in home-based telemonitoring scenarios by developing an ontology-driven solution that enabled a wide range of remote chronic patients to be monitored at home. This system works as a clinical decision support.

Based on configured profiles by physicians, the system examines patient's incoming data in order to decide whether or not an alarm should be trigger.

Through three stages, the challenges of integration and management were met through the ontology development and evaluation. The first stage dealt with the ontology design and implementation.

The second stage dealt with the ontology application study in order to specifically address personalization issues. For both stages, interviews and working sessions were planned with clinicians.

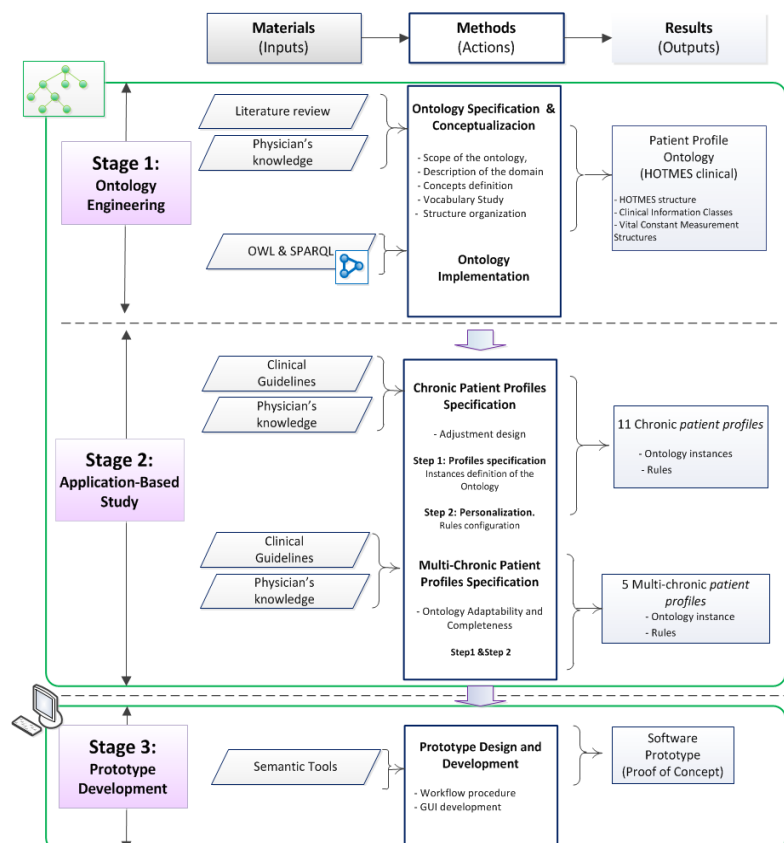
Clinical guidelines and MDs (medical device) interoperability were taken into account as well during these stages.

During the second stage, the application of the ontology was studied to monitor patients with different and multiple morbidities. Specifically it was studied to supervise patients with the following chronic conditions:

1. COPD (chronic obstructive pulmonary disease),
2. obesity,
3. thyroid disorders,
4. ischemic heart disease (IHD),
5. asthma,
6. hypertension (HTA) or high blood pressure,
7. osteoporosis (OPO),
8. heart failure (HF), often called congestive heart failure (CHF),
9. diabetes mellitus (DM),
10. dyslipidaemia (DLP) and
11. Osteoarthritis (OA).

Finally the third stage dealt with a software prototype implementation. Note that primary care physicians were involved in this project both for the ontology definition and the patient's profiles configuration.

The following figure exposes the methodology explained and the inputs, outputs and methods involved in each stage of it.





## 2.2. Specific health/ICT/innovation and/or social/economic objectives

To determine the feasibility of ontology-based personalized clinical management in home telemonitoring scenarios.

## 2.3. Organisations involved

Primary care physicians

## 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

An ontology was developed as an outcome of the first stage.

The structure, based on the autonomic computing paradigm, provides a clear and simple manner to automate and integrate the data management procedure.

During the second stage, the application of the ontology was studied to monitor patients with different and multiple morbidities.

After this task, the ontology design was successfully adjusted to provide useful personalized medical care.

In the third and final stage, a proof-of-concept on the software required to remote monitor patients by means of the ontology-based solution was developed and evaluated.

software required to remote monitor patients by means of the ontology-based solution was developed and evaluated.

### 3.3. Formal or informal evaluation and success criteria

Still in design stage.

### 3.4. Success criteria used to determine that the initiative is working well

Still in its design stage.

### 3.1. Key innovative elements of your good practice

Design and application of an innovative ontology architecture for personalized integrated care management in home-based telemonitoring scenarios.

### 3.2. Evidence on the impact and outcomes

An ontology was developed as an outcome of the first stage. The structure, based on the autonomic computing paradigm, provides a clear and simple manner to automate and integrate the data management procedure.

During the second stage, the application of the ontology was studied to monitor patients with different and multiple morbidities.

After this task, the ontology design was successfully adjusted to provide useful personalized medical care. In the third and final stage, a proof-of-concept on the

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

Our proposed ontology provides an understandable and simple solution to address integration and personalized care challenges in home-based telemonitoring scenarios.

Furthermore, our three stage approach contributes to enhance the understanding, re-usability and transferability of our solution.

## 5. FURTHER INFORMATION

### Link to references on this experience:

N. Lasiera, A. Alesanco, S.Guillén and J. García. A three stage ontology-driven solution to provide personalized care to chronic patients at home. Journal of Biomedical Informatics (2013) 46 (2013), pp. 516-529.

### Contact person:

José García Moros ([jogarmo@unizar.es](mailto:jogarmo@unizar.es))



## EVALUATION AND ALIGNMENT OF TELEMEDICINE SYSTEMS IN THE HEALTHCARE DOMAIN: TELEDERMATOLOGY EXPERIENCE IN ARAGÓN

### 1. BACKGROUND INFORMATION

CONSORTIUM	Asociación Bio-Med Aragón (BMA)
ORGANISATION NAME	Bio-Med Aragón / Telemedicine and e-Health Research Group
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Research centres, Academia ,
COUNTRY INVOLVED IN THE GOOD PRACTICE	Spain
REGION INVOLVED IN THE GOOD PRACTICE	Aragón
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Aragón
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	1.340.00 inhabitants
GOOD PRACTICE DIRECT TARGET GROUP SIZE	Patients with dermatological lesions
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	People visiting general practitioners, Patients visiting specialised physicians, Patients with a specific disease,
TYPE OF PARTNERS INVOLVED	Primary care centres, Specialised physicians, General practitioners,
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Telemedicine, teleservice, evaluation, alignment, dermatological lesions
RELEVANCE TO A1 ACTION PLAN	
<input type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input type="checkbox"/> Monitoring
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input checked="" type="checkbox"/> Service models <input type="checkbox"/> Training
<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

### 2.1. Methodology, processes and target population

The teledermatology experience was active from 2008 to 2010 in our region. Using a teledermatology system, GPs (general practitioners) are able to refer consultations to a dermatologist located elsewhere using information and communication technologies (ICTs).

A total of 20 physicians (4 dermatologists and 16 GPs including 11 paediatricians) organized in 3 working groups (associated to 3 medical speciality centres) distributed throughout our regional health-care service area participated in our study.

A complete design and evaluation methodology was conducted to fully address significant issues emerged in other teledermatology experiences and thus success with our teledermatology system set-up.

First, system design requirements and image quality issues were studied; this research led to the development of a web-based teledermatology system based on the clinical setting and the clinical staff skills.

Then, a detailed clinical concordance study was undertaken during two years in order to determine the accuracy of the diagnoses made using teledermatology for different dermatological clinics.

Finally, an impact study on the health system was performed. Clinical, technical, social and alignment outcomes were analysed during the study and at the end of it, in order to understand how and what emerging factors affected the final setup of the teledermatology system.

A retrospective assessment of the project as a whole together with the results was carried out after the three-year experience in order to identify the main problems and analyse benefits derived from the experience. It allowed us to study and discuss critically the issues that emerged during the experience and report the main lessons learned.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

To determine the clinical and social impact in patients and health organizations with the introduction of Teledermatology systems.

### 2.3. Organisations involved

Primary care physicians and dermatologists from different centres of the health area of Aragón

### 2.4. Funding

Has the initiative already received some funding?	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

Design and application of a collaborative consultation system based on state-of-the-art web technologies.

### 3.2. Evidence on the impact and outcomes

The most important results reported in this study can be summarized as follows:

- 1.a complete web-based environment for teledermatology support was developed as a result of a dynamic evaluation process with clinical personnel;
- 2.a total of 120 teleconsultations (82 paediatric and 28 adult) were made during the clinical concordance study. Concordance analysis was carried out for each dermatological disease group.

3.High concordance rates were found in paediatrics for inflammatory dermatoses (76%) and also for adults (75%) with infections and infestations;

4.Physicians were satisfied with the teledermatology system but the time dedicated to consultation in primary care was a limiting factor (19 min for each teleconsultation);

5.an extensive discussion about the successful and the limiting aspects of the teledermatology experience revealed the reasons behind the final decision not to proceed with its implementation. It was considered not to be aligned with Health Care Organization (HCO) strategy and consequently did not achieve high-level support for its long-term implementation.

The teledermatology experience was very positive and high rates of concordance were measured both for paediatrics and adults. It should be noted that low cost



resources were used for the tele-consultations and that clinicians involved in the experience were not experts in photography.

Nevertheless, other factors such as the reorganization required for the physicians' time schedule, remuneration issues, absence of EHR (electronic health record) integration and lack of interaction with the HCO were important limiting factors.

This led to the conclusion that under the evaluation conditions long-term set-up was not possible. It was also concluded that HCO participation would have been essential for both the evaluation study and the long-term set-up of the system.

The experience with the teledermatology system allowed us to identify keys that contribute to the long term implementation of a telemedicine system. As an outcome of this experience we developed a methodology which can be re-used for the evaluation of other telemedicine systems.

### 3.3. Formal or informal evaluation and success criteria

The evaluation was carried out with a complete study conducted to fully address significant issues emerged in other teledermatology experiences and thus success with our teledermatology system set-up. The teledermatology experience was active from 2008 to 2010.

### 3.4. Success criteria used to determine that the initiative is working well

A retrospective assessment of the project as a whole together with the results was carried out after the three-year experience in order to identify the main problems and analyse benefits derived from the experience. It allowed us to study and discuss critically the issues that emerged during the experience and report the main lessons learned.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

Our methodology can be re-used for the assessment of other telemedicine experiences. Furthermore detected keys for the success and failure can be study to the adherence of other telemedicine systems (including telemonitoring systems) to the healthcare domain.

## 5. FURTHER INFORMATION

### Link to references on this experience:

N. Lasier, A. Alesanco, Y. Gilaberte, R. Magallón and J. García Lessons learned after a three-year store and forward teledermatology experience using internet: Strengths and limitations. International Journal of Medical Informatics (2012), 81(5):332-343.

### Contact person:

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## EVALUATION AND ALIGNMENT OF TELEMEDICINE SYSTEMS IN THE HEALTHCARE DOMAIN: TELE-EEG EXPERIENCE

### 1. BACKGROUND INFORMATION

<b>CONSORTIUM</b>	Asociación Bio-Med Aragón (BMA)
<b>ORGANISATION NAME</b>	<b>Bio-Med Aragón / Telemedicine and e-Health Research Group</b>
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Research centres, Academia
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Spain
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	La Rioja
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	La Rioja
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	80,000 inhabitants
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	Patients with neurological disorders
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	Patients visiting specialised physicians, Patients with a specific disease
<b>TYPE OF PARTNERS INVOLVED</b>	Hospitals, Nurses, Specialised physicians,
<b>TOPICS/DISEASES ADDRESSED</b> (KEYWORDS)	Telemedicine, teleservice, evaluation, alignment, EEG
<b>RELEVANCE TO A1 ACTION PLAN</b>	
<input type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input type="checkbox"/> Monitoring
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input checked="" type="checkbox"/> Service models <input type="checkbox"/> Training
<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

The tele-EEG is a telemedicine system that provides patients from Calahorra (an area from La Rioja) and nearby areas with better access to the EEG test avoiding the need to travel to the San Pedro hospital (located in Logroño) unless absolutely necessary. This is pioneering service in Spain active since 2008 that allows performing more than 250 tele-consultations per year.

The electroencephalogram (EEG) is a neurophysiological examination that consists of the recording and measuring of bioelectrical brain activity, commonly used in medical practice.

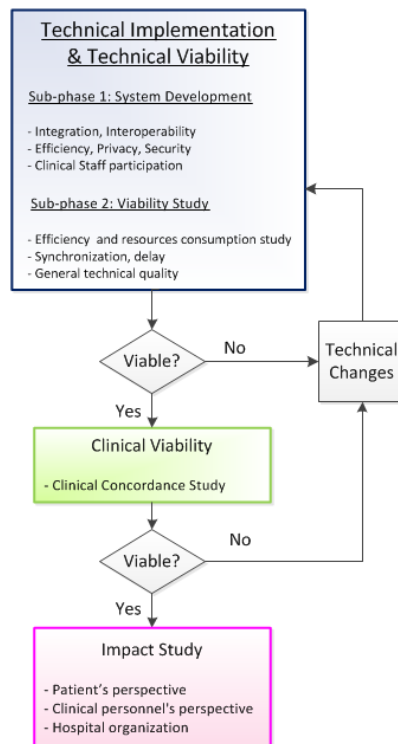
Monitoring the EEG signal together with a video, known as videoelectroencephalography, enables the patient's clinical (video) and electroencephalographic activity (EEG) to be simultaneously monitored during a variable

period of time. It provides for example, important information for the evaluation of epileptic seizures and other paroxysmal disorders of brain function.

### 2.1. Methodology, processes and target population

During the twelve first months of the setting-up a detailed evaluation study was performed. During this period we evaluated the technical aspects of the setup and also demonstrated the clinical viability of the system. The impact on hospital organization and the impact on patients regarding their improvement in their quality of life, as well as their financial savings, were also evaluated.

Technical, clinical and social issues were analysed in our study. The following figure depicts a workflow we follow to setup and evaluate the EEG system:



### 2.2. Specific health/ICT/innovation and/or social/economic objectives

To determine the clinical and social impact in patients and health organizations with the introduction of Tele-EEG systems.

### 2.3. Organisations involved

The Calahorra Hospital Foundation, FHC, from Calahorra, and San Pedro Hospital, HSP from Logroño



## 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

Implementation and evaluation of an innovative remote collaborative system for real-time consultation pioneer in Spain.

which could be re-used for the evaluation of the adherence of a telemedicine system to the healthcare domain.

### 3.2. Evidence on the impact and outcomes

During the twelve months of the evaluation, a total of 259 consultations were conducted through the telemedicine system. The clinical viability study was completely successful, and technical problems were detected only during the first months of setting-up.

### 3.4. Success criteria used to determine that the initiative is working well

This pioneering service in Spain is active since 2008 and allows performing more than 250 tele-consultations per-year. Both patients and professionals have expressed their complete satisfaction with the system thus supporting its usefulness in the daily clinical practice.

### 3.3. Formal or informal evaluation and success criteria

Regarding patients' preferences (177 completed an opinion questionnaire), 99% expressed a high degree of satisfaction with the telemedicine service. They also remarked that they preferred the telemedicine service to previous methods for the EEG test, on the grounds that it provided a significant improvement in access to specialized medical care and important financial savings in terms of travel (around 30D per visit) and of time (approximately 2 h) invested in consultations.

After one year of evaluation, we concluded that the tele-EEG system had been successfully introduced into the clinical routine. Overall, impact on patients was very positive both in their quality of life as well as on their financial savings.

The set-up and evaluation of this telemedicine system allowed us to study from an alignment angle, keys for the success and failure that contributes to the long term implementation of a telemedicine system. As an outcome of this experience we develop a methodology

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

The tele-EEG system is well established and given its success, the experience can be transferable to other regions. Furthermore, our evaluation methodology can be re-used for the assessment of other telemedicine experiences.

## 5. FURTHER INFORMATION

### Link to references on this experience:

C. Campos, E. Caudevilla, A. Alesanco, N. Lasiera, O. Martinez, J. Fernández and J. García. Setting up a telemedicine service for remote real-time video-EEG consultation in La Rioja (Spain). International Journal of Medical Informatics (2012), 81(6):404-414

### Contact person:

José García Moros ([jogarmo@unizar.es](mailto:jogarmo@unizar.es))



**INTEGRATED MANAGEMENT BETWEEN HOSPITAL AND TERRITORY OF PATIENTS SUFFERING FROM HEART FAILURE-THE ROLE OF PHARMACISTS IN THE COMMUNITY**

**1. BACKGROUND INFORMATION**

<b>ORGANISATION NAME</b>	<b>Azienda Provinciale per i Servizi Sanitari (APSS)</b> - Health Care Service Trust of the Autonomous Province of Trento, Italy
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Regional public authorities
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Italy
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	Trentino Region
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	Vallagarina Health District -Trento
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	520,000 inhabitants
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	89,500 inhabitants (Vallagarina Health District)
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	Patients in hospitals, Formal caregivers, Informal caregivers, People collecting prescriptions from pharmacies, Pharmacists, Patients with a specific disease
<b>TYPE OF PARTNERS INVOLVED</b>	Hospitals, Pharmacists, Local public authorities, Nurses, Specialised physicians
<b>TOPICS/DISEASES ADDRESSED</b>	Heart failure, education, pharmacists
<b>RELEVANCE TO A1 ACTION PLAN</b>	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

The initiative is being implemented in a territory of the Autonomous Province of Trento (520,000 inhabitants) where specialists of the Rovereto Hospital (physicians, pharmacists, nurses, dieticians) and GPs working in the Vallagarina health district (89,500 inhabitants) have already been involved for years in a shared management process of patients suffering from Heart Failure (HF).

The initiative aims at verifying whether the involvement of pharmacists, working on the territory, in the follow-up of patients suffering from HF can contribute to the improvement of the disease management.

Community pharmacies represent the most accessible point of care for citizens, and «dispensing» medicines offers the opportunity to provide information and advice on healthy lifestyles, and to contribute improving the compliance with therapies.

Intensive counseling on disease management and education of patients and their caregivers, performed by the pharmacist and aimed at reinforcing the educational process initiated during hospitalization, are among the strongest points of the project.

### 2.1. Methodology, processes and target population

#### Methods

#### 1-Targeted training for pharmacists (April 2009-October 2009)

With a targeted training course (9 meetings), territory pharmacists were informed about the epidemiological relevance of heart failure and on the therapeutic management of the disease and have shared the most effective interventions, in compliance with their institutional role.

They also defined the information tools to be used in pharmacies and devoted to the patients recruited in the study (materials supporting the information obtained in hospital); pharmacists themselves worked out the assessment instruments of their intervention (assessment grids).

#### 2-Patients and caregivers education (continuous)

All the patients suffering from HF hospitalized in the Operative Units taking part in the study (medicine, cardiology and geriatric medicine), together with relatives and caregivers, are specifically trained with the aid of printed materials, in order to enhance their empowerment.

This education stage involves different professional operators: nurses, dieticians and hospital pharmacists

in order to comprehensively treat all the aspects of the disease.

#### 3-Patient recruitment (from December 2009)

53 patients hospitalized during 2010 in the Operative Units taking part in the study (medicine, cardiology and geriatric medicine) and enrolled after obtaining informed consent were randomized to an intervention group (IG) and a control group (CG). Patients belonging to the IG group are followed by their reference pharmacist working at territorial level, according to a planned and structured pathway that included the compilation of a specific assessment grid (every three months).

One month and one year after the hospitalization, patients of both groups are asked to answer a questionnaire consisting of two validated questionnaires on the quality of life (The Kansas City Cardiomyopathy questionnaire and Short Form Health Survey) and a questionnaire to assess the degree of achieved education.

#### Direct target population.

This initiative is the first experience of this kind in Italy aiming at enhancing the role of pharmacists, both in hospitals and on the territory, as educators and point of reference for patients suffering from chronic diseases, like heart failure

The education of patients and caregivers provided in hospitals and enhanced at territorial level is a fundamental intervention in the management of the disease.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

#### Primary objectives

- Improve the patient's quality of life
- Reduce the number of hospitalizations for HF
- Reduce the accesses to emergency departments
- Reduce the length of stay in hospital

#### Secondary objectives

- Improve the compliance with pharmacological therapies

### 2.3. Organisations involved

- Vallagarina Health District - Trento: 40 territory pharmacists working in 20 pharmacies (public and private);

## Action Group on "Prescription and adherence to medical plans"



- Hospital of Rovereto: hospital pharmacists, dieticians, medical directors;
- APSS Trento: Pharmaceutical Service – Health Care Service Trust of the Autonomous Province of Trento

### 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

This initiative shows that an increasing empowerment by the patients in the management of disease with respect to the number of professionals who are involved in the therapeutic process (i.e. the more, the better).

The initiative also enabled us to identify an evolution path for developing the territorial pharmacy to the new model of «Pharmacy Services» in which the pharmacist intervenes in patient care with an increasingly important role, laying down the foundations for a different function of the pharmacy in the organization of health care delivered across the territory.

and salt intake. IG patients were generally more adherent to prescribed cardiovascular drug therapy.

Specifically, 85% of IG patients were adherent to the diuretic therapy, if compared to 62% of CG patients ( $p=0.04$ ); although the perceived quality of life was similar between the two groups of patients, IG patients, who were administered a satisfaction questionnaire, acknowledged the role of educator and point of reference performed by the pharmacist, especially for the management and monitoring of drug therapy and patient care (average satisfaction rating of 9). Patients also state that the educational intervention was appreciated and exhaustive.

### 3.2. Evidence on the impact and outcomes

During the enrolment phase from January to December 2010, 53 patients (26 IG, 27 CG) were included in the project; during the one year follow-up there were no significant differences in the mean number of hospitalizations between the groups.

The intervention of the pharmacist in a multidisciplinary team is still useful, even if it cannot affect the prognosis and re-hospitalization of patients.

Efficacy of educational interventions of pharmacists is also shown towards lifestyles, in particular with respect to the reduction in the intake of alcoholic beverages

### 3.3. Formal or informal evaluation

A formal evaluation was carried out and a publication concerning the initiative is currently in press: Spadaro F. et al. Progetto GIFT Gestione Integrata ospedale territorio del paziente affetto da scompenso cardiaco: ruolo del Farmacista Territoriale – Risultati. [Giornale Italiano di Farmacia clinica](#) 2013; 27,2: 66-81.

### 3.4. Success criteria used to determine that the initiative is working well

The satisfaction questionnaire administered to patients in the intervention group,

QUESTION	ANSWER GIVEN 12 MONTHS AFTER THE HOSPITALIZATION
How do you rate your quality of life (from 0 to 10)?	6,92 ( $\pm 2,23$ )
How important is for you to have a pharmacy for reference (from 0 to 10)?	9,5 ( $\pm 0,83$ )
How important for you has been your pharmacist in the drugs management and for advising you about drugs (from 0 to 10)?	9,54 ( $\pm 0,89$ )



QUESTION	ANSWER GIVEN 12 MONTHS AFTER THE HOSPITALIZATION
How important has been your pharmacist for the monitor of your health (weight, blood pressure) (from 0 to 10)?	9,04 ( $\pm$ 1,33)
How important has been your pharmacist in modifying your lifestyles (salt intake, diet, alcohol consumption, and smoking) (from 0 to 10)?	7,38 ( $\pm$ 1,64)
As far as the contents of the educational path started in hospital and reinforced by the support of the pharmacy, is there anything that is still not entirely clear to you? If so, what are they?	100% answered no

and the questionnaire administered to the pharmacist,

QUESTION	PHARMACISTS THAT ATTENDED AT LEAST ONE PATIENT N=15	PHARMACISTS THAT ATTENDED NO PATIENT, ONLY THE TRAINING N=25	P
How do you rate the usefulness of the project for the patient from 0 to 10?	8,33 $\pm$ 1,35	8,52 $\pm$ 1,2	
How do you rate the usefulness of the specific training on heart failure from 0 to 10?	8,93 $\pm$ 1,22	8,8 $\pm$ 1,13	0,6506
How do you rate the usefulness of the project considering the costs in terms of time spent and the benefits for the patient and for your professional training from 0 to 10?	7,93 $\pm$ 1,28	8,16 $\pm$ 1,21	

### Conclusion

This initiative is the first experience of this kind in Italy aiming at enhancing the role of pharmacists, both in hospitals and on the territory, as educators and point of reference for patients suffering from chronic diseases, like heart failure. The education of patients and caregivers provided in hospitals and enhanced at territorial level is a fundamental intervention in the management of the disease.

### **4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS**

This project can be implemented in the other health districts of the Autonomous Province of Trento and in other Regions, with the involvement of all pharmacies and of the citizens suffering from HF; it does not involve the use of additional resources.

### Limits

The high standard of the usual care of the hospital and territorial management of patients with HF and the small sample size has probably underestimated the true benefit of the educational intervention of the pharmacist.

### **5. FURTHER INFORMATION**

#### **Contact person:**

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## 1. BACKGROUND INFORMATION

ORGANISATION NAME	CatSalut ( Catalan Health Service)
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Regional Public Authorities;
COUNTRY INVOLVED IN THE GOOD PRACTICE	Spain
REGION INVOLVED IN THE GOOD PRACTICE	Catalonia
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Catalonia
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	About 7.5 M
GOOD PRACTICE DIRECT TARGET GROUP SIZE	6,1 M
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	≥18 years old
TYPE OF PARTNERS INVOLVED	Regional Public Authorities; Local Public Authorities ,Hospitals, primary care centres, city council, community pharmacist
TOPICS/DISEASES ADDRESSED (KEYWORDS)	General population; older people; patient empowerment; medication adherence; quality, safe and effective use of medication; electronic prescription
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input checked="" type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input checked="" type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input checked="" type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

### 2.1. Methodology, processes and target population

"Medicament 360: m'agrada saber el que prenc" is an educative campaign about medicines. It is composed by 13 videos. Each video has between 1 and 3 minutes of duration. Its aim is to promote correct medication habits and to improve citizen knowledge about medicines and technical terms.

At the moment the campaign is shown in primary health centres as a passive intervention and we are developing meetings in different places (e.g. public libraries) in Barcelona to show them as an active intervention.

The target is general population, who go to public care centres.

This material has been produced after having done a survey to establish the real knowledge about medicines and people attitude and opinion about rational use of medicines. Its main results were: citizens have a low knowledge about suitable use of medicines; people think it would be necessary to perform campaigns to improve citizen's attitudes and opinion about rational use of medicines. Also, they prefer video and TV campaigns to receive general messages.

Tools to promote adherence are presented in one video, although we want to develop a specific material and study which is the better method to find a positive response.

As well we are developing other health programs focused on promotion of education in medicines in elderly people, in collaboration with community

pharmacy professionals, and sponsored by the Catalan Health System.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

For us, ICT and health innovation have been the use of social network as a communicative channel and sense of humour to produce our creative idea.

This project gives attention to technical concepts about medicines. Basic information that people must to know but it has been shown in the previous study that in general they are unknown. Although young age and high study level have been related with having a better use of medicines the target is all population, because everybody can require medicines one day. In order to approach the message to the target, sense of humour is used to explain each concept.

Videos are in YouTube and messages of our campaign also are tweets.

Regional radio and TV have developed their own advertisement using our campaign messages.

Some new tools had been designed to provide information in order to improve the adherence and a rational use of medicines. Nowadays the "Health Personnel Folder" that includes the electronic prescription plan, is implanted in Catalonia. We are planning also to include this information in mobile personal devices.

### 2.3. Organisations involved

CatSalut, Regional Health Service

### 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

Our innovative elements have been using videos and social network to approach technical concepts to the community. Our second step would be empowering the patients and caregivers to use their medicines. All the experiences are planned to promote adherence of medical treatments, correct use and accessibility.

### 3.2. Evidence on the impact and outcomes

1. Davis T, Wolf M, Bass P, et al. Literacy and misunderstanding prescription drugs labels. Ann Intern Med. 2006; 145:887-94.
2. Nkukuma L. Health literacy: a barrier to pharmacist-patient communication and medication adherence. J Am Pharm Assoc. 2009; 49: e132-e149.



3. Gazmararian JA, Williams MV, Peel J, et al. Health literacy and knowledge of chronic disease. Patient Educ Couns 2003; 51: 267-75.
4. Berkman ND, Sheridan SL, Donahue KE, et al. Low health literacy and health outcomes: an updated systematic review. Ann Intern Med 2011; 155:97-107.
5. Bostock S, Steptoe A, Association between low functional health literacy and mortality in older adults: longitudinal cohort study. BMJ 2012; 344:E1602.
6. Warner A, Menachemi N, Brooks R. Health literacy, medication errors and health outcomes: is there a relationship? Hosp Pharm 2006;41: 542-51.

#### Results from first phase of the project

- <http://www.youtube.com/playlist?list=PLRqnlsj8RdJKNarL2fd3t5Mud3uZfXmOf>
- <http://www.slideshare.net/17CongresoSefap/comunicacin-co-2-rita-puig-17-congreso-sefapv1-17>
- [http://www20.gencat.cat/docs/salut/Minisite/catsalut/CatSalut\\_territori/barcelona/medicaments\\_i\\_farmaciacia/butlleti\\_e\\_farma/arxiu\\_de\\_butlletins/efarma\\_19.pdf](http://www20.gencat.cat/docs/salut/Minisite/catsalut/CatSalut_territori/barcelona/medicaments_i_farmaciacia/butlleti_e_farma/arxiu_de_butlletins/efarma_19.pdf)

Each video has been visited an average of 83 times (42-175) in 5 month. Not data are available yet, but we have already designed evaluation methodology and we will start this evaluation next October 2013.

### **3.3. Formal or informal evaluation**

Informal evaluation has been done with a focus group of 8 people. Videos may help people understand the exposed concepts and be aware when use a medicine. A Pharmaceutical commission from Consorci Sanitari de Barcelona has reviewed each part of the project.

### **3.4. Success criteria used to determine that the initiative is working well**

The first phase of the project (establishment of knowledge, attitudes and opinions of general population about rational use of medicines) has been presented in:

- 17th Congress of SEFAP (Spanish society of primary care pharmacists) where it has received the first award
- 9th Jornada de reflexió de gestors sanitaris sobre la despesa farmacèutica i el seu impacte en la sostenibilitat del sistema, Barcelona.
- 7th Jornada de debat sobre eficàcia i seguretat en la utilització de medicaments, Barcelona.

The second phase of the project (campaign Medicament 360: m'agrada saber el que prenc) has been presented at the 5th Congreso Nacional de Atención Sanitaria al Paciente Crónico

### **4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS**

Videos and support materials are in Catalan, but they will be translated to Spanish and English.

### **5. FURTHER INFORMATION**

#### **Contact persons:**

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**MULTIPLE STRATEGIES FOR CLINICAL MEDICATION REVIEW AND RECONCILIATION OF THE MEDICATION IN COMPLEX CHRONIC PATIENTS IMPROVING SAFETY, EFFICIENCY AND ADHERENCE**

**1. BACKGROUND INFORMATION**

<b>ORGANISATION NAME</b>	<b>Catsalut</b> (Catalan Health Service)
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Regional Public Authorities; Local Public Authorities; Hospitals; Primary Care centers; Specialist physicians; General practitioners; Pharmacists; Nurses; Home Care centers; Nursing homes
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Spain
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	Catalunya
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	Catalunya
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	7.5 M
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	Chronic patients; specifically ,Complex Chronic Patients (PCC)
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	Chronic patients; Complex Chronic Patients (PCC); Specialist physicians; General practitioners; Pharmacists; Nurses
<b>TYPE OF PARTNERS INVOLVED</b>	Regional Public Authorities; Local Public Authorities; Hospitals; Primary Care centers; Specialist physicians; General practitioners; Pharmacists; Nurses; Home Care centers; Nursing homes
<b>TOPICS/DISEASES ADDRESSED</b> (KEYWORDS)	Chronic patients, Complex Chronic Patients, prescription, medication review, medication reconciliation, medication adherence, quality, safe and effective use of medication
<b>RELEVANCE TO A1 ACTION PLAN</b>	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input checked="" type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input checked="" type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input checked="" type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking



## 2. DESCRIPTION

The national Health Plan of Catalonia 2011-2015 established, as one of the pillars of its healthcare model transformation, the development of a system oriented to chronic patients. The ageing of population increases multimorbidity and polypharmacy, and raises the need to design interventions that allow better medication management.

The aim of the program is to develop a multiple strategy, based on an integrated model of care, to promote activities on clinical medication review, reconciliation and adherence in order to improve prescription quality, efficiency and safety in chronic patients.

### 2.1. Methodology, processes and target population

One of the main activities of the Catsalut is to promote the safe, effective and efficient use of drugs in order to grant the rational use of medicines

Following the pharmaceutical care objectives of the Health Plan of Catalonia 2011-2015, different interventions to improve the medication management are being developed. The main characteristics of the initiative are:

- Patient-centered
- Participation and compromise of all the organizations from the territory
- Healthcare professionals coordination and integrated work
- Multidisciplinary team work

The target population is all people with chronic diseases, with particular consideration of chronic complex patients (PCC) defined as people with multiple long-term conditions patients, hospitalizations and use of resources.

The Catalan government published [rules to promote the correct management of medicines in chronic patients, concerning prescription, reviewing and conciliation](#) (June 2012).

On September 2012 was published The Guidance Document "[Medication management in patients with chronic diseases: medication reconciliation, review, deprescription and adherence](#)". This document has the intention to provide national guidance to healthcare organizations and professionals.

Healthcare organizations were tasked to address these activities in a multidisciplinary approach using hospital and primary care pharmacists working with GP's, specialized physicians and nurses. The collaboration

and coordination with the community pharmacists will be also strength in the future.

In addition, medication review and reconciliation objectives have been incorporated in the contract signed by Catsalut with the different primary and secondary care organizations. This will require Primary Care centers working to undertake clinical medication review in the context of holistic care, considering each medication and its impact on the individual clinical circumstances of each patient. Reconciliation protocols and activities have to be undertaken by primary care and especially by hospitals and nursing homes in patients who are admitted to, or discharged. Several objectives have also been included in the contract in order to evaluate the safe, effective and efficient use of drugs.

It has been designed an e-learning course on medication review and reconciliation based in resolution of clinical cases. Its objective is to improve clinicians and pharmacists skills on medication review. It will be implemented in 2014 and 200 professionals will be able to performed it in each edition. In the future another course focused on strategies to improve medication adherence will be designed and offered.

Catalan electronic prescription system (Rec@t) is being implemented in the different levels of care assistance as the main tool for prescribing, promoting collaboration and communication between clinical practitioners and patients and an accurate use of drugs. In order to facilitate the activities of medication review and reconciliation, Catsalut is developing different e-pharmacological support tools to prevent drug related problems (for example interactions, duplicate medications, excessive dosage) and standard e-messages to facilitate communication with other clinicians concerning prescription modification undertaken. The electronic treatment plan allows patients and practitioners to have available all the information about medication for each patient, and it is an item for achieving safety, information quality and coordination between healthcare professionals.

Finally, in order to be able to measure the implementation of all the activities and to evaluate the outcomes in the medication management it is strategic for the project to develop different tools and indicators. One of them is to develop a questionnaire and a DAFO analysis to evaluate its implementation in the different organizations and the impact into the organization and the professionals.



## 2.2. Specific health/ICT/innovation and/or social/economic objectives

- Implement processes on medication review, medication reconciliation and adherence in all the organizations
- Improve prescription quality, efficiency and safety in chronic patients
- Integrate all the prescriptions in one electronic treatment plan shared by all the clinicians.

- Develop e-pharmacological support tools to prevent drugs related problems.
- Improve health professional's education on drug management in chronic patients
- Establish indicators and tools to evaluate the outcomes of the program

## 2.3. Organisations involved

Catsalut, Catalan Department of Health, Healthcare organizations, community pharmacies

## 2.4. Funding

Has the initiative already received some funding?	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

- Working towards a patient centred care model with an integration of the services and levels of care.
- Multidisciplinary team working on reviewing appropriateness of medication
- Introduction into organization's contract framework to undertake medication review and reconciliation
- Integrate all the prescriptions in one electronic treatment plan and developing e-alerts and messages
- Design of an e-learning course on medication review and reconciliation
- Development of indicators to evaluate the outcomes of these activities on the drug management.
- Development of a questionnaire and a DAFO analysis to evaluate its implementation and the impact
- Improving electronic prescription and dispensing to ensure security and efficiency.

The guidance document Medication management in patients with chronic diseases: medication reconciliation, review, deprescription and adherence".

Departament de Salut. [Pla de salut de Catalunya 2011-2015](#). Programa de prevenció i atenció a la cronicitat. Maneig bàsic de la medicació en el pacient crònic: 'Conciliació, revisió, desprescripció i adherència. Barcelona: Generalitat de Catalunya; 2012.

The implementation of this national program for chronic patients 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.

Our preliminary results in a sample of 324 patients from the North Area of Barcelona city after one year of intervention (February 2012-January 2013) are showing that a 72% of patients had a clinical medication review performed, polypharmacy ( $\geq 10$  drugs) decreases from 41,6% to 38,3% and a 46% reduction of potential inadequate and unsafe prescriptions per patient is observed.

Every improvement accomplished in the electronic prescription tool has a great impact all over the population in Catalonia, because it is implemented in

### 3.2. Evidence on the impact and outcomes

Evidence has been collected in the:

[Health Plan of Catalonia 2011-2015](#): Departament de Salut. Pla de salut de Catalunya 2011-2015. Barcelona: Generalitat de Catalunya; 2012.



100% of primary care centers, in 85% of the hospitals of the public health system and in 30% of the mental health centers (September 2013).

The organizations and professionals consider this program positive and that it brings an opportunity to collaborate with other professionals and work closer with the patient. Even though, they also comment on the time dedication it implies.

### 3.3. Formal or informal evaluation

- Chronic patients identified as PCC
- PPC with a clinical medication review done.
- Evolution of the potential inadequate and unsafe prescriptions selected to measure the results of the medication use.
- Evolution of the indicators on effectiveness and efficiency selected to measure the results of the medication use.
- Hospitals and nursing homes with a reconciliation protocol at discharge
- PCC with a medication reconciliation at discharge
- Evaluation of the e-learning course
- Questionnaire and DAFO analysis to evaluate its implementation and impact and satisfaction of the professionals

### 3.4. Success criteria used to determine that the initiative is working well

We assume that all the complex chronic patients must have their therapeutic plan reviewed and conciliated in order to assure the quality of the prescription.

Also some indicators that measure the evolution of potential inadequate and unsafe prescriptions can give us information on the success of the intervention.

The number of professionals (%) that complete the e-learning course on medication review and reconciliation may also contribute to reach the aims.

The incorporation of all the prescriptions (including specialized physicians) in e-prescriptions and the implementation of alerts and messages that helps the physician in the prescription is also a good result.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

Models centred on the patient, and especially on the chronic patients are being developed in many different countries. Evidence demonstrates that initiatives to undertake medication reviews into patients with polypharmacy or with prescription drugs with a potential risk to cause adverse events are successful.

Incorporation of these objectives to the contract with the healthcare organizations, education courses for the professionals and evaluation of the national implementation and its results are the main characteristics of the program.

Catalonia participates in National and European projects (ep-sos) about inter-operability of prescription and dispensing treatments, oriented to ensure the accessibility of medicines of chronic patients abroad.

## 5. FURTHER INFORMATION

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## IMPLEMENTATION OF A PERSONALISED DOSIFICATION SYSTEM IN COMPLEX CHRONIC PATIENTS

### 1. BACKGROUND INFORMATION

ORGANISATION NAME	CatSalut (Catalan Healthcare Service)
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Primary Care centers; Specialized physicians; General practitioners; Pharmacists;
COUNTRY INVOLVED IN THE GOOD PRACTICE	Spain
REGION INVOLVED IN THE GOOD PRACTICE	Catalonia
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Catalonia
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	7.3 M habitants
GOOD PRACTICE DIRECT TARGET GROUP SIZE	Chronic patients; specifically ,Complex Chronic Patients (PCC) 30.000 inhabitants
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Chronic patients; and specifically ,Complex Chronic Patients (PCC) Specialized physicians; General practitioners; Pharmacists
TYPE OF PARTNERS INVOLVED	Primary Care centers; Specialized physicians; General practitioners; Pharmacists; Regional Public Authorities; Local Public Authorities
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Chronic patients, Complex Chronic Patients, prescription, medication review, medication reconciliation, medication adherence, quality, safe and effective use of medication
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counseling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input checked="" type="checkbox"/> Service models <input type="checkbox"/> Training
<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking



## 2. DESCRIPTION

### 2.1. Methodology, processes and target population

The target population is people with chronic diseases, especially chronic complex patients (PCC) and advanced chronic disease patients (MACA) who have multiple long-term conditions, frequent hospitalizations and a high use of resources. Among these people, Primary care centres select those who are candidate to take part in the personalized dosification system (SPD)

Pharmacies which participate in the process have been trained and authorized by health authorities. Their functions are:

- To elaborate a complete anamnesis of all drugs and products taken by the patient
- To provide information and health education to the patient
- To make easier the administration (SPD)
- To suggest non pharmacological options, changes in doses, guidelines and length of treatments

All these procedures are detailed in the document "[Guide of pharmaceutical monitoring with personalized systems of dosification](#) (SPD)", published by the Health Department in 2012

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

#### General aims

- Increase the therapeutic effectiveness level of treatments of chronic complex patients, which leads to a better health and life

### 2.4. Funding

Has the initiative already received some funding?

☐

YES

☒

NO

Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument

☐

YES

☒

NO

- Improve prescription efficiency

#### Intermediate aims

- Guarantee an assistance that provides a comprehensive and integrated treatment of patients, ensuring the continuum medical attention of people with chronic diseases who take part in the program, in order to reach an optimum level of adherence, a therapeutic accomplishment and an improvement in their security.
- To progress in the integration of community pharmacy into other health bodies as well as the prevention and specific care of chronicity.
- To increase the resolution capacity of community pharmacy

#### Specific aims

- To determine the patient needs regarding their treatment and to prevent the potential problems related to medication (PRM)
- To Identify correctly and solve the PRM
- To develop the pharmacotherapeutical monitoring system (SFT) with personalized systems of dosification (SPD) and its implementation in groups of chronic patients with higher complexity (PCC/MACA).

### 2.3. Organisations involved

Catalut, Catalan Department of Health, Healthcare organizations, community pharmacies

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

- To offer tools and procedures to improve adherence and therapeutic accomplishment
- To increase the system's resolution capacity
- To facilitate the integration of community pharmacy into the health system

### 3.2. Evidence on the impact and outcomes

To evaluate the impact of the program, several indicators regarding coverage, process, organization and impact (health and economic) will be proposed

### 3.3. Formal or informal evaluation

There are monitoring tests to follow the evolution on the SPD patient. The accomplishment test verifies the adherence to the treatment and consists of an interview done by the pharmacist (Test Haynes).



Following the specific training provided, there are also tests to check the correct use of the blister by the patient

Any change in prescription and its possible effects are assessed by the pharmacist

### 3.4. Success criteria used to determine that the initiative is working well

The initiative is in the early stages and we are in the way to elaborate indicators to evaluate the results; the pilot phase is planned to begin later this year.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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Several models of personalized dosification systems in complex chronic patients have been implemented in other countries with success.

The Catalan model follows a pattern which could be implemented in other regions or adapted to other organizations.

## 5. FURTHER INFORMATION

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### Contact persons:

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Alba Prat ([aprat@catsalut.cat](mailto:aprat@catsalut.cat)), Pharmaceutical Care Area, Catalan Healthcare Service



## 1. BACKGROUND INFORMATION

ORGANISATION NAME	C.I.R.F.F. (Interdepartmental Research Center in Pharmacoeconomics and Drug utilization), Department of Pharmacy, University of Naples Federico II
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Hospitals, Pharmacists, Research centres, Local public authorities, Academia, General practitioners, Regional public authorities
COUNTRY INVOLVED IN THE GOOD PRACTICE	Italy
REGION INVOLVED IN THE GOOD PRACTICE	Campania Region
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Whole Campania Region territory
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	About 6M inhabitants
GOOD PRACTICE DIRECT TARGET GROUP SIZE	NA
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Older people in general population, People visiting general practitioners, General practitioners, People collecting prescriptions from pharmacies, Pharmacists, Patients with a specific disease
TYPE OF PARTNERS INVOLVED	Hospitals, Pharmacists, Research centres, Local public authorities, Academia, Specialised physicians, General practitioners, Regional public authorities
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Monitoring of Prescriptions, Appropriateness, Cost containment, Data Warehouse
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input checked="" type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input checked="" type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

The initiative performs a monitoring of administrative health databases (mainly prescription and hospitalization data flows) in order to create a powerful knowledge base for each stakeholder involved in the health care system. From this platform many different actions have stemmed such as:

- Annual Regional Report about correct drug utilization aimed to Regional authorities.
- Clinical audits about specific diseases of relevance (e.g. COPD) aimed to general practitioners.
- Informative campaigns aimed to citizens and involving pharmacists about correct drug utilization both in general and on specific diseases of relevance (e.g. diabetes, hypertension) based on data derived from the platform.

Monitoring administrative data allows the identification of a set of indicators suitable to strategic planning. To fulfil this objective, a data warehouse has been created from administrative health data flows, whose Data Analysis Layer was specifically designed to provide tools for standardization, quality assessment and epidemiological analysis of data.

The creation of the data warehouse is the first step to implement many different actions such as:

- Identify poor adherence to therapy using a large population basis, thus providing the foundation to tailored interventions.
- Create early alert systems to prevent potential inappropriate drug utilization.
- Create an open health data platform in order to provide citizens with information about usage and consumption of health system resources.

Therefore the initiative can be a useful support to decision makers to optimize resource allocation as well as improve therapeutic care paths by the effects of a constant monitoring, promoting higher standards of care and the safe, effective and efficient use of medication.

The initiative targets the whole Campania Region population (about 6 million inhabitants).

### 2.1. Methodology, processes and target population

The methodology used for building the Data Warehouse used was organized into the following phases:

**Initiation:** evaluation of readiness of the potentially interested Stakeholders in Campania Region and assessment of scientific and economic opportunities deriving from the initiative

**Analysis:** Analysis and requirements determination

**Design:** translation of requirements specification documents into a complete design of Data Warehouse and Data Mart Models. This included both use of UML diagrams and documental specification of technical architecture. In this phase were also defined procedures for acquiring and importing data, modelled into an Extract-Transform-Load (ETL) Layer capable of acquiring raw textual data from data sources and refining them into their final usable format.

**Construction:** Loading Data and creation of a first set of presentation/analysis tools (Business Intelligence).

**Testing**

**Rollout:** Deploy in Production

**Iteration:** Make Incremental Changes for addressing new research projects, fixing runtime bugs, improving performances.

Regarding the Business Intelligence, it uses standard epidemiologic and statistical methods to extract indicators of interest. For specific focuses (e.g. COPD project) algorithmic representation of guidelines and care standards were also included to efficiently represent facts of interest.

Given the nature of the initiative, target populations were defined for single research projects. The maximum available extension for target population was of 6 million inhabitants (whole Campania Region resident population).

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

The main objective of the initiative is to enhance health care levels and promote optimal utilization of economic resources by creating an instrument for analysing health trends in Campania Region, specifically focusing on epidemiological, statistical and pharmaco-economical aspects. Other important objectives are promoting correct drug utilization, assessing of prescriptive appropriateness on territory, individuation of care patterns, performing pharmacovigilance monitoring activities.

### 2.3. Organisations involved

Health Care Authority of Campania Region through Regional Health Agency (ArSan), providing support by granting access to administrative data;

Federico II University Hospital R&D Unit providing technical support;



Department of Medicine and Surgery of Federico II University providing clinician support;

Department of Medicine of University Hospital Salerno providing clinician support.

## 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

The initiative's most innovative elements are:

- **Continuous updating and monitoring:** given the availability of regular updates of the data flows, it is possible to perform regular monitoring over time of most significant indicators of drug expenditure and utilization, providing useful information over years.
- **Supporting ad hoc reporting and inquiry:** the design of the data warehouse used for the initiative allows focus on specific targets (such as COPD, osteoporosis, diabetes). One of the key requirements given for the development was flexibility, in order to be capable to support every request from both stakeholders and citizens.
- **Modularity:** the design of the data warehouse allows to add multiple modules in order to achieve specific results such as:
  - Monitoring adherence
  - Providing interoperability with other non-clinical data sources
  - Profiling of single patients risk levels

### 3.2. Evidence on the impact and outcomes

The initiative is active since 2005. Over the years, it has achieved many important results:

- In 2007 a project focusing on COPD, named "Evaluation of Diagnostic and Therapeutic Appropriateness of COPD in Campania Region", was performed using the data warehouse provided by the initiative. The project consisted in gathering significant indicators of prescriptive appropriateness, in order to perform audits among General Practitioners. The effects of these audits were checked after six months by extracting again the same indicators. As a result of the project Regional Health authorities issued Regional Executive Decree n.78 of 07/27/2007. By means of that decree, a Diagnostic Therapeutic Path for the management of COPD patients was established involving Regional specialists, General Practitioners associations and Scientific Societies.

- In 2008, Local Health Unit Salerno2, asked for a high-detail level report for their population. Subsequently an Agreement Protocol was signed to extract and report periodically such information.
- Over the years many different Regional Decrees (55/2011, 56/2011, 14/2010, 44/2010) and Deliberations (1880, 1882, 1883) about correct drug prescription and cost containment were issued basing on the Regional Report yearly published as a part of the initiative.

### 3.3. Formal or informal evaluation

To ensure reliability of the initiative, periodic internal data quality evaluations have been performed over years. We plan to make additional efforts on this path by involving external personnel to evaluate data quality.

### 3.4. Success criteria used to determine that the initiative is working well

Due to the informative nature of the initiative, its most measurable success criterion is the number of projects/decisions involving Regional Health System stakeholders that have been influenced by the initiative or have taken in account its results.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

This good practice can be of interest for other regions, as constant monitoring of Health System resource utilization is a necessary step to make appropriate decisions, as well as an important tool to fully understand current health status of the population.

The main problem that it poses is to set up an IT structure capable of receiving and analyse data.

It is important to note that, the more significant the data flows are, the better the final results will be. So it is important to ensure that at least drug prescription and hospital admission records, as well as a good and



updated patient personal data are available. We also suggest that at least a time span of at least three years should be available in order to perform every analysis of interest.

## **5. FURTHER INFORMATION**

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### **Link to web pages:**

<http://www.cirff.it>

### **Contact person:**

Enrica Menditto ([enrica.menditto@unina.it](mailto:enrica.menditto@unina.it))



## 1. BACKGROUND INFORMATION

ORGANISATION NAME	Consejería de Sanidad y Política Social, Región de Murcia
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Regional public authorities
COUNTRY INVOLVED IN THE GOOD PRACTICE	Spain
REGION INVOLVED IN THE GOOD PRACTICE	Region of Murcia
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Region of Murcia
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	1.474.449
GOOD PRACTICE DIRECT TARGET GROUP SIZE	50.000
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Older people in general population, Informal caregivers, General practitioners, Nurses, Patient's groups, Formal caregivers, Older people receiving care/living at home, People in care homes
TYPE OF PARTNERS INVOLVED	Pharmacists, Nursing homes, SME & Large-sized industry, Research centres, Local public authorities, Advocacy organisations nurses, Informal caregivers, Academia, Advocacy organisations patients/users, Advocacy organisations physicians, Advocacy organisations patients/users
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Empowerment, Therapeutic patient education, Online services, Social network, Best-practices, Training, Evidence, Networking
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking



## 2. DESCRIPTION

### 2.1. Methodology, processes and target population

In order to test improvements in patient's adherence we are going to reach, mainly through primary health centres but also from patient groups and nursing homes, at least 50,000 persons aged 65+ from a geographical area (containing both urban & rural settings), whom have either at least a health risk factor or a chronic disease, with the aim to develop, implement and evaluate a local experience which includes:

- a set of educational activities essential for the management of chronic disease conditions that foster the autonomy of patients and their caregivers;
- ICT platforms that facilitate a two-way communication between patients/caregivers and health care providers;
- integration between hospital records, the primary care and social workers ensuring better delivery with safety and convenience for the patients/caregivers.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

We have established a strategy in which the own health care sector is reorganized to better integrate health and social care, facilitating the participation of citizens.

The cornerstone of the strategy is in multidisciplinary primary care teams committed to enhance the continuity and integration of care and facilitating adherence of patients to pharmacological and non-pharmacological treatments.

An example of this is the launching of a pilot connecting homes and health personnel at the primary health level through e-mail (*consultacorreio* in Spanish) which is being deployed.

For the needed integration, our goal is that ICTs companies in the Coalition develop innovative products that meet the needs of our population in the short/medium term that can be readily transferable to other environments.

Lastly but not least important, is to reach those persons who are more in need or at risk of limited literacy, according the UE Health Literacy Survey (8% of very vulnerable and 51% of vulnerable for Spain -with no data for lower regional or local entities- vs. 35% and 12% respectively for UE average) .

### 2.3. Organisations involved

- Consejería de Sanidad y Política Social, Regional public authority with complete responsibilities in Health and Social Services;
- City Council of Murcia Health & Social Services, Local public authority with limited responsibilities in Health and Social Services directed to the population of Murcia, main town in the Region of Murcia;
- University of Murcia, Department of Preventive Medicine & Public Health, and Applied Economy, with responsibilities in the development of focus groups and cost effectiveness analysis);
- Advocacy organizations of patient/users: role of consultancy, source of focus groups, test of micro interventions, etc.
- Technological SME and large industries: development of ICTs and AAL solutions tailored to our needs;
- Agrofood SME and large industries: development of new products for older population;
- Nursing home in private organizations: role of consultancy, source of focus groups, test of micro interventions.

### 2.4. Funding

Has the initiative already received some funding?

☐ YES ☒ NO

Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument

☐ YES ☒ NO

However, we are just in the mist to receive funding as partners in the INCA project, a full service "in the cloud" offering socio-sanitary integrated pragmatic eHealth services, which is now at the end of the UE negotiation process with the ICT leader from Spanish SME "IDI EIKON".

The project "INclusive INtroduction of INtegrated CARE" (IN3CA) is from the Competitiveness and Innovation framework Programme (Proposal number: 621006) and starting date November 2013.



### 3. INNOVATION, IMPACT AND OUTCOMES

#### 3.1. Key innovative elements of your good practice

Our innovative solutions are based on:

- a) improve health competencies of citizens on the basis of educational programs such as those based on therapeutic patient education delivered by health workers, family or groups of patients, that allow them all to be the center of decisions and actions taken in their home and their environment while they are compatible with those of the health professionals,
- b) integration of different media and social health information to provide care to senior citizens while strengthening patient security,
- c) development and application of ICT and proactive communication between citizens and providers of health and social care;
- d) transfer of sector innovations between diet and health researchers, experts in food technologies and the food industry for the development of nutrient-rich foods whose target is to prevent or delay ageing.

#### 3.2. Evidence on the impact and outcomes

From the literature all the strategies directed towards strengthen health literacy and patient's empowerment in order to achieve better adherence to health prescriptions are well supported by a recent (2013) WHO publication entitled *Health literacy: The solid facts*.

Integration of care for chronic diseases is well documented through the research lead by the US Kaiser Permanente toward risk stratification (<https://healthy.kaiserpermanente.org/>) and the new model of delivering care to chronic diseases from the McColl Institute:

[http://www.improvingchroniccare.org/index.php?p=The\\_MacColl\\_Center&s=93](http://www.improvingchroniccare.org/index.php?p=The_MacColl_Center&s=93).

For doing such integration ICTs is compulsory and extremely useful in the case of monitoring adherence to prescription. Tackling health inequalities in order to reach those who are more in need is other of the basic arguments in Public Health which applies to the improvement in adherence to prescriptions.

#### 3.3. Formal or informal evaluation

Not performed

#### 3.4. Success criteria used to determine that the initiative is working well

We will set up a battery of indicators which include:

- % agreement to participate;
- % withdrawals from the intervention rate;
- % adherence to health indications, pharmacological and no-pharmacological, at 6, 12, 18 and 24 months;
- % improvement in quality of life;
- % improvement in self-perceived health status;
- results from a cost-effectiveness analysis;
- acceptance of the intervention for stakeholders and partners.

### 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

All our intervention areas on adherence (services integration, patient's empowerment, ICTs solutions deployment) are devoted to main targets in health and social services within UE countries and overseas.

Previously, several regions and countries have tested and developed pilots from which we have built up and learned in preparing our commitment. Similarly, we hope to help other areas with similar problems like us, to learn from our demonstration project.

### 5. FURTHER INFORMATION

Link to web pages:

[http://www.carm.es/web/pagina?IDCONTENIDO=819&IDTIPO=140&RASTRO=c\\$m22660](http://www.carm.es/web/pagina?IDCONTENIDO=819&IDTIPO=140&RASTRO=c$m22660)

<http://www.murciasalud.es/principal.php>

Contact persons:

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- Gorka Sanchez Nanclares ([gorka.sanchez@carm.es](mailto:gorka.sanchez@carm.es)) Family MD, Dirección General de Asistencia Sanitaria, Servicio Murciano de Salud, C/ Central, 7 "Edificio HABITAMIA" 5ª planta; Espinardo (Murcia), E-30100 Spain, phone +34 -968- 288104.



**ADHIÉRETE: ASSESSMENT OF PHARMACEUTICAL CARE SERVICES ON ADHERENCE FOR ELDERLY CHRONIC AND POLYMEDICATED PATIENTS (MHEALTH AND PERSONALISED DOSAGE SYSTEMS)**

## 1. BACKGROUND INFORMATION

CONSORTIUM	ADHIÉRETE
ORGANISATION NAME	<b>Consejo General de Colegios Oficiales de Farmacéuticos de España</b> (General Council of Pharmacists Chambers of Spain)
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Community pharmacists
COUNTRY INVOLVED IN THE GOOD PRACTICE	Spain
REGION INVOLVED IN THE GOOD PRACTICE	Barcelona (Catalonia), Vizcaya (Basque Country), Cáceres and Badajoz (Extremadura)
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Extremadura: 41,634 km <sup>2</sup> ; Barcelona: 101.9 km <sup>2</sup> ; Vizcaya 2,217 km <sup>2</sup> . Representing 8.7% of total surface of Spain (505,992 km <sup>2</sup> )
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	Extremadura: 1.1 M; Barcelona: 5,6 M; Bizkaia 1.16 M, representing 16.6% of total population of Spain (47.27 M) People aged 65+ per province: Cáceres (83,518), Badajoz (122,563), Barcelona (970,677) and Bizkaia (239,290)
GOOD PRACTICE DIRECT TARGET GROUP SIZE	225 patients
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Older people in general population, General practitioners, Informal caregivers, Older people receiving care/living at home, People collecting prescriptions from pharmacies, Pharmacists
TYPE OF PARTNERS INVOLVED	Pharmacists, Research centres, Private companies, Large-sized industry
TOPICS/DISEASES ADDRESSED (KEYWORDS)	No specific disease will be addressed. This action will focus on chronic and acute conditions prevalent among older population
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input checked="" type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input checked="" type="checkbox"/> Service models <input checked="" type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input checked="" type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking



## 2. DESCRIPTION

**ADHIÉRETE** is a pharmaceutical care programme for improving adherence to treatment of patients >65 years old who are chronically ill and polymedicated. It will use professional expertise of pharmacists and innovative IT applications.

This is a programme under the RIFAC (Community Pharmacy Research Network) framework. The General Council of Pharmacists of Spain created this network in 2011 in order to promote community pharmacy led clinical research aimed at improving the quality of life of patients with the ultimate goal to bring more efficiency to the Health System.

The research protocol has been presented to the Spanish Agency on Medication and Healthcare Products (AEMPS) and to the Clinical Research Committee on Ethics (CEIC) of the Basque Country.

### 2.1. Methodology, processes and target population

#### Methodology

Research study on community intervention (pre-post), without a control group, prospective and multi-centred.

#### Sample

- 60 community pharmacies (20 voluntary pharmacies in each participating region: Catalonia, Extremadura and Basque Country).

- 225 patients (5 patients per pharmacy, over the age of 60, chronically ill, Polimedicated and non-adherent to their treatment).

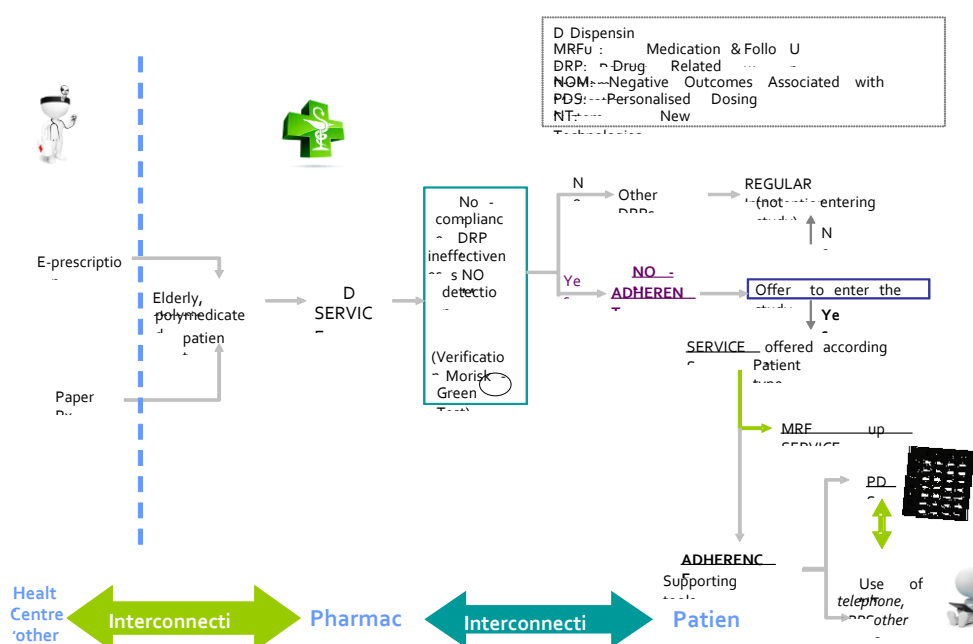
#### Duration

6 months.

#### Methodology

- Each pharmacist will sign the research commitment form.
- Five patients will be recruited frequenting each participating pharmacy, based on compliance with recruitment criteria. Out of the five patients included in the study, two will receive the Personalised Dosage Systems (PDS) service; two will receive telepharmacy services; and one patient will receive PDS combined with a remote alert system.
- Patients will visit the pharmacy at least six times.
- Data will be collected in an electronic Data Collection Notebook. Recorded information will be periodically reviewed by the study manager.
- Communication between pharmacists and physicians will be preferentially carried out via the electronic prescription system.

#### Processes





## Work Team

General Council of Pharmacists of Spain, Pharmacists Chambers of Barcelona, Vizcaya, Cáceres, and Badajoz, and participating pharmacies.

The General Council of Pharmacists Chambers of Spain is responsible for the direction of the program. The regional participating Pharmacists Chambers are in charge, along with the General Council, of the coordination, supervision of the program and dissemination of results.

## 2.2. Specific health/ICT/innovation and/or social/economic objectives

Main objective is therefore to improve adherence to medication in target population; other goals are:

- Increase patients' quality of life (QoL)
- Detect Drug Related Problems (DRP) 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 collaboration between doctors and pharmacists (collaborative practice).
- Improve the relationship between patient and pharmacist

- Assess the impact of electronic prescriptions on improving adherence, in terms of efficiency and effectiveness.
- 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 pharmacist led interventions to adherence

## 2.3. Organisations involved

- General Council of Pharmacists Chambers of Spain (leader of the Consortium), and Pharmacists Chambers of Barcelona, Vizcaya, Cáceres and Badajoz: coordination, supervision and dissemination.
- Pharmaceutical Group of the EU: advisory and supporting role
- Pharmaceutical manufacturer, Laboratorios ESTEVE SA.: sponsor.
- It also counts on the support of company Anota and Fundación Vodafone.
- Anota: development of Personalised Dosage Systems with remote warnings
- Vodafone Foundation (Fundación Vodafone): development of web based platform for medication management, monitoring and communication from patient home.

## 2.4. Funding

Has the initiative already received some funding?

☒ YES ☐ NO

Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument

☐ YES ☒ NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

Patient empowerment: improve the relationship between the patient and the pharmacist, and facilitate communication with the pharmacist from the patient home.

Development of new models of collaboration between health professionals: improve the level of interaction doctor-pharmacist

New Services focused on patient needs:

- Medication Review with Follow up, with a new focus on patient health outcomes rather than in the process

- Provision of pharmaceutical care services at the patient' homes through supporting ICT tools-telepharmacy

Innovative ICT Tools in Health:

- Electronic prescription, which improve quality of prescription and the level of interaction doctor-pharmacist. Also improve the monitoring of adherence as pharmacist can monitor if patient picks up the prescribed medicines.
- Web based platform will be also used to allow medication management and monitoring, sending notifications, reminders and ad hoc messages by the pharmacist. The application will allow the patient or caregiver, via a cell phone application to be alerted of any non-compliance with medication



adherence, registering such incidents, thus offering a greater control of adherence, and facilitate communication with the pharmacist from the patient home.

- Personalised dosage systems: every pharmacy will offer PDS devices, as well as an associated management and alert system (including use of QRs) specially adapted to the target population.

- Analysis of problem detection in relation to medications (PRM), prevention and evaluation of negative results associated with the medications (RNM).
- Assessment of the efficiency and effectiveness of the program, comparing degree of therapeutic compliance, number of problems related with the medications (PRM) and negative results associated with medications (RNM) detected, corrected and/or prevented, considering the situation prior and after the intervention.

### 3.2. Evidence on the impact and outcomes

This program builds on a **pilot study** conducted between 2009 and 2010 in pharmacies in **Azuaga** (Badajoz) that showed that after pharmacist intervention, through Medication Review with Follow up (MRFup), patient adherence improved from 41.2% to 70.6%<sup>23</sup>.

It also builds on the **program ConSIGUE** based on the Pharmaceutical Care service Medication Review with Follow up (MRFup). This program has just finalized its Phase II and preliminary results (final report to be launched in September) show:

- Reduction of 58% of patient health problems (from 26% of uncontrolled health problems at baseline to 11% at the end of it), meaning a greater control of health problems of the patient after pharmacist intervention.
- Number of emergency visits has been reduced by 30% (from 29.6% of people who visited emergency at baseline to 21% at the end)
- Reduction of the number of hospitalizations by 50% (from 18% of hospitalizations at baseline to 8.9% at the end of it).

The protocol of Research is being evaluated and validated by the regional CEIC (Committees of Ethics of clinical research). The CEICs are independent bodies, accredited by the Regional administrations and responsible for ensuring the protection of the rights, safety and well-being of the subjects involved in clinical research and projects. It offers public guarantee in this respect, by means of an opinion on the Protocol of the study, the suitability of the investigators and the adequacy of facilities as well as the methods and documents to be used to inform on the trial subjects in order to obtain their informed consent. As of beginning of October 2013 a positive reasoned opinion has been received from the CEIC of Euskadi. Then the protocol will be successively presented to the CEIC of Barcelona and to the CEIC of Badajoz.

In terms of the development study, there will be a research company performing an on-going evaluation of all the aspects involved (data collection, analysis, etc.). The pharmacists will also be supervised by the trainers provided by the General and provincial Pharmacists Councils. The General Council will coordinate and supervise all the teams involved.

### 3.3. Formal or informal evaluation

The variables to be measured under the program are the following:

- Descriptive analysis of the socio-demographic and clinical characteristics of the study population (age, gender, economic status, etc.) and their possible links with level of adherence to treatment.
- Assessment of therapeutic results obtained, prior and after the pharmacist intervention.
- Program impact study in terms of cost-benefit, considering the direct costs of setting up and implementing the program as well as costs associated with prescribed treatments and all healthcare resources used.

### 3.4. Success criteria used to determine that the initiative is working well

- Improvement in patient adherence
- Improvement in health outcomes
- Reduction in number of hospitalisations
- Reduction in number of emergency visits
- Improvement in patient QOL (Test Morisky-Green prior and after the intervention)
- Degree of satisfaction of patient: there will be a specific satisfaction questionnaire for participating patients.

Also all the information collected from the patients will be directly collected in electronic dossiers in order to avoid errors derived from manual transcription.

<sup>23</sup> CGCOF. Project. Pilot study on the Implementation of a Pharmaceutical Care Service for Dependent Patients. PAM. 2011;341:151-8.



#### 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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We believe this program is transferable to other regions. In terms of Pharmaceutical Care services, In UK and in other countries Medication Use Review is already well established, although we believe there is still room to focus more on the patient health outcomes, such as in the service we develop within this program, Medication Review with Follow up.

In terms of ICT supporting tools, these are transferable; for the electronic prescription services the necessary infrastructure has to be in place.

To scale up this program it is necessary to have a legal and technical framework that provides for the use and exchange of patient records across the health care services. In this regard, it is also important that when developing of the infrastructure, as for example in the electronic prescribing systems, bi-directionality of communication is in place, that is, e.g. community

pharmacies are allowed read and write access to the patient record to register the non-prescribed medication the patient is actually taking, as well as check medicines that patient is already taking. This is necessary in order to have a complete and integral view of the patient medication record and hence, to deliver a more efficient provision of health care.

It is also important to set up an adequate remuneration framework for the provision of these services.

#### 5. FURTHER INFORMATION

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**Link to web pages:**

<http://www.portalfarma.com/profesionales/investigacion/farmacia/adhierete/Paginas/Programa-Adhierete.aspx>

**Contact person:**

Sonia Ruiz ([sruizmo@redfarma.org](mailto:sruizmo@redfarma.org))



MY HYPERTENSION CARE

## 1. BACKGROUND INFORMATION

ORGANISATION NAME	Daiichi Sankyo Italy
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Medium-sized industry
COUNTRY INVOLVED IN THE GOOD PRACTICE	Italy
REGION INVOLVED IN THE GOOD PRACTICE	All Italian Regions
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	All Italian Country
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	60.72 M
GOOD PRACTICE DIRECT TARGET GROUP SIZE	18 M hypertensive patients
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Older people in general population, Patients visiting specialised physicians, Specialised physicians, Patients with a specific disease
TYPE OF PARTNERS INVOLVED	National public authorities
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Hypertension/Treatment Adherence/Healthy lifestyle adherence/ Patient empowerment
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input checked="" type="checkbox"/> Social networks
<input type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

The first phase of the **My Hypertension Care** project consist of a web based adherence programme ([www.it.myhypertensioncare.eu](http://www.it.myhypertensioncare.eu); [www.pressione-alta.it](http://www.pressione-alta.it)), sponsored by Daiichi Sankyo, and designed to assist physicians in the management of patients with hypertension.

The programme will help them to address issues surrounding non-adherence and medical plan, giving patients a better chance of reaching their blood pressure targets, and reducing their risk of cardiovascular events.

My Hypertension Care website contains:

- Patient-friendly information about hypertension and its management
- A fully interactive healthy lifestyle planner to help patients identify personal lifestyle goals and support them in achieving sustained lifestyle changes
- An innovative patient segmentation, allowing elements of the programme to be tailored to a patient's personality type in order to maximize individual impact
- A robust evaluation of programme outcomes against predefined objectives (assessed at baseline, 3 months and 6 months) to help measure the success of the programme and improving patient engagement and adherence.

The interactive healthy lifestyle planner is a key and innovative feature of the My Hypertension Care program.

The planner enables patients to track their blood pressure readings on a regular basis, as well as set their own realistic goals for initiating and maintaining healthy lifestyle changes. After selecting goals based on 7 healthy lifestyle choices (quit smoking, keep weight down, eat more fruit and vegetables, eat less salt, drink less alcohol, get more active, and overcome stress), the patient will be able to pick from a menu of activities in order to tailor their own plan in a way that matches their personal preferences.

On the My Hypertension Care website, patients will have the opportunity to complete a questionnaire to assess their motivations and attitude towards receiving treatment. Using a sophisticated, evidence-based algorithm, each patient's responses will be used to categorize them into one of five personality segments. Monthly newsletters and or text messages will be sent to the patient, containing information specifically tailored to their personality segment.

How does the program work?

- The physician identifies suitable patients
- The physician gives the patient a registration leaflet
- Patient registers on the My Hypertension Care website from their home computer (or any other available computer)
- Access to information and support on the My Hypertension Care website
- Patients complete a questionnaire, assessing their personal attitudes and preferences
- Tailored newsletters and or text messages (SMS) sent by the website
- Patients set personal lifestyle goals and creates a healthy lifestyle plan
- Patients monitor their own progress using the healthy lifestyle planner
- Patients can print a record of their progress to discuss with their physician
- Patients are required (not mandatory) to complete a follow up questionnaire after 3 and 6 months to evaluate their progress

### **My Hypertension Care Facebook Fan Page**

In September will be launched the second phase of the project consisting of a *My Hypertension Care Facebook fan page*.

Social media, especially Facebook, the most popular platform which has about 23 million users in Italy, more than 90% of internet users, can be a powerful tool of aggregation, involvement and content sharing, through the "word of mouth". These tools can contribute effectively to mobilize, engage, inform, provide support and empower patients in order to improve adherence to treatments and healthy lifestyles.

The Fan page contents will be focused on healthy lifestyle, hypertension, blood pressure targets achievement and adherence to treatment and medical plan.

Furthermore there would be external contents (video o texts) from media or from partner websites i.e. about healthy recipes and physical exercises.

Being in a social media platform, the active participation of patients, through comments and or post will be allowed and highly appreciated.



## 2.1. Methodology, processes and target population

The target patients would be 3.9 Million Italian Hypertensive Patients: age 45-64 years (FB users); active web users interested in:

- Being informed about the disease and related risks
- Sharing experiences and opinions, influence
- Talking to other patients
- Finding support
- Improving control of BP through the adoption of healthy lifestyles and adherence to treatments prescribed

## 2.2. Specific health/ICT/innovation and/or social/economic objectives

The objective of **My Hypertension Care** programme is making awareness about hypertension and its cardiovascular risks, to address issues surrounding non-adherence and medical plan, giving patients a better chance of reaching their blood pressure targets, and reducing their risk of cardiovascular events.

Patients will benefit from:

- Guidance on practical issues related to life with high blood pressure.
- A range of support and information designed to motivate patients, encourage them to stick with prescribed medication, and help them maintain healthy lifestyle changes
- An improved understanding of hypertension and commitment to their treatment and medical plan.

- A service of text message (SMS) and/or email messages to engage and support patients to achieve sustained lifestyle changes and adherence to the treatment prescribed by their physician.

The objectives of My Hypertension Care Facebook page are:

1. Make awareness about the program, driving patients to *My Hypertension Care* webpage
2. Improve awareness about hypertension and its risks
3. Improve awareness about the beneficial effects of a healthy lifestyle and reach blood pressure target
4. Create and support a community of people with hypertension:
  - Building a relationship
  - Listening to better understand patients' needs
  - Empowering and mobilizing the patients to take advantage of the most active word of mouth
  - Supporting patients to help each other
  - Getting suggestions of patients to develop new services

## 2.3. Organisations involved

AIFA-Italian Medicine Agency Consortium

## 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

**My Hypertension care** is a flexible and web based program. In **My Hypertension Care** program there is fully interactive healthy lifestyle planner to help patients identify personal lifestyle goals and support them in achieving sustained lifestyle changes. The planner enables patients to track their blood pressure readings on a regular basis, as well as set their own realistic goals for initiating and maintaining healthy lifestyle changes. After selecting goals based on 7 healthy lifestyle choices (quit smoking, keep weight down, eat more fruit and vegetables, eat less salt, drink less alcohol, get more active, and overcome stress), the

patient will be able to pick from a menu of activities in order to tailor their own plan in a way that matches their personal preferences. Patients furthermore can choose to receive monthly newsletters and or text messages containing information specifically tailored to their personality segment, in order to help them to achieve their personal goals.

The **My Hypertension Care** Facebook Fan Page is the first FB page dedicated to Hypertensive patients. FB can be a powerful tool of aggregation, involvement and content sharing, through the "word of mouth". These tools can contribute effectively to mobilize, engage, inform, provide support and empower patients in order



to improve adherence to treatments and healthy lifestyles.

### 3.2. Evidence on the impact and outcomes

Improve awareness about the importance of adherence to treatment and a healthy lifestyle. Increase the number of hypertensive patients who reach their blood pressure target.

### 3.3. Success criteria used to determine that the initiative is working well

The following criteria will be used in order to determine if the initiatives are working well:

#### Landing Page ([www.pressione-alta.it](http://www.pressione-alta.it))

- No. of Total Access
- No. of Unique visitors
- No. of Video Visualization
- No. of Registration page access

#### My HypertensionCare Program ([www.it.myhypertensioncare.eu](http://www.it.myhypertensioncare.eu))

- No. of Total registrations
- No. of Baseline survey completions
- No. of Personalize my plan survey completions
- 3/6 months follow up questionnaire

#### Facebook Fan Page

- **Fan Reach:** simply corresponds to the number of fans who have seen any given post.
- **Organic Reach:** corresponds with the number of people, fans and non-fans, who have seen a given post
- **Engagement:** is "the number of people who clicked anywhere in your post". This includes liking, commenting and sharing and people who've viewed your video or clicked on your links and photos. And it also includes people who've clicked

on a commenter's name, liked a comment, clicked on your Page name and even gave negative feedback by reporting your post.

- **People Talking About This:** This metric is part of the engagement metric. So the number of "people talking about" a post is included in the number of people who "engaged" with that post. The "people talking about this" metric only measures three types of actions: likes, comments or shares.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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The program could be a valuable service for physicians and nurses to be offered to patients as an integrated solution to the problem of adherence to treatment and to medical plans.

The improvement of adherence to treatments and medical plan in hypertensive patients would lead to a higher percentage of patients achieving the recommended blood pressure goal (140/90 mmHg) resulting in a reduction of cardiovascular risk and expenses relative to hospitalizations and diagnostic tests.

Critical success factors of the program are engagement and commitment of physicians and nurses in the enrolment of patients.

It would be advisable collaboration with hypertension centres with regard to the enrolment of patients and the creation of new content to be published in both the site and Facebook page.

## 5. FURTHER INFORMATION

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### Link to web pages:

[www.it.myhypertensioncare.eu](http://www.it.myhypertensioncare.eu);  
[www.pressione-alta.it](http://www.pressione-alta.it),

### Contact person:

Elena Mancini ([elena.mancini@daiichi-sankyo.it](mailto:elena.mancini@daiichi-sankyo.it)).



ACTIVE PATIENT PROGRAM

1. BACKGROUND INFORMATION

ORGANISATION NAME	Department of Health, Basque Country
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Hospitals, Research centres, Primary care centres, Nurses, General practitioners
COUNTRY INVOLVED IN THE GOOD PRACTICE	Spain
REGION INVOLVED IN THE GOOD PRACTICE	Basque Country
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Basque Country
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	2.1 M
GOOD PRACTICE DIRECT TARGET GROUP SIZE	Approximately 134,421 people (over age 35) have been diagnosed with DM type II in the Basque Country.
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Patients visiting general practitioners, General practitioners, Informal caregivers, Patients with a specific disease, Patients' groups, Nurses
TYPE OF PARTNERS INVOLVED	Hospitals, Research centres, Primary care centres, Nurses, Informal caregivers, General practitioners
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Chronic disease, Diabetes Mellitus type 2, Self-management, Education, Primary care
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input checked="" type="checkbox"/> Social networks
<input type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

The "Active Patient" Programme is a structured training programme on self-management, in which chronic patients are trained with the objective of improving their understanding of their condition and their skills to take better control of their health.

Eligible patients are being recruited in several ways: through advertisements in the local media; by sending letters addressed to patients diagnosed with DM2, identified through the primary care electronic database; and by direct invitation to participate made by their assigned health professionals.

### 2.1. Methodology, processes and target population

It consists of peer-to-peer structured training courses, given by other patients with the same condition or carers, in group sessions (8 to 15 people), on a weekly basis (2.5 hours per week), during 6 weeks. It is based on the "Expert Patient" methodology by the Stanford University.

The content of the sessions covers techniques for coping with problems in general, promotion of exercise, basic nutrition, appropriate use of medication, effective communication with family and health professionals and basic knowledge about diabetes and its complications. The sessions are supported with educational material in multimedia formats: books, brochures and CDs.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

Objective: 3,000 activated patients by end of year 2014. A pilot on 556 type 2 diabetic patients is being evaluated through a randomized controlled trial.

A clinical trial will be launched to validate the methodology on line and assess the effectiveness of the program Active Patient online.

### 2.3. Organisations involved

Osakidetza (Basque Public Health Provider), Nursing Schools, teaching unit of family and community medicine, pharmaceutical industry, private health sector.

### 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

Peer-to-peer structured training courses.

A gradual change of attitude in the patient-doctor relationship is happening, providing more independence to the patient and making the patient take more responsibility for their health care.

Incorporating social media as part of the treatment.

### 3.3. Formal or informal evaluation

Results of a before-after evaluation study (February-November 2011)

Objective: to evaluate the effectiveness of the "Spanish Diabetes Self-Management Program" in type 2 diabetes patients, in the context of the primary care network of the public Basque Health Service.

### 3.2. Evidence on the impact and outcomes

By July 2013, a total of 110 courses have been organized, 97 of them on the "Diabetes Self-Management Programme" and 13 on the "Chronic Disease Self-Management Programme". A total of 1349 patients (and carers) have been trained, 1204 on self-management of diabetes and 145 on self-management of chronic diseases. In addition, 20 people (health professionals and patients) have been qualified as master trainers (trainers of trainers) by Stanford and 106 have been qualified as leaders (trainers).

- Sample: 164 patients
- 46.7 % of participants were women. Average age of participants: 63.3 years.
- 79.5% of participants completed four or more training sessions, and 16% expressed their will to be trained as leaders.
- Most patients were recruited by health professionals.
- Significant differences before and after the intervention were found for: self-efficacy, systolic blood pressure, consumption of vegetables and fruit, and percentage of patients who carried out the physical activity they were advised to do.



- No significant improvement was found for HbA1c levels.
- No change in the number of prescribed drugs by patient was found.
- The number of visits to the medical practitioner and to the primary care nurse has reduced in one visit each in 6 months.
- High level of satisfaction by patients (4.5 /5) and trainers (4.42 /5).

Evaluation: Randomised controlled trial under way

The effectiveness of "Diabetes Self-Management Programme" (DSMP) is being evaluated through a randomised controlled trial that started in 2011. On a pilot of 556 patients diagnosed with type 2 diabetes, 18 to 79 years old and coming from 4 primary care areas of the Basque health system. These patients are randomly assigned to two groups: the intervention group (which follows the "Diabetes Self-Management Programme") and the control group.

### 3.4. Success criteria used to determine that the initiative is working well

The effectiveness of the programme will be measured after 6, 12 and 24 months of intervention on the metabolic control, cardiovascular risk reduction, quality of life and self-efficacy in adult patients with type 2 diabetes, compared with current standard care of patients with type 2 diabetes, in the context of the Primary Care network of the Basque Health Service.

Currently we are analysing statistically the results of 6 months, and these analysis are expected to be finished within two months.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

The transfer of this good practice to other organizations or regions is feasible and easy to do. For almost three years of existence of the project the various difficulties that have emerged have been addressed to adapt the program and reduce these difficulties. One of the main problems has been the resistance detected from the health professionals. This would be minimized with a good information campaign before the onset of the program.

Several Spanish regions have been contacted to help them implement this project in their respective places.

Besides, we have an agreement with Flowlab, the telemedicine company that that implements the Stanford methodology online exclusively.

## 5. FURTHER INFORMATION

### Links to web pages:

[www.pacienteactivo.com](http://www.pacienteactivo.com)

<http://bit.ly/1c1YaqU>

<http://youtu.be/rAaeoaF0bcc>

<http://youtu.be/Q1Qt5o3DjyM>

<http://www.biomedcentral.com/1471-2458/13/521>

### Contact person:

Estibaliz Gamboa

([estibaliz.gamboamorenos@osakidetza.net](mailto:estibaliz.gamboamorenos@osakidetza.net))



## 1. BACKGROUND INFORMATION

ORGANISATION NAME	Department of Health, Basque Country
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Regional public authorities
COUNTRY INVOLVED IN THE GOOD PRACTICE	Spain
REGION INVOLVED IN THE GOOD PRACTICE	Valencia, Cataluña, Madrid, Castilla-La Mancha, Andalucia and the Basque Country
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Valencia, Cataluña, Madrid, Castilla-La Mancha, Andalucia and the Basque Country
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	31 M
GOOD PRACTICE DIRECT TARGET GROUP SIZE	The epidemiological study has been conducted in 1100 patients. The practice has the potential to be used by all Spanish polymedicated and pluripathological patients aged over 65 with a Barthel index > 60
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Polymedicated and pluripathological patients aged over 65 with a Barthel index > 60
TYPE OF PARTNERS INVOLVED	Hospitals, Research centres, Primary care centres, Academia
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Adverse Event, pluripathology, polimedication, therapeutic compliance, virtual pillbox, medication errors
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input type="checkbox"/> Monitoring
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

In Spain, several studies have analysed the frequency of Adverse Events (AE) among the older population. Some key factors have been identified as promoters of AE such as age, pluripathology and poly-medication. For example, in Valencia, 41% of people older than 75 have experienced one or more AE; the most frequent causes in Primary Care for AE are diagnostic and prescription errors and communication problems between the doctor and the patient.

Spanish scientific literature establishes that about 10%-35% of Adverse Events among older adults must be considered Adverse Drug Events, which implies poor health quality and safety for patients. It is known that safety increases when the patient is involved in the care process, since the patient is also responsible for errors (action and/or omission errors) that can lead to an AE.

In this context, the research team aims at designing and validating an intervention strategy to reduce medication errors among pluripathological and polymedicated patients aged over 65. To do so, secondary objectives have been established.

On the one hand, there is a need to identify the most frequent error causes when managing drugs (patients themselves, caregivers or family members), so that safety practices can be established in order to avoid medication errors.

Furthermore, a virtual pillbox (VP) that helps managing medication has been designed and validated. This tool has been designed to run on mobile gadgets (JAVA, Windows Mobile and Android), using simple images and alerts to increase security when it comes to taking and maintaining medication; it also allows communication with caregivers to inform of patient non-compliance if necessary, with general practitioners and pharmacists.

Finally, as a consequence of the aforementioned objectives, autonomy and efficacy in medication self-management should be promoted among older patients.

### 2.1. Methodology, processes and target population

#### Design

The research project consists of two stages:

1. Epidemiological study combining qualitative and quantitative techniques to identify factors that determine medication errors in the target population
2. Experimental study: two groups (pre-test - post-test) to validate the efficacy and utility of the intervention (information and virtual pillbox versus

oral and written information) to reduce medication errors in the target population

#### Setting

Stage one has been developed in Primary Health Centres in Valencia, Cataluña, Madrid, Castilla-La Mancha, Andalucía and the Basque Country.

Patients for stage two have been recruited in Primary Health Centres from Valencia.

#### Subjects

Epidemiological study: The Qualitative technique (QLT) has involved 8 physicians and 8 nurses with at least 3 years of professional experience and 24 chronic polymedicated patients older than 65, living at home or with their families. The Quantitative technique has engaged 1076 randomly selected patients (same criteria as QLT) using stratified sampling considering sex (50%) and treatment including a minimum of 6 drugs.

Experimental study: 84 patients with a similar profile with Barthel Test >60 distributed among two groups: experimental and control.

#### Intervention

The control group has been informed about the type and frequency of patients' errors, risks and possible complications in a 40 minutes talk. The experimental group will receive the same information as the control group and will be provided with a virtual pillbox to help on safe use of medications, it must be used during three months at home. These patients were provided with continuous technical support to solve any doubts and/or problems that could happen during the experiment.

#### Measures

Frequency and type of medication errors, severity of the error and consequences, therapeutic adherence and risk perception of suffering an adverse event, patient satisfaction when using a virtual pillbox

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

The objectives in relation to health/ICT/innovation are to validate the efficacy and utility of a virtual pillbox, as well as to measure the satisfaction of the patients that use it

### 2.3. Organisations involved

- Miguel Hernandez University. Leader of the project, it has been involved in designing,



coordinating and asking for the funding of the project

- Health Authorities from Valencia, Cataluña, Madrid, Castilla-La Mancha, Andalucía and the Basque Country, that have been involved in recruiting the

- patients in Primary Care to take part in the research

- O+berri (Basque Institute for Healthcare Innovation) acts as the link between the leader and the primary Healthcare Units in the Basque Country, and actively promotes the spread of the project results

## 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

To date, there are some Apps in the mobile market that can help the patient to better manage the process of medication mainly through the use of alerts.

However, nowadays Information and Communication Technologies allow the design of more advanced gadgets that not only inform the patient about when to take the medication but also enables a dynamic relationship with different agents (general practitioner, that can be informed about the stock of medication; the caregiver can be notified when pills have not been taken, the pharmacist, etc.) and the possibility of including alerts for other activities such as physical exercise and so on.

### 3.2. Evidence on the impact and outcomes

Formal evaluation of the project has been carried out. The main results and outcomes are the following:

- 94.1% of patients in the experimental group say that it is easy to use the virtual pillbox (VP).
- In a satisfaction rating scale that goes from 0 to 10 points, patients give 8.5 points to the VP.
- In relation to self-perception of health status, while the starting point for both control and experimental group is the same, post-perception of health status is statistically higher in the experimental group.
- Patients belonging to the experimental group show a higher rate of therapeutic adherence during the use of the VP (pre: 49% vs. post: 69%,  $p=0.03$ ) and a lower average rate of errors (Pre: 2.3 vs. Post: 1.1,  $p=0.001$ ).
- In relation to the control group, there are no differences between pre and post behaviour in therapeutic adherence or in the rate of errors made (Pre: 66% vs. Post: 52%,  $p=0.351$ ; Pre: 1.5 vs. Post: 1.7,  $p=0.375$ ).

### 3.3. Formal or informal evaluation

Formal evaluation of the project has been carried out.

### 3.4. Success criteria used to determine that the initiative is working well

- Therapeutic adherence
- Patient Satisfaction when using the virtual pillbox
- Improvement of self-perception of health status

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

This research project shows that a virtual pillbox can help older, pluripathological and polymedicated patients increase their medication adherence and reduce the rate of errors they may have when it comes to medication management at home. Even though technology may act as a barrier for this targeted population, almost every patient recognises the easiness of the VP to be used.

Therefore, this tool can be transferred to any health system that aims at improving medication management. A virtual pillbox then can add value and compete with the existing medication management apps at an international level.

## 5. FURTHER INFORMATION

### Links to web pages:

<http://www.alphagalileo.org/ViewItem.aspx?ItemId=131997&CultureCode=en>

<http://dl.acm.org/citation.cfm?id=2491155>

### Contact person:

Nuria Toro ([toro@bioef.org](mailto:toro@bioef.org)), Senior Researcher at Basque Institute of Healthcare Innovation



**MEDICINES MANAGEMENT FOR OLDER CITIZENS**

**1. BACKGROUND INFORMATION**

<b>ORGANISATION NAME</b>	<b>Department of Health of Health Social Services and Public Safety</b>
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	National public authorities
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Northern Ireland
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	Northern Ireland
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	Regional
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	1.8 M
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	400,000
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	Older people in general population, Patients in hospitals, Older people receiving care/living at home, People collecting prescriptions from pharmacies, Patients with a specific disease, People in nursing homes
<b>TYPE OF PARTNERS INVOLVED</b>	Hospitals, Pharmacists, Nursing homes, National public authorities,
<b>TOPICS/DISEASES ADDRESSED</b> (KEYWORDS)	Long Term Conditions
<b>RELEVANCE TO A1 ACTION PLAN</b>	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input checked="" type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking



## 2. DESCRIPTION

Northern Ireland (NI) pharmacy initiatives involve integrated working between healthcare professionals, pharmacies, community and the voluntary sector and enable local solutions to local issues and bring about positive health changes.

Traditional barriers have been broken down and communication is enhanced with the older person ultimately benefitting. The initiatives include the greater utilization of community pharmacists to deliver an adherence programme to targeted patient groups, their families and carers in primary care.

Pharmacy redesign of secondary care services was conducted as a randomized controlled trial, during which patients over 65 years of age were randomized to receive an enhanced clinical pharmacy service (provided by pharmacists and technicians) or to receive normal care.

Engagement with the pharmaceutical industry has led to focused procurement approaches securing best value for money and achieving local economic progress.

The Pharmaceutical clinical effectiveness (PCE) programme, in place in Health and Social Care (HSC) since 2005 is the outcome of the application of pharmaceutical skills directed at providing a systematic approach to rational product selection and consistently applied across secondary and primary care, taking account of clinical need, evidential product clinical performance, product presentation, safety characteristics and economic factors.

The process is applied to medicines, wound care and medical/surgical disposable products. It employs a multidisciplinary collaborative approach to reach consensus on the most appropriate clinical products and achieves the ownership and behavioral change necessary to operationalize decisions.

Effectively it is the right medicine for the right patient at the right time and for the right cost. The Pharmaceutical Clinical Effectiveness programme comprises a number of initiatives synergistically designed to optimize the implementation of the product selection process through effective procurement, prescribing policy and guidelines and pharmaceutical service improvements.

These initiatives contribute to improved clinical and cost effectiveness by identifying those medicines suitable for first-line prescribing for older people. This multi-facetted medication adherence service supports the clinical management of Long Term Conditions (LTCs) and meets the recommendations of the new NI policy framework "Living with Long Term Conditions" by

identifying those medicines suitable for first-line prescribing for older people.

Collaboration is established with healthcare staff and organizations in NI. The initial IMM work was undertaken in one HSC Trust area. A key aspect of the programme was to ensure on-going monitoring of the outputs with regular communication to all stakeholders. Based on the positive results a spread strategy was devised based on quality improvement methodology. Standard operating procedures were developed for all aspects of the work which were disseminated to Trust sites across NI to ensure ease of implementation. An international conference was held in 2008 for more widespread dissemination with a follow up in 2013 attracting over 100 delegates on both occasions. This was complemented by attendance at other national and international conferences. International visitor programmes were established to experience the system first-hand. These included Ireland, Sweden, England, Norway, Netherlands and Denmark. Pharmacists and student pharmacists can spend up to 5 months in a visitor programme depending on the requirement.

### 2.1. Methodology, processes and target population

NI is implementing a multi-faceted medication adherence service. This service involves pharmacists and other health professionals, patients and caregivers using innovative risk-prediction software to identify patients who are at risk and/or non-adherent.

Agreed interventions are then undertaken by the most appropriate person (professional or carer) using agreed clinical protocols to educate and empower patients on appropriate use of their medication. Focused upon elderly patients receiving 4 or more medications, it is considered possible to both improve outcomes and save medicine costs per patient. This represents a series of initiatives to improve patient adherence with medication and reduce waste. It centers on greater utilization of community pharmacists to deliver an adherence programme to targeted patient groups, their families and caregivers in primary care. There is also a recent focus on integration and development of community pharmacy support for unidimensional interventions designed to improve adherence by:

- reducing the number of daily doses of medications;
- rationalising monitored dosage systems;
- deploying motivational strategies;
- improving therapeutic marker monitoring and feedback.



The initiatives outlined above comprise the PCE Programme endorsed by the Department of Health, Social Services and Public Safety (DHSS&PS) for application in HSC. DHSS&PS is developing a revised 'Strategy For Pharmacy Services in the Community' and a 'Northern Ireland Medicines Management Policy' to coincide with 'Transforming Your Care' (2012).

## 2.2. Specific health/ICT/innovation and/or social/economic objectives

Goal: To ensure that older people, in accordance with their clinical needs, have access to timely, safe, quality assured medicines with appropriate advice and support to help them gain the best outcomes from their treatment.

Objectives:

- To Improve medicines management arrangements for older people who are identified as having problems with their medicines;
- To empower and educate older people so that they are co-partners and co-producers of their care, health and well-being;
- To listen to and engage with older people to ensure that services and products respond to their needs;
- To assess patient's adherence need using a developed tool, to deliver service provision in support of a range solutions including technology based adherence aids;

- To prevent Health Care Acquired Infection's (HCAI's) and to improve the management of HCAIs when they occur;
- To disseminate new software that has been developed to enable medicines reconciliation to be carried out more quickly and efficiently with linkage to primary care;
- To disseminate the electronic clinical pharmacy intervention system (EPICS);
- To evaluate the impact of the standard operating procedures have been put in place for the processes with competence training for all staff;
- To roll-out a new model of outreach for nursing homes by a consultant prescribing pharmacist;
- To evaluate and disseminate evaluations from piloted intermediate care model;
- To evaluate the impact of a training package and competency assessment that has been introduced for health care support workers in respect of patients in their own homes

## 2.3. Organisations involved

Health and Social Care (HSC) Board, HSC Trusts, University of Ulster; commercial partnerships have been forged including Yarra Software Ltd, (Belfast) Digitalis Rx bv (Amsterdam), Digitalis Medicines Management (Dublin) and Iskus Health (Dublin).

## 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

Currently the NI focus on medicines management creates an ideal environment and location for innovation in the design, development and implementation of a multi-faceted strategic approach to improved prescription and adherence action regionally.

With regard to the current stage of the re-engineered medicines management system, initiatives have been spread effectively to cover some 50% of NI hospital beds. This has been enabled by the provision of funding by the DHSSPS on the basis of the very significant benefits to patients and optimisation of healthcare resource utilisation across the whole healthcare economy.

In addition to Ministerial support, critical to the success of these initiatives has been commitment from the key actors in the system namely general practitioners, community pharmacists, hospital pharmacists, hospital doctors and primary and secondary nurses.

Further, as the system has continued to be developed and enhanced, other stakeholders such as social workers and dieticians have become more involved bringing their skills to the process.

In relation to the innovative procurement process STEPSelect is used on a regional basis and includes a number of expert groups with appropriate membership from across the health service depending on the specific area being looked at.



STEPSelect was initially developed for use with medicines but has now been extended to dressings and work is progressing on medical and surgical devices. Key in this process has been the pharmaceutical industry which has helped refine the system. The initiative is supported at government and commissioning level as well as at local level as evidenced by its continued use and development. Numerous tools have been developed to improve the process and all of the procedures entailed including enabling technology such as bespoke lockers and software. These are available to allow spread to other regions.

Work is progressing with the NI Centre for Pharmacy Learning and Development, HSC Trusts and domiciliary care agencies to build on the established accredited educational programme and support medicines management training for domiciliary care workers. To date 211 pharmacists and technicians have undertaken an integrated medicines management training programme.

Training remains an integral part of all of this work and there is a wealth of experience in the region to enable and facilitate further spread and implementation in other regions - as can be seen in the success of the transfer of this work to other countries such as Sweden and Ireland in particular.

### 3.2. Evidence on the impact and outcomes

This Integrated Medicines Management Service (IMM) has strategically re-engineered clinical pharmacy services in Northern Ireland.

IMM demonstrated improvements in patient care and efficiencies. (Refs 1 Burnett et al *Amer.J Health Syst.Pharm* 2009 ;66 :854-9, 2, Scullin et al *J Eval Cli. Pract* 2007;13:781-8. 3 Bolas et al *Pharm World Sci*.2004 ; 26:114-120 4 Lynas et al *Pharm J* 2004 273; 294-5

### 3.3 Formal or informal evaluation

A key aspect of the programme was to ensure on-going monitoring of the outputs with regular communication to all stakeholders. Based on the positive results a spread strategy was devised based on quality improvement methodology.

Standard operating procedures were developed for all aspects of the work which were disseminated to Trust sites across NI to ensure ease of implementation.

An international conference was held in 2008 for more widespread dissemination with a follow up in 2013 attracting over 100 delegates on both occasions. This

was complemented by attendance at other national and international conferences. International visitor programmes were established to experience the system first-hand. These included Ireland, Sweden, England, Norway, Netherlands and Denmark.

Pharmacists and student pharmacists can spend up to 5 months in a visitor programme depending on the requirement.

### 3.4 Success criteria used to determine that the initiative is working well

A formal review of the IMM service was undertaken in 2012. The review found that the Integrated Medicines Management Service (IMM) has strategically re-engineered clinical pharmacy services in Health and Social Care Trusts (HSCT) in Northern Ireland.

The findings of this review confirm that there is a dedicated cohort of pharmacists and pharmacy technicians delivering the IMM service within the context of wider clinical pharmacy activities in all Trusts.

Findings show that the current funding associated with IMM supports the delivery of the service in an average of 5 in 10 suitable beds in all Trusts, between the hours of 8am to 6pm from Monday to Friday.

The service involves the input of pharmacists and pharmacy technicians at all stages during the patient stay with evidence of a higher number of interventions on admission compared to discharge.

In respect of integration with primary care there is routine contact with GPs but a less consistent approach to communications with community pharmacies.

## 4 TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

An Erasmus student exchange programme is now in place with Wroclaw (Poland). Recently an exchange programme has been established with Sittard in the Netherlands and a student placement link with Madrid and most recently with Amman Jordan. Thus there is extensive experience of dissemination, transfer to other regions as well as promotion and training programmes of various formats locally. A request has now been received for a 10 month placement to help implement in another region in Sweden.

A website was established with Dutch colleagues related to some of the work and it is intended to further enhance web-based communication and access to documentation. There is extensive work ensuring the transfer of knowledge from this initiative.



There is close collaboration with the School of Pharmacy, Queen's University Belfast and University of Ulster. Additionally there is a formal R&D link with Orbis Medisch Centrum, Sittard (Netherlands) and professional colleagues in Ireland, England, Netherlands and Sweden. A number of PhD Students have undergone training since the inception of the work together with post-doctoral fellows.

## 5 FURTHER INFORMATION

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### **Link to additional references:**

This Integrated Medicines Management Service (IMM) has strategically re-engineered clinical pharmacy services in Northern Ireland

IMM demonstrated improvements in patient care and efficiencies. (Refs 1 Burnett et al Amer.J Health Syst.Pharm 2009 ;66 :854-9, 2,Scullin et al J Eval Cli. Pract 2007;13:781-8. 3 Bolas et al Pharm World Sci.2004; 26:114-120 4 Lynas et al Pharm J 2004 273; 294-5.

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PROMOTING ADHERENCE IN CLINICAL PRACTICE

## 1. BACKGROUND INFORMATION

ORGANISATION NAME	Fondazione Salvatore Maugeri IRCCS, Italy
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Hospitals, Research centres, Day care centres, Home care centres,
COUNTRY INVOLVED IN THE GOOD PRACTICE	Italy
REGION INVOLVED IN THE GOOD PRACTICE	Lombardy, Piemonte, Campania, Puglia, and Sicily Regions
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Lombardy: Pavia, Montescano, Tradate Lumezzane, Castel Goffredo, Mede, Milano; Piemonte: Veruno, Torino; Campania: Telese; Puglia: Cassano delle Murge; Sicily: Mistretta, Sciacca.
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	About 25M
GOOD PRACTICE DIRECT TARGET GROUP SIZE	<ul style="list-style-type: none"> <li>▪ Disabled patients suffering from neurological, neurodegenerative, orthopedic, cardiologic/ respiratory and rare diseases</li> <li>▪ Disabled patients suffering from chronic diseases with dyspnoea, reduced exercise tolerance, muscle deconditioning or limitation of daily-life activities, in stable clinical conditions</li> <li>▪ Disabled patients suffering from acute exacerbation (i.e. requiring mechanical ventilation, antibiotics, oral/parenteral nutrition, or an increase of oxygen, drugs stabilisation)</li> <li>▪ Disabled patients needing palliative care</li> <li>▪ Aged and frail people</li> </ul>
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Older people in general population, Patients in hospitals, Formal caregivers, Older people using public infrastructure ( e.g.. transport, buildings, environments), Patients visiting specialised physicians, Informal caregivers, People in care homes, People collecting prescriptions from pharmacies, Patients with a specific disease, Patients' groups
TYPE OF PARTNERS INVOLVED	Hospitals, Research centres, Local public authorities, Primary care centres, Academia, Specialised physicians, Day care centres, Home care centres, Private companies, Regional public authorities
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Chronic diseases, disability, rehabilitation (in-hospital, at home), integrated care, telenursing, telemedicine, education, participation, holistic care, palliative care
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices

## Action Group on "Prescription and adherence to medical plans"



	<input checked="" type="checkbox"/> Service models
	<input checked="" type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence
	<input checked="" type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository
	<input type="checkbox"/> Networking

## 2. DESCRIPTION

FSM network involves several environments deserving internal needs (i.e. clinical units, gymnasium, and dedicated units alternative to Intensive Care Units) and external collaborations (GPs, home services, telemedicine).

FSM network for chronic patients' empowerment focuses on supporting the patients in such environments and takes into account the following elements:

- The patient is considered the main actor in care process, instead of the passive receiver of actions performed by caregivers
- In the development of interventions, information in a personal profile is utilized to choose right methods and tailor intervention content and delivery, so matching needs and interests of the single person
- After suitable strategies have been identified, they are tailored to personal motivators and resources in order to achieve personal relevance and maximize the impact of the care plan. Motivational aspects and possible non-compliance must be accounted for, instead of being considered just as undesirable deviations from the normal path
- Recommendations and guidelines (actions) is usually less strict and given with a direct mediation of a health professional

- Disabled patients needing palliative care
- Disabled patients suffering of neurological, neurodegenerative, orthopedical, cardiological, respiratory and rare diseases
- Aged and frail patients

To achieve the rehabilitative programme, an interactive process has been carried out with both patients and professionals, extracting their main needs, validating and refining the programme by design and phases of development.

Additionally, experts from different medical and clinical disciplines related to the patient target groups (i.e. psychological and behavioural sciences and healthcare planning), have been included as active part of the design team, to achieve a clinically innovative, but sustainable and manageable, program of patient's empowerment.

Disabled and chronic patients can be admitted to FSM network for a rehabilitative program as in-hospital patients or out-patients.

In both cases, the patients are submitted to a comprehensive rehabilitation programme consisting of:

- a. exercise training,
- b. educational support,
- c. verbal inputs stressing the need for adherence to therapy,
- d. a nutritional intervention and
- e. psychological counselling.

The rehabilitation program is completely tailored to suit needs of the individual and adapted according to guideline recommendations.

Thus the exercise programme is individualized and supervised by a physiotherapist (PT) and a doctor.

The programme usually consists of an average of five supervised daily sessions per week as follows:

- a. exercise training

### 2.1. Methodology, processes and target population

#### Direct target population:

- Disabled patients suffering from chronic diseases with dyspnoea, reduced exercise tolerance, muscle deconditioning or limitation of daily-life activities, in stable clinical conditions
- Disabled patients suffering from acute exacerbation (i.e. requiring mechanical ventilation, antibiotics, oral/parenteral nutrition, or an increase of oxygen, drugs stabilisation)



- b. respiratory muscle training,
- c. breathing exercise,
- d. postural exercises, and
- e. upper- and lower-body muscle strength training exercises.

In more severe respiratory patients, dedicated units have been developed in FSM network.

Dedicated units have the ability to provide all or at least most types of mechanical ventilatory supports and allow transfer of haemodynamically stable prolonged mechanical ventilation out of the Intensive Care Units (ICU) setting.

These units have been created as a cost-saving alternative to ICU and have produced promising results, with a significant cost reduction from 20 to 60%. In these units the rehabilitation program is based on a multidisciplinary team of doctors, nurses and physiotherapists, consisting in:

1. Stabilization of clinical status
2. Weaning from mechanical ventilation (MV)
3. Intensive nursing
4. Individualized and integrated rehabilitation

#### In-Hospital Educational/adherence programs

There is strong evidence that many patients with chronic diseases have difficulties to adhere to the medical regimens.

Poor adherence has been defined by WHO as a worldwide problem of striking magnitude; in developed countries adherence in patients affected by chronic diseases averages 50%, in developing countries the rate is even higher.

The WHO defined adherence as "...the extent to which a person's behaviour - taking medication, following a diet, and/or executing lifestyle changes - corresponds with the agreed recommendations from a provider", enlightening the importance of adhering not only to medications but also to life style modifications through an active involvement of the patient favoured by a good communication with the health professionals. Improving adherence would have a more beneficial impact on health outcomes compared to improving specific treatments.

One of the most shared beliefs among clinicians is that it is best to promote adherence than to treat non adherence.

As to promoting adherence, several variables negatively affecting patients' motivation to adhere have

been identified. Some of them are not modifiable (i.e. age, economic difficulties, social isolation), but many are modifiable, and imply psychological aspects to be taken into account by the multidisciplinary team.

Adherence is a process, not a state. By considering adherence a dynamic and not a static entity we could legitimate non adherent behaviours as a free (although dysfunctional) expression of autonomy: some patients decide not to follow therapeutical prescription in order to find a better and sustainable subjective balance between perceived quality of life and illness management.

Therefore, every adherent patient may become non adherent through his lifetime chronic condition, and vice versa. This does not necessarily imply that every patient should be tightly monitored by retrospectively analysing her/his adherence behaviour, but that every patient should be proactively screened with an eye on the future.

According to literature, adherence may have antecedents in interconnected psychosocial and cognitive variables, such as sex, age, family support, illness acceptance, expectations, illness knowledge, and habits. All these variables could be screened in order to identify the risk of non-adherence.

In our experience, the screening method for risk/presence of non-adherence is performed by a psychologist in synergy with all the members of the multidisciplinary team, since everyone can provide a contribution stemming from her/his own professional expertise.

All data are collected on a purposely prepared schedule allowing identifying patients requiring a tailored intervention on selected aspects of disease management.

All inpatients of the Cardiological Rehabilitation Department, within the first week of admission, are screened by a physician/nurse and a psychologist together. A Psycho-Cardiological Schedule (PCS) may be compiled (see Appendix A) on the basis of clinical data, medical records and observation of patient's behaviour during hospitalization.

The PCS is constituted of four parts; the first three assess specific aspects related to disease management:

1. patient's characteristics, such as age, marital status, current occupation, lives alone yes/no;
2. clinical data (i.e. disease and aetiology, medical history, risk factors, height, weight) and eventual notes from physician/nurse/physiotherapist;
3. social problems, history of psychological disorders, manifestations of psychological distress, disease



knowledge, suspected cognitive deficits, reported/observed adherence, symptoms minimizing.

In the latter, physician/nurse and psychologist define the necessity for a psychological intervention, on the basis of pre-defined screening criteria: age (< 50), absence of or problematic support provided by family/friends, smoking habit, presence of psychological disorder or/and distress, inappropriate disease knowledge, suspected cognitive deficits, scarce adherence.

If considered necessary, adherence is further assessed by self-report tools specifically aimed at assessing the cognitive antecedents of non-adherence and the self-reported behaviours related to disease management at home: ASiHD-R: Adherence Schedule in Heart Disease-Revised or ASiHF-R: Adherence Schedule in Heart Failure-Revised<sup>24</sup> ; or ASiT-A Adherence Schedule in Transplantation-Adults<sup>25</sup>.

The items are purposely made in order to assess, on a five point Likert scale ranging from "not at all" to "very much", all aspects of adherence, from pharmacological (i.e. *Do you ever forget to take your medicines?*, *Do you ever change the time you take your medicines?*) to behavioural (i.e. *When you are at home, do you manage to follow the diet you have been suggested?*, *When you are at home do you measure some clinical factors as the doctors have asked you to do?*)

After a deeper psychological/neuropsychological assessment if necessary, the psychological intervention consists in individual counselling and or brief psychotherapy sessions as a part of a circular network of interacting competences.

The expected outcome should be seen therefore as the product not only of the specific psychological intervention, but of the whole complex system. The continuous dialogue among the network agents allows a constant feedback and readaptation of the interventions to be applied.

The formal outcome evaluation consists of quantitative objective data such as clinical parameters, number of rehospitalisation, morbidity and mortality adjusted for variables other than those connected to adherence.

The informal outcome evaluation may stem from qualitative data such as patients' self-report (i.e. interview, adherence schedules ASiHD, ASiHF and ASiT), caregivers' feedback, nurse/physicians' reports.

General educational program for chronic patients consist of 6 areas of intervention delivered in "common spaces".

The interventions include different sessions on:

1. knowledge about chronic diseases multidisciplinary management,
2. appropriate exercise for maintaining and improving strength, flexibility, and endurance
3. appropriate exercise and education to prevent falls,
4. appropriate use of medications,
5. nutrition, and
6. treatments.

A particular attention is done to techniques to deal with problems such as frustration, fatigue, pain and isolation, communicating effectively with family, friends, and health professionals, and decision making, in particular by psychologists.

Sessions on specific matter are conducted by different members of the educational team from the single Units, in a group setting (up to 30 people), and in a dedicated room, by the use of educational materials (slides and brochure).

Educational program is conducted by physicians, nurses, physical therapist, pharmacists and dieticians using power point presentations de visu and on tablets, leaflets.

Every Unit organizes its educational time on management of specific disease problems (i.e. in the respiratory unit: pathophysiology, lifestyles, nutrition, medications, rehabilitation, oxygen therapy, bronchoaspiration, tracheostomy tube management, respiratory problems, use of cough assist machine, oxygen saturation measurement, ventilator use).

Every patient is registered and has to attend different lessons. To evaluate improvement in education, an evaluation tool (usually a questionnaire) is proposed at the beginning and at the end of the program.

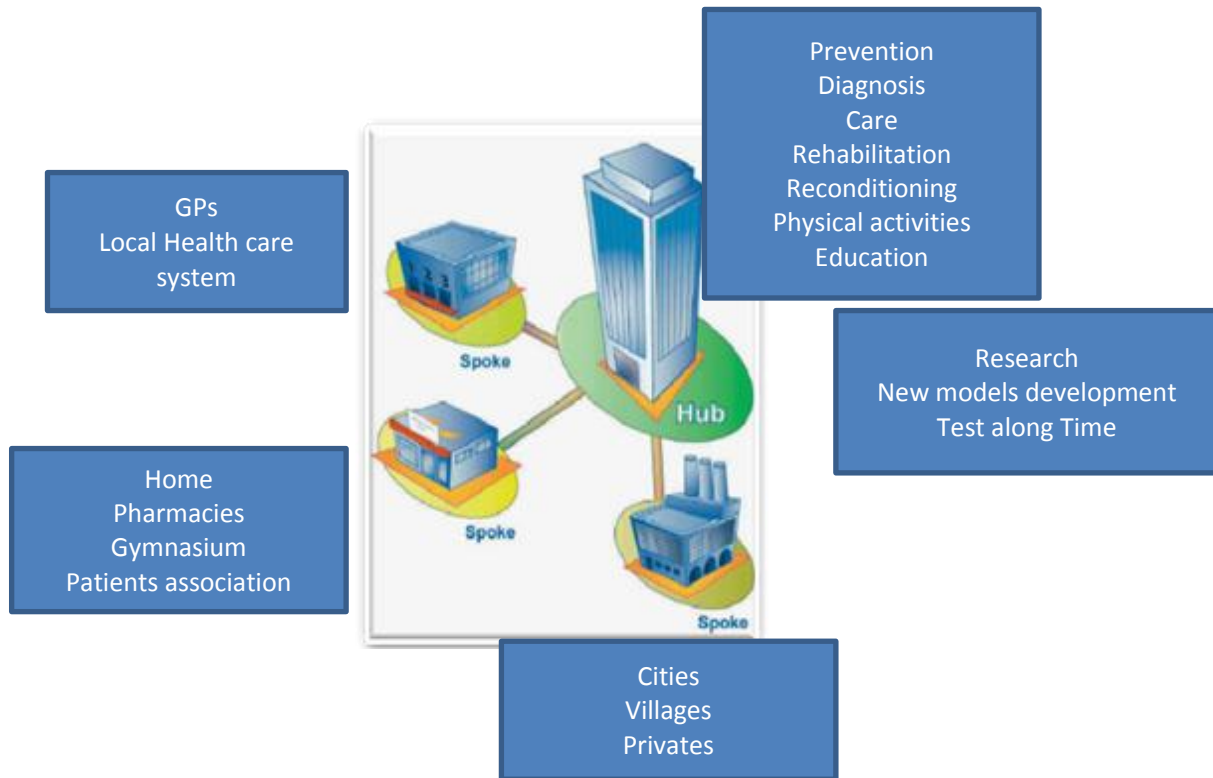
#### From Hospital to home

Continuity of care is based on an integrated network of services; the network includes hospitals for acute admissions, intermediary structures, hospitals for rehabilitation and long-stay hospitals, homecare and primary care services that would work with real dialogue, communication and integration.

<sup>24</sup> Majani G., Pierobon A, Giardini A, Callegari S. Valutare e favorire l'aderenza alle prescrizioni in riabilitazione cardiologica e pneumologica. Pavia: Pime Editrice, 2007

<sup>25</sup> Giardini A, Pierobon A, Majani G, Biffa G, Volpe B, Sala A, Gangeri L, Aurelio MT, Ferri F, Colombo EM, Fontana L, Trabucco G, Travaglini C, Zoncheddu P, Nobili R, Bellapi S, Masolo LS, Sacchi AM. Adherence self-report assessment in solid-organ pre and post-transplant recipients. G Ital Med Lav Ergon. 2011;33(1 Suppl A):A69-76

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Nowadays, many modes of continuity of care are possible and operative. Different programs made on specific and local situations or on specific diseases with different levels of severity will be a winning card in their approach to the person with chronic diseases.

Whatever the model of continuity of care, patients' departure from health environments must be organized according to an accurate plan founded on preparation, education and training.

Continuity of care is promoted, for patients and caregivers, by the FSM network as outpatient visits, home visits and homecare program by the use of telemedicine.

### Home care service

Home visits are requested from the Home health care system to our Hospital. The requests were then given to respiratory specialists. The visits were for no urgent respiratory problems which the general practitioner (GP) could not manage and that have to be done within 3 days.

The candidates for home visits were strictly proposed by GP or by home care staff of the health care system (HCS) according to the following criteria: quadriplegic patients, severe bedridden patients with difficulties to perform an outpatient visit, presence at home of frail instrumentation as invasive mechanical ventilation, nutritional pumps and suction devices not easily available on ambulance or in an outpatient clinic.

The physician drives to the location at the allocated time; during the visit different therapeutic decision or intervention could be performed:

1. Tracheotomy tube substitution
2. O<sub>2</sub> prescription modification
3. O<sub>2</sub> prescription suspension
4. Drug therapy modification
5. Prescription of night oxygen saturation monitoring
6. Mechanical ventilation resetting
7. Adaptation to home non-invasive mechanical ventilation
8. Prescription of new equipment and devices for MV
9. Prescription of hospital admission for rehabilitation
10. Prescription of home respiratory rehabilitation course.

### Education other than patient

- **To give value to caregiver's assistance:** the caregiver has become one of the main actors of the assistance, guaranteeing continuity of care as one node of a network of other actors. The caregiver is an active non-medical member inside or outside the patient's family who is directly involved in basic and/or advanced care of a disabled or of a person affected by a specific disease. The main caregivers' activities are conducted at home. In order to provide assistance to patient with impaired daily life activities,



caregiver spends an enormous amount of time and energies and usually is not included in economic analysis. Thus, the caregiver becomes a real subject of care. To educate and train family and caregivers mean to make possible a therapeutic and organizational alliance in order to prevent new hospital admissions of the relatives. FSM network sustain this matter by means of face to face lessons and educational programs

- **Continuous educational program to GPs:** it has been reported that physicians working in primary care continue to be unaware of guidelines as well as of other information related to management of specific diseases. This suggests the need of reviewing medical education with appropriate training and continuing education programs. FSM proposes an educational program for GPs developed by specialists (i.e. pulmonologist).

The educational program is organized on 3 major points:

1. face to face lectures on disease knowledge and treatment: GPs attended two series of learning sessions lasting 3 hours, performed by respiratory specialists from FSM. These sessions focused on International guidelines
2. skills implementation strategy: GPs visited our Hospital and attended the pathophysiology laboratory for a couple of hours to implement their knowledge, utility and modality of the spirometry test.
3. second medical opinion: respiratory specialists offered to GPs (by telephone) their clinical consultation when needed.

## 2.2. Specific health/ICT/innovation and/or social/economic objectives

New models of supporting homecare programs after discharge has been implemented: patients are included in early hospital or emergency room (ER) discharge with follow up by physiotherapists (PT) through frequent telephone contacts, home visits or telemedicine (TM) when patient's condition or ability to manage the care makes it necessary.

In details a teleassistance (TA) service is used to monitor patients and caregivers after hospital discharge or after an outpatient visit in an in-site dedicated office.

The TA program is proposed for 6, 12 months, or until death according to diagnosis. TA service belongs to a

multidisciplinary respiratory rehabilitation unit, which supports and admits patients from respiratory and neurological units.

An educated and dedicated health team (doctors, nurses and PT) is involved in e-health management. A nurse tutor, available from 8:30 AM until 4:00 PM weekdays, had the key role in the service, connecting all the hospital and home personnel by telephone.

The objective is to update clinical data by a weekly scheduled call and solve all problems whenever presented by patients or caregivers at home (unscheduled calls).

During follow-up, the nurse tutor used clinical interviews to monitor the worsening of the disease.

At the end of telephone consultation, the nurse tutor decided whether an additional call was needed for further consultations, or contact with general practitioner (GP) or specialist (i.e. pulmonologist, cardiologist, neurologist).

## 2.3. Organisations involved

Regional Health Care System of Lombardy, Piemonte, Campania, Puglia, and Sicilia Regions.

Public and private health providers are the 38 hospitals with whom we are conducting NRS (Nuove Reti Sanitarie); all the hospitals are accredited by Lombardy Region (Regional administration) and followed in their work by ASL (Local administration); Lombardy Region and ASL, periodically, organize meeting to discuss the rules, to check the data collected, to check the quality of the programme etc.

All the 38 hospitals work by a private telemedicine service centre (SME), being in our case Health Telematic network srl ([www.e-htn.it](http://www.e-htn.it)).

Health Telematic Network (HTN), Telemedicine Services, started as a Ltd. Company in December 1998 based on the scientific research project called Boario Home Care and it became a joint-stock Company in May 2001 with the entry of the investment capital of Hopa, Interbanca, and Archimede.

The structure of the Company (104 people) is based on: the management, a strategic development department, a professional consultancy department, a technical informatics department, a call center.



## 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

All FSM services are proposed as a part of an integrated puzzle matching different needs and practical possibilities to sustain a continuum of care.

Reduction in the occurrence of hospitalizations or other acute healthcare services, reduction in mortality rate, improvement in the sickness impact-profile scores and patient's satisfaction are reported in our in-hospital or tele rehabilitative programs.

Moreover, the possibility of maintaining frail people at home allows respect for their rhythms of life and habits in familiar surroundings, full of significance in their life.

The most important approach for a good continuity of care is technically called case management.

Case management is the ability to activate all necessary resources to face various needs of a single patient.

An unsolved problem, particularly for the physicians, is to try to work applying shared guidelines.

The available guidelines are often centred on the hospital management and for this reason they are often unrelated to continuity of care between hospital and community.

FSM network has proposed "Simultaneous care" as possible answer. It starts from prevention and leads to the learning of suitable lifestyles up to integrated care at the end of life.

Continuity of care programs may be an opportunity for health organizations to elaborate new strategic policy and clinical reorganization. Continuity of care starts from a suitable multidimensional evaluation where the different professionals appraise programs and proper settings, which seek out that section of the population with a greater risk of frailty.

Therefore, this continuity founds itself on two poles: the first directed by general practitioners (GPs), local districts, integrated home care services and the second one based on the hospital with the possibility of admission or specialist's treatment through outpatient services.

Since 2004, FSM network has adopted Information and Communication Technology (ICT) to improve quality of life and satisfaction with health care. Patient

involvement is crucial and it is still not clear if the benefits are perceived as such by the patients themselves. ICT helps to proceed to an early detection of chronic conditions, early intervention based on professional coaching and self-management, to enable self-management (e.g. personal health records) and a use of a management tool that integrates all aspects of an individual patient's health care, including medical, social and emotional issues.

Through efficient ICT network, adequate medical care has been ensured to chronic patients at home; through the best application and use of available resources can guarantee standardized and efficacious health services. We have developed a small-scale validation of personalized services and care programmes, which engages patients as well as their relatives, as active members of the care team, enhances collaboration among carers and promotes seamless continuity of care across different care settings.

Patients suffering from multiple chronic conditions can benefit from integrated care approaches (i.e. integration between primary, secondary, home and self-care).

In particular by the use of ICT systems, chronic patient can be provided of:

- 1.a personal health record, which comprises the personal characteristics of an individual (e.g. personal profile, preconditions, risk factors, unhealthy behaviours, preferences, physical activity, sleep, mental status, diseases etc.);
- 2.advanced sensors to acquire data on lifestyle aspects (behaviour and surrounding environment, early detection of deterioration, including data acquired by sensors and individual self-assessment);
- 3.wearable, portable, mobile or web-based systems for monitoring of patient status and activity, therapy compliance or treatment at the point of need;
- 4.auto-adaptive and self-calibrating systems that take into account the acquisition of physiological data in non-clinically controlled environments;
- 5.decision support systems for professionals and patients, as well as patient guidance services, which build on multimodal data fusion (involving e.g. physiological, environmental, emotional and genetic data), data and pattern analysis, and



modelling and predictive algorithms of patient health status;

6. stratification of patients to care programmes and personalisation of such programmes to specific characteristics of patients.

### 3.2. Evidence on the impact and outcomes

#### In-hospital education

We have demonstrated that in patients discharged from ICU, irrespective of diagnosis, multidisciplinary in-hospital rehabilitation improves autonomy and reduces disability and nursing needs, these indices being inter-related<sup>26</sup>. Mortality and weaning are related to clinical and disability status and their respective improvements over time. Different diagnoses show different rates of weaning success.

Another study<sup>27</sup> has demonstrated, in a large cohort of disabled people, that a formal program of education performed in-hospital to chronic patients is highly feasible and effective in improving patient knowledge in managing the disease being patients most likely to benefit from education are those with high adherence, low comorbidities, and lower level of knowledge about the disease and its related problems.

#### Teleassistance

Several studies have been performed to care patients or caregivers at home by telemedicine in terms of programs, use of devices, self-management and education. Scalvini et al.<sup>28</sup> demonstrated that patients at low to medium risk for early mortality following cardiac surgery can be followed up and rehabilitated at home (JTT 2010) with effective and comparable results to the standard in-hospital rehabilitative approach indicating that rehabilitation following cardiac surgery can be implemented effectively at home when co-administered with an integrated telemedicine service.

Vitacca et al.<sup>29</sup> demonstrated that in patients with severe chronic disease, clinical information derived by

self-administration of a dedicated Tele-assistance card, is not inferior to the same phone nurse interview.

We have also demonstrated that home visits performed by a physician to bedridden patients with chronic diseases determine high satisfaction to patients, allow money saving to caregivers and are predominantly made up to change tracheotomy tube without adverse events<sup>30</sup>.

Scalvini et al.<sup>31</sup> showed that a home blood pressure telemonitoring programme is effective in improving blood pressure control and related medical and economic outcomes in hypertensive patients with metabolic syndrome. It will also provide a comprehensive understanding of the psychological determinants of medication adherence and blood pressure control of these patients<sup>32</sup>.

A home multidisciplinary programme for primary cardiovascular disease prevention is simple, efficacious, and very well accepted by the patients, with the majority of patients showing reduction in cardiovascular risk scores.

Evaluation of adherence to GOLD guidelines of 12 GPs from rural areas of Northern Italy and changes after an educational program on COPD management was performed by Bertella et al.<sup>33</sup> showing that adherence to COPD Guidelines is suboptimal and data collection is poor.

The EP did not change significantly GPs' practice:

- i. COPD diagnosis is largely clinical,
- ii. usage of spirometry is poor, GPs prescribe more chest X-rays
- iii. a small proportion of patients receive respiratory therapy,
- iv. therapy is often incorrect or not related to FEV1,

<sup>26</sup> Vitacca M, Nava S. Incomplete network for survivors of catastrophic illness after release from ICUs. *Respir Care* 2013; 58 (2):383-385.

<sup>27</sup> Paneroni M, Clini E, Crisafulli E, Guffanti E, Fumagalli A, Bernasconi A, Cabiaglia A, Nicolini A, Brogi S, Ambrosino N, Peroni R, Bianchi L, Vitacca M. Feasibility and effectiveness of an educational programme in Italian COPD patients undergoing rehabilitation. *Respir Care* 2013; 58(2):327-333.

<sup>28</sup> Scalvini S, Zanelli E, Comini L, Dalla Tomba M, Troise G, Febo O, Giordano A. Home-Based Versus In-Hospital Cardiac Rehabilitation After Cardiac Surgery: A Nonrandomized Controlled Study. *Phys Ther*. 2013;93(8):1073-83.

<sup>29</sup> Vitacca M, Scalvini S et al. Tele-assistance respiratory card: feasibility of self-reporting in patients with severe COPD. *Telemed J E Health*. 2013;19(2):99-103

<sup>30</sup> Barbano L, Bertella E, Vitacca M. Episodic medical home intervention in severe bedridden chronic respiratory failure patients: a 4 years retrospective study. *Monaldi Arch Chest Dis*. 2009;71(3):113-8.

<sup>31</sup> Parati G, Omboni S, Compare A, Grossi E, Callus E, Venco A, Destro M et al. Blood pressure control and treatment adherence in hypertensive patients with metabolic syndrome: protocol of a randomized controlled study based on home blood pressure telemonitoring vs. conventional management and assessment of psychological determinants of adherence (TELEBPMET Study). *Trials* 2013. doi:10.1186/1745-6215-14-22.

<sup>32</sup> Bernocchi P, Scalvini S 6-Month Programme on Lifestyle Changes in Primary Cardiovascular Prevention: a Telemedicine Pilot Study *Eur J Cardiovascular Prevent Rehabil* 2011;18(3):481-487.

<sup>33</sup> Bertella E, Zadra A, Vitacca M. COPD management in primary care: does an educational plan for GPs improve it? *Multidiscip Respir Med*. 2013;8(1):24.



- v. correct clinical practice is influenced by the number of COPD patients and number of dedicated visits.

A poor relationship between the recommendations of the GOLD international guidelines and current clinical practice, and that exacerbations may play a role in over-prescription have been shown in the study by Corrado et al. <sup>34</sup>

The SUMMA Project: A Feasibility Study on Telemedicine in Selected Italian Areas was designed to evaluate the feasibility of a joint telemedicine service application across general practitioners and clinical specialists in Italy. The SUMMA Project demonstrated for the first time clinically the effectiveness of second-opinion consultation by general practitioners and therefore fulfilling the actual needs in areas usually managed by the National Health System.

The TELEMACO study<sup>35</sup> provides home-based telemanagement services for patients with chronic heart failure and chronic obstructive pulmonary disease (COPD), as well as second-opinion teleconsultations in cardiology, dermatology, diabetology, and pulmonology for general practitioners.

Scalvini e Muiesan<sup>36</sup> evaluate the feasibility of a second-opinion consultation in supporting general practitioners (GPs) during the daily diagnosis and therapeutic management of patients with essential hypertension showing that Telemedicine applied to hypertensive patients at high risk of cardiovascular problems offers to GPs an easy-to-use tool to control blood pressure by improving connection with second-opinion specialist consultations.

### 3.3. Formal or informal evaluation

Formal or informal evaluations have not been performed

### 3.4. Success criteria used to determine that the initiative is working well

Outcome measures: health care utilization, hospitalization, dyspnoea, exercise capacity, HRQoL, functional status, disability scores, drug adherence, customer satisfaction questionnaires.

<sup>34</sup> Corrado A, Rossi A. AIPO group How far is real life from COPD therapy guidelines? An Italian observational study. *Respiratory Medicine* 2012; 106(7):989-997.

<sup>35</sup> Bernocchi P, Scalvini S et al. Healthcare continuity from hospital to territory in Lombardy: TELEMACO Project. *Am J Manag Care*. 2012;18(3):e101-8.

<sup>36</sup> Scalvini S, Muiesan ML. Telemedicine: the role of cardiologic second opinion for GPs in the care of hypertensive patients *Blood Press*. 2011;20(3):158-65

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

The proposed model could be easily transferred to other institutions due to its flexibility in the screening process and its adaptability according to the available resources, provided that a psychologist is part of the team.

The model's core is the psychological conceptualization of non-adherence where the focus is not on the present to be blamed behaviours, but on the early detection of barriers/facilitators in prescriptions' management in hospital and at home.

Two challenges rise from this approach:

1. Adherence is a complex process and it needs to be read not in a static and/or dichotomous framework.
2. To prevent adherence is as important as to intervene when non adherence is already performed by patients.

We believe that FSM good practice on integrated care for chronicity with the help of ICT can be easily transferred to others Hospitals, regions and organisations realizing systemic solutions compensating age-related physical and cognitive impairments leading to a significant prolongation of functional capacity, delay in institutionalization, increased autonomy and participation in society. All kinds of actions in health care (i.e., patient registration, medical consultations, medical diagnosis, therapy, drug prescriptions, etc.) are nowadays supported by ICT.

Our Hospital model together with the ICT application will allow to share information regarding the patient, the case history, the requirement of unnecessary and repeated tests, the increase in unfavourable effect risks, incompatible prescriptions, and, sometimes, contradictory recommendations.

Within this context, our model and ICT will improve the uncoordinated and fragmented manner in which health services are nowadays provided, thus allowing, by means of tools and electronic integrated services, a Better health care: more rapid and precise diagnosis, less medical errors and unnecessary tests, optimization of waiting time to receive care and access to test results, and the reduction of administrative expenses.

## Action Group on "Prescription and adherence to medical plans"



Participative care and ICT increase patient responsibility for their own health improve the mobility of citizens with chronic diseases (personal health record on the web), reduce hospital visits and medical consultations; chronic patients are much more involved in and understand their care plan.

### 5. FURTHER INFORMATION

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#### Links to web pages:

[www.fsm.it](http://www.fsm.it)

#### Contact person:

Anna Giardini ([anna.giardini@fsm.it](mailto:anna.giardini@fsm.it))



INTEGRATED PHARMACEUTICAL COMPLIANCE PROGRAMMES

1. BACKGROUND INFORMATION

CONSORTIUM	GIRP (European Association of Pharmaceutical Full-line Wholesalers)
ORGANISATION NAME	MEDIQ
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Pharmacists, Informal caregivers, Private companies, Other (Pharmaceutical Full-line Wholesalers)
COUNTRY INVOLVED IN THE GOOD PRACTICE	The Netherlands
REGION INVOLVED IN THE GOOD PRACTICE	The Netherlands
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Full geographical coverage of the country
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	16,8 M inhabitants in The Netherlands
GOOD PRACTICE DIRECT TARGET GROUP SIZE	2,5 M clients in pharmacies
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Older people in general population, Informal caregivers, People collecting prescriptions from pharmacies, Pharmacists, Patients with a specific disease,
TYPE OF PARTNERS INVOLVED	Pharmacists, Research centres, Primary care centres, Academia , Advocacy organisations patients/users, General practitioners,
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Asthma/COPD, Diabetes, Cardiovascular conditions, multi-morbidity in the ageing population, polypharmacy
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input checked="" type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input checked="" type="checkbox"/> Service models <input checked="" type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking



## 2. DESCRIPTION

Mediq Pharmacies introduced a new healthcare program: Integrated Pharmaceutical Healthcare (IPH), which is a partnership between pharmacist, prescriber and patient.

In 2012 our IPH Programme has been started in 100 Mediq pharmacies. Starting from January 2013 all Mediq pharmacies and some partner pharmacies have been involved, with a total of 245 pharmacies.

### 2.1. Methodology, processes and target population

The program consists of three different parts

1. Coach: increases efficacy therapies (compliance)
2. Review: prevents incorrect use
3. Advisor: lower the costs of medication

The objective of the program consists of two parts:

1. Reduce the incidence of medication related hospital admissions and improve the quality of life of the chronic patients and elderly people who use preventive medication.
2. The program will also reduce the medication costs by helping prescribers to act more cost-effective

In 2013 an independent Scientific Council IPH has been installed, under the chairmanship of a professor of GP's and with the involvement of 5 universities.

Key in this program is the cooperation between the pharmacists, prescriber and ultimately the patient.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

To lower costs, increasing efficacy of therapies and preventing incorrect use of medication.

General practitioners and pharmacists together evaluate the medication of their patients and discuss whether the current treatment is in line with the most recent guidelines and scientific insights.

Another element is patient adherence. It's the first time a pharmaceutical program provides - fully automated and at a glance - insight into whether the prescription of pharmaceuticals should be adjusted. Better use of pharmaceuticals reduces the chance of complications and prevents unnecessary hospital admissions.

This healthcare program of Mediq takes pharmaceutical care to the next level and it goes much further than just supplying pharmaceuticals. Together with the general practitioner involved, we improve the use of pharmaceuticals by our patients, in which regard Mediq focuses on the outcome of care. The quality of the service in the Mediq Pharmacy is improving while at the same time we are reducing unnecessary healthcare expenditures in pharmacies and hospitals.

### 2.3. Organisations involved

All health care insurers in the Netherlands. Big four: Achmea, CZ, Menzis & VGZ.

### 2.4. Funding

Has the initiative already received some funding?	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

Our programmes provide fully automated and at a glance insight into whether the prescription of pharmaceuticals should be adjusted.

The close collaboration among healthcare providers and the use of a centralised database provides a better use of medicines, increases compliance to medical treatment, reduces the chance of complications and prevents unnecessary hospital admissions saving costs.

### 3.2. Evidence on the impact and outcomes

For 105.000 patients there was a change of their medication use; for 46.000 patients their risk on hospital admission has been reduced.

### 3.3. Formal or informal evaluation

Between Q2 2012 till Q2 2013 in total 2,6 million patients have been assessed in our IPH Programme.



#### 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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Mediq IPH programme will be evaluated after 3 years by an independent scientific organisation (NIVEL) with the purpose of transferring this model to national scale. The major success criteria are the involvement of the payer (healthcare insurer) right from the start and the independent scientific evaluation on outcome variables.

#### 5. FURTHER INFORMATION

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**Link to web pages:**

[www.mediq.com](http://www.mediq.com) Annual Report 2012; pages 14, 33

**Contact person:**

H.P. Bert Kuipers LLM MSc ([bert.kuipers@mediq.com](mailto:bert.kuipers@mediq.com)),  
Corporate Director Public Affairs; T +31 (0)30 282 14 52



INTEGRATED PHARMACEUTICAL COMPLIANCE PROGRAMMES

1. BACKGROUND INFORMATION

CONSORTIUM	GIRP (European Association of Pharmaceutical Full-line Wholesalers)
ORGANISATION NAME	Brocacef
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Pharmacists, Informal caregivers, Private companies, Other (Pharmaceutical Full-line Wholesalers)
COUNTRY INVOLVED IN THE GOOD PRACTICE	The Netherlands
REGION INVOLVED IN THE GOOD PRACTICE	The Netherlands
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	The Netherlands
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	16,8 M inhabitants in The Netherlands
GOOD PRACTICE DIRECT TARGET GROUP SIZE	1.000 patients >65 per pharmacy. Approximately 200 BENU pharmacies
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Older people in general population, People collecting prescriptions from pharmacies, Pharmacists, Patients visiting specialised physicians
TYPE OF PARTNERS INVOLVED	Pharmacists, Micro-sized industry, Small-sized industry, Medium-sized industry, General practitioners, Large-sized industry,
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Asthma/COPD, Diabetes, Polypharmacy, elderly people
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input checked="" type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input checked="" type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking



## 2. DESCRIPTION

Pan-European Company Phoenix Group launched through its Dutch wholesaling company Brocacef and pharmacy chain BENU an array of compliance programmes. From Asthma/COPD compliance programmes and polypharmacy medication review, to diabetes hypo check and change of human insulin to analog insulin programmes and malnutrition theme through compliance of drinking power, Brocacef strives to increase patient compliance to medication and reduce healthcare costs through innovative measures.

### 2.1. Methodology, processes and target population

The general methodology for all programmes run is that Brocacef makes a selection of patients from the BENU database according to each programme's criteria (for e.g. for Asthma/COPD compliance programme patients using inhalation medication and those who are identified as less compliant<sup>37</sup> are chosen; for diabetes patients using oral diabetic medicines and patients with side effects (hypoglycaemia) of the oral diabetic medicines are invited to join the programme).

The pharmacist identifies the patients with a compliance issue and consults the general practitioner in case there is a need to do a change in treatment if necessary. The pharmacist invites the patient for a consult and suggests an intervention, e.g. to change all medication to one type of device to improve the compliance. A few months after the intervention takes place we report the compliance again and monitor the effect of the interventions with our selections in the BENU database. Also we monitor secondary outcome as less costly exacerbations.

#### Direct target population

The population included in these programmes varies from one programme to the other. Over 180 BENU pharmacies are participating in these programmes and about 1000 patients over 65 per pharmacy have access to these services.

For example:

<sup>37</sup> Compliance is measured by dividing the amount being dispensed by the amount that should have been taking by the prescription. E.g. Compliance ratio is measured by taking the prescribed dosage is for instance 2 times a day. This means on a yearly base  $365 \times 2 = 730$  dosages should have been dispensed in 1 year to be 100% compliant. We calculate the actually dispensed medicine in one year. For instance 10 packages à 60 doses = 600 doses. The compliance ratio calculated =  $(600 / 730) \times 100\% = 82\%$

- The approximate number of patients included in the asthma/COPD programme is approximately 30.000 between 2012 and 2013.
- The diabetes hypo check programmes includes over 3.500 patients and the diabetes change of human insulin to analog insulin programme more than 6.000 patients.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

Among the main drivers for these programmes are: lowering costs, increasing efficacy of therapies and preventing incorrect use of medication.

Our programmes focus on creating and building a good relationship among patients, prescribers, hospitals, pharmacists, wholesalers and other healthcare providers.

### 2.3. Organisations involved

Pharmaceutical industry (GSK, NOVO Nordisk, Astra Zeneca, Nutricia), Dutch health insurance companies.

### 2.4. Funding

Has the initiative already received some funding?	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO



### 3. INNOVATION, IMPACT AND OUTCOMES

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#### 3.1. Key innovative elements of your good practice

Our programmes provide fully automated and at a glance insight into whether the prescription of pharmaceuticals should be adjusted.

The close collaboration among healthcare providers and the use of a centralised database provides a better use of medicines, increases compliance to medical treatment, reduces the chance of complications and prevents unnecessary hospital admissions saving costs.

#### 3.2. Evidence on the impact and outcomes

The level of compliance in the Asthma/COPD> Compliance\* program increased by approximately 16% (intermediate result) in the period 2012 – 2013.

#### 3.3. Formal or informal evaluation

None

#### 3.4. Success criteria used to determine that the initiative is working well

- Pharmacy, pharmaceutical industry or health insurance willing to pay

- Good relationship with prescribers / hospitals / other healthcare providers is vital!!! It is always a multidisciplinary effort. And perhaps: do not forget the relationship to the patient...when no consent / awareness / understanding...there is no result from the intervention!!! [concordance model].

### 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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Phoenix Group is considering implementing similar programmes in other countries where we are active.

### 5. FURTHER INFORMATION

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#### Link to web pages:

<https://www.benuapotheek.nl/>

#### Contact person:

Maria Merkx ([mmerkx@benuapotheek.nl](mailto:mmerkx@benuapotheek.nl)), BENU Apotheek, Straatweg 2, 3604 BB Maarssen

Postbus 75, 3600 AB Maarssen, phone: +31-30-245 07 12.



**FARMAD: EFFECTIVE MONITORING OF OLD AND CHRONIC PATIENT ADHERENCE THROUGH COMMUNITY PHARMACY**

**1. BACKGROUND INFORMATION**

<b>CONSORTIUM</b>	GIRP (European Association of Pharmaceutical Full-line Wholesalers)	
<b>ORGANISATION NAME</b>	<b>COFARES</b>	
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Pharmacists, Informal caregivers, Private companies, Other (Pharmaceutical Full-line Wholesalers)	
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Spain	
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	Madrid	
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	Madrid metropolitan area	
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	6.488.347	
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	300	
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	150 patients	
<b>TYPE OF PARTNERS INVOLVED</b>	Hospitals, Pharmacists, Advocacy organisations others, Academia, Medium-sized industry, General practitioners, Private companies	
<b>TOPICS/DISEASES ADDRESSED</b> (KEYWORDS)	Monitoring of chronic aged patients adherence, Diabetes mellitus, Hypertension ,COPD, Parkinson, Dementia	
<b>RELEVANCE TO A1 ACTION PLAN</b>		
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring	
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input type="checkbox"/> Social networks	
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input checked="" type="checkbox"/> Service models <input checked="" type="checkbox"/> Training	
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input type="checkbox"/> Guidelines	
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking	



## 2. DESCRIPTION

Observational, prospective with control group, randomized, multicentre study.

- Timing 2013-2014, 2015-2016.
- Doctors recruit elderly outpatients from HM University Madrid Hospital, and patients select the pharmacy from their health area. The patients are recruited among those with the most prevalent chronic diseases: respiratory (COPD), endocrine (DM), cardiovascular (hypertension, heart failure), neurological (dementia).

Thanks to the Action Plans of the European Innovation Partnership on Active and Healthy Ageing (EIP AHA), we can see the importance of the role of the pharmacy with elderly patients.

Community pharmacies are health facilities, which make the network more accessible to health and to perform tracking processes necessary for each patient. With a better level of communication pharmacist-physician a decrease in medical interventions is obtained, promoting only necessary interventions if events occur or circumstances so warrant.

### 2.1. Methodology, processes and target population

#### Methodology

Observational, prospective with control group, randomized, multicenter study

To compare in chronic patient subjects of the study vs. controls

- Adherence to treatment
- Quality of life
- Evolution of chronic disease
- Healthcare costs

Community pharmacies situated in the vicinity of the hospital are contacted in order to set up meetings to inform them about the project FARMAD.

The project is created with the aim of providing (through the collaboration between two private health agents) to chronic and older patients, necessary, feasible and continual collaboration solutions. Pharmacies involved will sign a commitment to the project. To increase motivation of the research: meetings of practitioners and pharmacists participants will be convened quarterly, to discuss and share concerns.

Patients will be included in the study, in the Hospital where the practitioner will explain the study and request their participation by signing an informed consent.

In this Hospital patient randomization will be done (control group, intervention group) and the patients of the intervention group will be presented the pharmacies where can be tracked the effectiveness and safety of treatment and all the necessary information on the treatment and disease to achieve better adherence to treatment.

Adherence to treatment will be determined by questionnaires, administered by the Technical Committee, from the pharmacy and from the Hospital. The selected record will be the same and it is determined that revisions will be made in the pharmacy or in the hospital and with this method we avoid bias in the results. Technicians seek maximum efficiency with minimum registration of possible items.

FARMAD is developed in two steps:

First Part: Jun 2013-Oct 2014, pilot Project with 300 patients, target more than 150 older than 65 years old; inclusion period is one month (October), conducting on-going assessments after 3 months (February), after 6 months (May), after 9 months (August) and a final evaluation after 12 months.

This calendar follows the steps of the project and presents a rigorous important development, which will require sending and analysing data and records. The end of the first 12 months is considered the first part of the project and at the end of it, if the outcome is satisfactory, the project will be extended beyond.

Second part: from 2015-2016 services introduction in more pharmacies in Madrid with a wider target population over 65 years and new target 2016: old Poly medicated patients. Statistics says that from that 50% older than 65 years old, 34,2% are polymedicated with 5 drugs (SEFAC) .

For this Second part, we have the help of COFARES GROUP and IFC training to create special tools and services for the pharmacy in a more massive way, considering that we have our own computer company for pharmacies. Our aim is provide a place in the pharmacy for old people, in this area the pharmacy is going to give full services adapted for old people and their pathologies.

#### Target Population

Patients non dependents, who have given informed consent in medical therapy for some of the most prevalent chronic diseases:

- Chronic Respiratory: COPD, chronic bronchitis, emphysema, asthma
- Cardiovascular: hypertension, heart failure



- Endocrine: diabetes mellitus
- Neurological: dementia, Alzheimer's disease, Parkinson, stroke.

Pilot Project with 300 patients, target population 150 patients older than 65 (June 2013-October 2014); next steps will be expanding the project over Madrid Region.

#### Estimation of sample size and composition

300 patients we chosen for the pilot project, all of them belonging to HM University Hospital outpatient Madrid, Plaza de Conde de Valle Suchil, and living in the same urban area. There is a target of 150 patients over 65 years old in this group. Our population is getting older, and today chronic persons in their fifties will be tomorrow included in this group over 65 too. Next phase the target population older than 65 years will be increased extended the study in Madrid Region.

#### Timing

**First Part:** Pilot Project from 2013 until October 2014: we will have the first results of this pilot with 300 patients, 150 over 65 years old.

The IFC have started the 2013 with training for pharmacies, with the collaboration of Navarra University: "Nuestra MAYOR Atención" and gives sanitary credits and merit to pharmacist: Expertise en Envejecimiento y Farmacoterapia by Navarra University.

**Second part:** from January until December: more pharmacies and patients over 65 years to join the Group; development of practical tools and training for pharmacies (COFARES and IFC).

From January until December 2016: more pharmacies and patients. Bigger population to target on over 65 and polymedicated

## **2.2. Specific health/ICT/innovation and/or social/economic objectives**

The study will analyse the adherence to treatment, quality of life, evolution of chronic diseases of elderly patients and healthcare costs. Respiratory, cardiovascular, endocrine and neurological are the most prevalent chronic diseases.

#### Innovation

- A new relationship: patient, medical doctor and pharmacist.

- The patient would have a professional nearby who will advise and help to meet therapeutic recommendations, drug, diets or health habits.
- Assess the improvement of the patient's quality of life.
- Develop an integrated group to combine medical advice with personalized pharmacist advice.
- Implement pharmaceutical care services to improve adherence to treatment
- IT new tools to promote information exchange between doctors and pharmacists
- Pharmacological data bases.
- Pharmacist training with older people, therapies, orthopaedic helps, medical devices, and any tool that could be used to wide services: home services, including IT techniques.
- The pharmacist works as an educator training patients and /or caregivers to deal with medication, medical devices and to obtain healthier habits.
- With a better level of communication between pharmacists and physicians a decrease in medical interventions is obtained, promoting only necessary interventions if events occur.
- The identification of individual problems in adhering to medical plans and medication, both in community and in hospital settings.

#### Economic

The greater involvement of Community Pharmacies in monitoring chronic old patients get a better grip and improves the course of the disease, its complications and reduce healthcare costs.

#### Objectives

- Main objective: to improve adherence to treatment of chronic and elderly patients.
- Detect possible undesirable effects of medication and ineffectiveness.
- Detect different adherence rates at different ages: <65 years old and >65 years old.
- Improve teamwork and the patient-physician-pharmacist communication.
- Help doctor to monitor the disease evolution.
- Assessing the quality of life
- Reducing healthcare costs.
- Develop of practical tools and training for pharmacies (COFARES and IFC)

One of the main objectives is to establish a good communication between doctor and pharmacist, which



will allow improving information sharing and knowledge of the patient's status.

Healthcare costs are estimated based on the costs of treatment, health care, income, according to HM scales hospitals.

To monitor drug therapies, a computer application will be used by physician and pharmacist, which will allow crossing all drug information and asses all the information necessary for the patient.

The Technical Commission will create records for the development of this procedure; both in pharmacies and hospital, these records must be created with the philosophy of continuity of service, thus useful and rigorous, should be computerized records, initially for use in printable paper.

The Data Protection Act compliance records will be sent by the participants following the procedure and with the name of the people who do the work of analysis and evaluation of them. Computer analysts chosen for this task must know beforehand the records and assess them any shortcomings or improvements.

#### Expected Results

The greater involvement of Community Pharmacies in monitoring chronic old patients get a better grip and improves the course of the disease, its complications and reduce healthcare costs.

### **2.3. Organisations involved**

#### COFARES

COFARES is the Spanish leader full-line wholesaler, a cooperative with more than 9.800 pharmacies associated all over Spain.

Since it was founded in 1944, it has acted as a driving force for the sector, helping to enhance the Spanish Health System.

Our Pharmaceutical Distribution network supplies all authorized medicines in Spain and takes resources from profitable operations to 'subsidize' unprofitable ones (cheap medicines, medicines with low sales turnover, or rural pharmacies): it is a supportive distribution model which ensures equal access to medicines for all patients. Its mission is to help its members in the management of their pharmacies and to act as a guarantor for the Spanish pharmaceutical model.

#### Instituto Formacion Cofares (IFC)

COFARES Training Institute for pharmacists:

- Classroom activities

- Platform for online training
- subsidized and accredited training

In collaboration with IESE, the UIMP, Faculty of Pharmacy, Navarra University, scientific societies, hospitals, foundations, pharmaceutical companies and public institutions.

#### Hospital Madrid (HM)

HM Hospitals is a private hospital group created in 1988 by Dr. Juan Abarca Campal to rehabilitate and put back into operation the old Hospital San Pedro in Madrid, as a way to put into practice his ideas regarding Spanish health and the practice of its professionals.

Based on a Decalogue and on the Hippocratic Oath, managed by doctors and with the aim of offering a top quality health service, the different centers that form HM Hospitals are equipped with state-of-the-art technology and the best qualified and most humane medical staff.

All the centers that form HM Hospitals operate in an integrated manner. To this end, there is a corporate structure with centralized services as well as different comprehensive management IT tools. This allows a complementary and synergic action of structures, services and equipment ensuring maximal use of the technological and human resources.

HM Hospitals is currently formed by six private hospitals:

- HM UNIVERSITARIO MADRID
- HM UNIVERSITARIO MONTEPRÍNCIPE
- HM UNIVERSITARIO TORRELODONES
- HM UNIVERSITARIO SANCHINARRO
- CENTRO INTEGRAL ONCOLÓGICO CLARA CAMPAL (CIOCC)
- HM NUEVO BELÉN

HM Hospitals has always strived to integrate its healthcare activity with teaching and research as formulas to encourage motivation for professionals and attain a high quality and excellent healthcare, where the application of the scientific progresses within the clinical practice is conducted immediately (Translational Medicine).

#### Sociedad Española de Farmacia Comunitaria (SEFAC)

SEFAC is an association of scientific-professional, independent, non-profit, state-wide and composed of university degree holders of Bachelor, Graduate, Master and Doctor of Pharmacy who are active in



community pharmacy or interested to collaborate with her.

SEFAC serves the scientific and professional development of community pharmacy and their professionals. It is the only scientific and professional society established in Spain by and for pharmacists practicing in community pharmacy, and its main mission is to lead a change of orientation to the provision of professional services to the patient taking medicaments.

SEFAC is a scientific reference partner with government and other health professions, and has aspirations of always maintaining close collaboration with schools, universities, business, industry and distribution.

[Colegio Oficial de Farmaceuticos de Madrid](#) (COFM)

The Pharmacists Association of Madrid, as public body with legal personality and full capacity to carry out its purposes, was established as mandatory professional association, according to the Royal Decree of October 23, 1916. COFM is the grouping of all pharmacy graduates who have its sole or principal place of business in Madrid territory. COFM is aware that the quality provided to pharmacists, will come in the near future, subject, in addition to technical and health regulations by developments experiencing other factors, including: pharmacist own needs, and scientific knowledge.

## 2.4. Funding

Has the initiative already received some funding?	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

With a better level of communication: between pharmacists and physicians a decrease in medical interventions is obtained, promoting only necessary interventions if events occur.

- Assess the improvement of the patient's quality of life. Links to dentists, and other health givers.
- Develop an integrated group to combine medical advice with personalized pharmacist advice.
- IT tools to promote information exchange between doctors and pharmacists.
- Implement new pharmaceutical care services to improve adherence to treatment.
- Develop special course and training for pharmacist in geriatric area.

### 3.2. Evidence on the impact and outcomes

- Through questionnaires Increase in quality of life, decrease in medical interventions and better adherence over 65 years old. Both doctors and pharmacist will do revisions together.
- The identification of individual problems in adhering to medical plans and medication, both in community and in hospital settings.

### 3.3. Formal or informal evaluation

Formal evaluation: Adherence to treatment will be determined by questionnaires, administered by the Technical Committee, from the pharmacy and from the Hospital.

The selected record will be the same and it is determined that revisions will be made in the pharmacy or in the hospital and with this method we avoid bias in the results. Technicians seek maximum efficiency with minimum registration of possible items.

Intermediate variables to measure the clinical evolution may be carried out by community pharmacists participating in the study: lack of effectiveness and lack of drug safety, based on parameters such as blood pressure, blood sugar, etc.

The evolution of the disease will be assessed by the patient's physician, taking into account the need for changes in treatment, exacerbations, income or medical care, complications and other objective characteristics of the patient's chronic disease (laboratory, radiology ...).

### 3.4. Success criteria used to determine that the initiative is working well

Better adherence: better patient health indicators, decrease in hospital medical interventions and increase in quality of life.



#### 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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First step is the Regional Area of Madrid, but once it is demonstrated that the initiative is working well, it will be easily transfer to all Spanish pharmacies.

#### 5. FURTHER INFORMATION

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**Contact person:**

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PHARMACEUTICAL CARE PROGRAM

## 1. BACKGROUND INFORMATION

ORGANISATION NAME	Hospital Clinic
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Hospitals, Pharmacists
COUNTRY INVOLVED IN THE GOOD PRACTICE	Spain
REGION INVOLVED IN THE GOOD PRACTICE	Catalunya
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Eixample Esquerre (Barcelona's left district)
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	534.955 habitants (35% of Barcelona population)
GOOD PRACTICE DIRECT TARGET GROUP SIZE	20.000 patients discharged form hospital and 5.000 outpatients
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Patients visiting specialised physicians, Specialised physicians, People collecting prescriptions from pharmacies, Pharmacists, Nurses
TYPE OF PARTNERS INVOLVED	Hospitals, Pharmacists,
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Pharmaceutical care, adherence to medication, patient information
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

Patient compliance is extremely important in terms of efficacy, costs, and safety. Hospital Clinic Pharmacy has developed a program to provide drug information to patients in order to improve adherence and decrease medication errors (related to intake). In this programme currently pharmacists working in Hospital Clinic offer counselling to patients in two scenarios: when the patient is discharged from hospital and in the Outpatient Pharmacy.

### 2.1. Methodology, processes and target population

#### Pharmaceutical care at discharge

In 1997 we designed a program to provide drug information to patients at discharge. When the patient is discharged the physician sends the prescription to the pharmacy and the pharmacist validates the treatment, selects the brand name (giving priority to generics), edits an individualised information leaflet, and provides the official prescriptions for the health system.

The leaflet provides an easy daily medication schedule and information in plain language on general considerations and adverse drug reactions for every drug (figure 1; 19.700 information leaflets edited in 2012).

When the leaflet is handed to the patient, verbal information can be provided by pharmacists, nurses or physicians, depending on the ward. In this manner, every patient receives verbal and written information regarding his therapy.

#### Pharmaceutical care for outpatient with complex therapies

Pharmaceutical care program includes:

1. Ensure the appropriateness of medication therapy and patients' understanding of their therapy.

2. Provide information, education, and counselling to patients about medication-related care.

3. Provide information about prevention, early detection and management of adverse effects.

4. Identify potential and actual drug-drug interactions and make recommendations for dosage modification or alternative therapies.

5. Adherence monitoring

6. Promote patients adherence by joining developing a daily medication schedule with the assistances of a pharmacist (identifying barriers, giving education and motivation tips).

In 2012 we applied this program to 4000 HIV patients, 500 patients treated with oral chemotherapy and 180 patients receiving HCV therapy. In the future we are planning to extend this program to other chronic patients like patients with multiple sclerosis, rheumatoid arthritis and tropical diseases.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

To set-up a pharmaceutical care programme as a mainstream service in a tertiary university hospital supporting discharged patients and selecting groups of ambulatory patients with complex therapies.

With this pharmaceutical care programme we provide medication information, prevention and resolution of medication-related problems, improve outcomes and increase patient satisfaction. Currently we apply this program to HIV patients, HCV patients, and patients treated with oral chemotherapy.

### 2.3. Organisations involved

Hospital Clinic

## 2.4. Funding

Has the initiative already received some funding?

☒ YES ☐ NO

Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument

☐ YES ☒ NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

Set up and roll out of a pharmaceutical care program as a mainstream service in a tertiary university hospital.

### 3.2. Evidence on the impact and outcomes

#### Pharmaceutical care at discharge

We designed a randomized study to evaluate the impact of drug information to patients discharged from



hospital described in the next section. The results of this study showed that with this program patient knowledge increases and improves adherence ( $\Delta 12\%$  in patients with  $>85\%$  of adherence rate). After these results we decided to apply gradually this information program to all discharged patients.

#### Pharmaceutical care for outpatient with complex therapies

Our studies have shown the next results:

- ✓ The percentage of patients with good adherence increase in HIV, HCV and cancer patients included in the pharmaceutical care program.
- ✓ Currently, adherence rates are 92,1%, 94,4% and 99,8% for HIV, HCV and cancer patients.
- ✓ HIV patients included in the pharmaceutical care program had a better immunologic and virologic outcome.

### **3.3. Formal or informal evaluation**

#### Pharmaceutical care at discharge

In 1997 we designed a randomized study to evaluate the impact of drug information to patients discharged from hospital.

210 patients discharged from internal medicine, gastroenterology and cardiology ward were included. 105 patients were randomized to intervention group and 105 to control group.

Both groups received the conventional prescription and medication for 12 days. Intervention group received additionally individualized information as described in the section 2.1. Adherence was monitored by means of pill counts. We looked for the percentage of patients showing adherence greater than 85%.

In the control group 69,4% of the patients had adherence  $>85\%$  versus 82,6% in the intervention group.

#### Pharmaceutical care for outpatients with complex therapies

In 1998 we designed a study to evaluate the impact of the pharmaceutical care program in outpatients on the improvement of adherence to antiretroviral therapy.

Patients included were those who initiated antiretroviral therapy during 1998, 1999 and 2000. 397 patients were included in the pharmaceutical care group and 252 in the control group.

The number of patients with adherence equal or greater than 90% was 11% higher in the intervention group.

Patients with undetectable viral load (effectiveness indicator) was higher in the intervention group than in the control group, 258 (65,0%) versus 129 (51,2%), respectively.

In 2003 we coordinated a multicenter study to explore the transferability of the pharmaceutical care program and to establish the impact of the program on the improvement of adherence to antiretroviral therapy, and on patient immunologic and virologic outcome.

It was a multicenter, observational, prospective study in a HIV-infected patient cohort under treatment with antiretrovirals selected by random sampling in 19 Spanish hospitals. The study lasted 12 months, in which the program was applied through a baseline pre-procedural visit and 4 quarterly visits. Adherence estimation was based on pill counting. An adherence equal or greater than 90, or equal or greater than 95% was considered adequate (in two time points); 541 patients were included, mean baseline viral load and CD4 count values were 32,866 copies/ml and 485 cells/mm<sup>3</sup>, respectively.

Throughout the study a slight increase in the percentage of adherent patients was seen; however, statistical significance was not reached (64.3 and 79.2% of patients showed an adherence  $> 95$  and  $> 90\%$ , respectively, during the fourth quarter, versus 59.8 and 75.5% at baseline). A statistically significant decrease in viral load and increase in CD4 cells was seen following program application. The percentage of patients with a viral load  $< 200$  copies/ml was 72.2, 76.7, and 75.0% at the 2nd, 3rd, and 4th quarters, respectively, versus 64.2% at baseline. CD4 cell counts increased by 50 cells/mm<sup>3</sup> on average, from the start to the end of follow-up.

### **3.4. Success criteria used to determine that the initiative is working well**

The results of the studies confirmed the need to implement pharmaceutical care programs for patients at discharge and for outpatients with complex therapies in order to ensure maximum therapeutic.

In 2012 we edited 19.700 information leaflets for patients at discharge and we applied the pharmaceutical care program for outpatients to 4000 HIV patients, 500 patients treated with oral chemotherapy and 180 patients receiving HCV therapy.

Our quality system forces us to conduct an outpatient satisfaction survey twice a year. In this questionnaire patients are asked to rate their general satisfaction on a



scale from 1 to 10. Since the implementation of these programs, patient satisfaction has been >9 every year.

#### 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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Pharmaceutical Care is the sanitary response to the need of helping patients to obtain maximal benefits from their drugs and help the self-management of their disease.

Pharmacists involved in the program have to be appropriately trained in the pathology therapy and in communication skills. In our case, two pharmacists developed and learned these communication skills to set up the pharmaceutical care program. Besides, when initiating this task we recommend to begin with a patient subgroup to detect the model limitations (we started with HIV patients) and the resources needed to

provide the best quality in the services, before expanding it to other patients subgroups.

It's recommended to establish indicators for the service provided, including knowing patient's satisfaction to detect patient's needs.

Once constraints have been corrected and the model improved we recommend including gradually other patients groups. If it is possible, electronic dispensing support and electronic adherence tracking is recommend in order to individualize the interview to patient's needs.

#### 5. FURTHER INFORMATION

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Maite Martin ([mmartin@clinic.ub.es](mailto:mmartin@clinic.ub.es))



REGIONAL STRATEGY FOR POLYMEDICATED & CHRONIC PATIENTS

1. BACKGROUND INFORMATION

ORGANISATION NAME	Hospital Clinic Barcelona, Consorci Hospitalari de Vic
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Hospitals, Pharmacists, Local public authorities, Primary care centres, Nurses, Specialised physicians, General practitioners, Regional public authorities
COUNTRY INVOLVED IN THE GOOD PRACTICE	Spain
REGION INVOLVED IN THE GOOD PRACTICE	Catalunya
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	1. Eixample Esquerre (Barcelona's left district) 2. Vic - Osona Region. Vic
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	1. 534.955 inhabitants (35% of Barcelona population) 2. 150.000 inhabitants (rural area)
GOOD PRACTICE DIRECT TARGET GROUP SIZE	1. Around 20.000 inhabitants 2. Around 5.000 inhabitants
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Older people in general population, Patients in hospitals, People visiting general practitioners, General practitioners, People in day care centres, Patients visiting specialised physicians, Specialised physicians, Older people receiving care/living at home, People collecting prescriptions from community pharmacies, Pharmacists, Patients with a specific disease, People in nursing homes, Nurses
TYPE OF PARTNERS INVOLVED	Hospitals, Pharmacist, Primary care centres, General practitioners, Nurses, Specialised physicians, Nursing homes, Community pharmacists, Regional public authorities
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Pharmaceutical care, polymedicated patients, delivery of care, sustainability of services.
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input checked="" type="checkbox"/> Service models <input checked="" type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input checked="" type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking



## 2. DESCRIPTION

Pharmaceutical care is currently fragmented across centres and levels of care (University hospital, hospital, primary care, and community pharmacy), not existing a coordinated and integrated work between them (vertical model).

Furthermore, discrepancies exist between different drug formularies of the different levels of care and organizations, being this issue pointless and a source of medication errors.

However, consensus among different levels of care is not easy as the objectives of the institutions are not necessarily aligned in the same direction, and if they are, the interest or importance given to certain targets could be different. This division compromises the effectiveness and quality of health care.

On the other hand, the incidence of chronic diseases is increasing and polypharmacy is becoming an important problem.

Long-term diseases consume the vast majority of resources and are at a higher risk of conciliation errors: therefore, a generic framework to ensure smooth management of drug prescription is necessary based on patient centred of care model (transversal model).

In addition, different delivering of care/professional skills adds value to this complex medication review process. Thus multidisciplinary health care teams need to be promoted.

### 2.1. Methodology, processes and target population

The first step made to design this new model was to visit a country where it was already implemented, specifically Lothian (Scotland), with the Pat Murray team and Bill Scott (responsible of Scottish Government pharmaceutical policy framework).

Secondly, a multidisciplinary care team has been formed including pharmaceuticals of different levels (hospital, primary care, and community pharmacist), physicians, nurses from different levels (primary and secondary care) and representatives of Catalonia health department, from two regions: Barcelona Esquerra (Barcelona left district) and Osona Comarca (a rural region of Catalonia).

A Workshop on Developing Innovative Territorial Pharmaceutical Policy for Chronic Disease Management was held in October 10<sup>th</sup>-11<sup>th</sup> 2013 to discuss the key elements to design a single pharmacy model and identified the barriers to draft a common drug formulary. In order to achieve this target, the meeting was divided into four interactive workshops:

1. Tools to improve the Continuity of Care. Rational use of medicines and ensure a quality selection of drugs.
2. Drug use safety: Medication review models and initiatives.
3. Patient's adherence and health education.
4. Establishing health outcomes indicators.

The main aim of this workshop was to act as a trigger for the need to change the system on chronic patients (polypharmacy).

Workshop conclusions and strategic plan: in order to implement a *territorial chronic patient of care model*, different targets need to be reached in the next 12-16 months:

#### 1) Drug selection

- Implement a single drug formulary including primary & secondary care (with first and second choices) and drug use guidelines among Eixample Esquerra health system on one hand, and in Osona region, on the other hand. These formularies and guidelines will be based on evidence based medicine and will be agreed with all professionals involved.
- New educational approaches that can be packed as a mainstream service in the delivery of care (prescribing bulletins, shared care protocols etc.).
- Establish communication networks between the health care providers involved, in each region.

#### 2) Patient centred medication review

- Implement a multidisciplinary approach to review patients medication based on patient centred of care model.
- Identified and stratified patients, based on the level of morbidity risk. To successfully implement this new model is necessary to identify and stratified the individualized needs of our target population. The different groups identified on this stratification will be provided with different health care services (medications cards, expert patients programs, personalized prescribing systems etc.), always taking into account patients and family needs (patient's lifestyle, knowledge and treatment characteristics).
- To develop policies and systems for medicines reconciliation in the health area, in each region
- Design a territorial pharmaceutical care model for chronic patients that integrate community pharmacies.



### 3) Patient agreement and adhere with his treatment

- Design an educational program for patients and health care professionals
- Provide communication skills to health care professionals, like how to perform a motivational interview to patients.

### 4) Indicators

- Establish indicators to evaluate health, safety and efficiency outcomes.
- Establish the relationship between medicines consumption and clinical outcomes

To promote this change, our strength is that innovation and communication tools are available in the different levels of care (electronic prescribing, electronic health records, in primary and secondary care, even in community pharmacy we have data form dispenses) but they need to be connected to each other.

Population target will be all citizens in this healthcare area, prioritizing chronic and polymedicated patients.

### 2.4. Funding

Has the initiative already received some funding?	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

To design and implement a single pharmacy model in order to ensure the viability, quality and sustainability of the services, involving a multidisciplinary care team, including primary care, secondary care and community pharmacies.

### 2.3. Organisations involved

- Departament de Salut de la Generalitat (Catalonia Health Department);
- Institut Catala de Salut (Catalan Institute of Health) (Primary Care)
- Hospital Clinic, Barcelona;
- Consorci Hospitalari de Vic
- Hospital Fundació Santa Creu de Vic
- Primary care centres: CAPSE and Les Corts, Barcelona;
- Colegio Oficial de Farmacéuticos de Barcelona (Official College of Pharmacist of Barcelona, Community Pharmacy Association)

## 3. INNOVATION, IMPACT AND OUTCOMES

Healthcare models are evolving from healthcare fragmented across centres and levels of care, towards an increasing integration of services.

It is known that having this shared goal that unites the interests and activities of all stakeholders will improve the performance, health outcomes and patients satisfaction.

Patients centred care model is already being used in other settings like the Scottish National Health System with good outcomes. We assume that using this type of transversal model, pharmaceutical costs will decrease, helping the sustainability of the system.

This assumption is based on the 2011 data of pharmaceutical costs of Scotland and Spain. In Scotland pharmaceutical cost per patient is 224.6 € compared with 236 € /patient plus the percentage that the patient pays in Spain.

Design a regional pharmaceutical policy focused on chronic patients (in progress)

Four strategic lines (in progress):

1. Develop a formulary: elaborate a local formulary in order to decrease polypharmacy
2. Best selection and use of all medicines: New models of pharmaceutical care with integrated multidisciplinary teams: reconciliation of medicines at all stages of transitions (integrated with all stakeholders including patients)
3. Patients agreement and adhere to treatment.
4. Indicators to evaluate health of population/ clinical outcomes/patient safety; Indicators to evaluate sustainability of Health Care system; Patient experience and pharmacotherapy; Indicators should integrate systems across environments, pharmacy and health outcome data.

### 3.1. Key innovative elements of your good practice

Multidisciplinary team & different settings

### 3.2. Evidence on the impact and outcomes

Patient centred medication review (Strategic LINE 2) (Consorti Hospitalari de Vic. Group).



N.Molist, D.Sevilla et al. Optimizing drug therapy in patients with advanced dementia. E.Geriatric Medicine. "IN PRESS"

#### Abstract

**Background:** Advanced dementia is a prevalent health problem in geriatric patients. These patients usually suffer from several chronic diseases, frequently leading to an end of-life situation lasting months or years, generating complex and often inappropriate medication regimens.

**Objectives:** Describe the re-orientation of drug therapy in patients with advanced dementia utilizing a systematic medication review process.

**Methods:** This non-experimental pre-post analysis included all patients with advanced dementia admitted to acute geriatric unit (AGU) over one year. Medications were reviewed by a multidisciplinary team and together with the patient caregivers; new therapeutic objectives based on end-of-life care principles were established.

Medications were classified as preventive, therapeutic, or symptomatic. The average number of medications per patient pre- and post-admission was compared.

**Results:** We included 73 patients (mean age 86.1 years, mean Barthel Index: 14.5/100). At admission patients had a mean of 7.27 drugs compared to 4.82 at discharge (66.85% reduction,  $p < 0.05$ ). The main drugs withdrawn were cardiovascular and haematological (35.76%). Drugs for prevention decreased by 66.85% (from 1.8 to 0.6,  $p < 0.05$ ) and those for symptomatic care decreased by 17,52% (from 2.34 to 1.93,  $p < 0.05$ ).

**Conclusion:** Medication therapy plans in patients with advanced dementia often do not meet their therapeutic goals. The proposed methodology is a useful tool to assess therapeutic appropriateness.

### 3.3. Formal or informal evaluation

Every 4 months every strategic line will be evaluated. We have developed a delivery plan with the different initiatives and the progress will be evaluated by the Chronic Care Committee.

Two Doctoral theses are in progress about the medication review, "strategic line 2". So, some more results will be available.

### 3.4. Success criteria used to determine that the initiative is working well

The main measures are the results, outcomes or programmes from each strategic line.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

The Scottish Single Pharmacy model "patient centred care model" is a transversal model that is considered nowadays the gold standard of care. The main challenge of this model is that for its implementation needs, in our case, to transform the current model. Consensus among different care levels is mandatory for the success of this model (University hospital, hospital, primary care, and community pharmacy).

In fact this is an example of transferability from the Scottish National Health System to Barcelona Esquerra (Barcelona's left district) health system and Osona Region, as a rural area close to Barcelona.

Hospital Clinic. Barcelona and Consorci Hospitalari de Vic, have a collaborative and narrow alliance. Sharing clinical services; pharmacy department; chronic patient's management programme, etc. It's a very good example on Catalan Hospital alliances, related knowledge & health care level synergies.

## 5. FURTHER INFORMATION

### Contact persons:

Carlos Codina ([ccodina@clinic.ub.es](mailto:ccodina@clinic.ub.es));

Maite Martin ([mmartin@clinic.ub.es](mailto:mmartin@clinic.ub.es))



## 1. BACKGROUND INFORMATION

ORGANISATION NAME	Hospital universitario de Getafe/Region de Madrid/Consejeria de Sanidad/
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Hospitals, Research centres, Local public authorities,
COUNTRY INVOLVED IN THE GOOD PRACTICE	Spain
REGION INVOLVED IN THE GOOD PRACTICE	Madrid
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Region de Madrid
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	Region of Madrid has 6,489,680 inhabitants (Source: INE, 2011) with a rate of ageing of 16.7%. This means that in this Region there are 1.083.776 people older than 65. Taking into account that around 8.4% of them are frail and another 41.8% are pre-frail (Data from the Toledo Study of Healthy Ageing-TSHA), our site would have a population coverage (patients with frailty/pre-frailty) of 91,037 frail older patients plus 453,018 pre-frail older patients. In addition, among the remaining robust people, around 20-25% of them are at risk for pre-frailty and frailty, mainly in those older than 75-80 years old.
GOOD PRACTICE DIRECT TARGET GROUP SIZE	Around 2,000 patient are admitted in our geriatric department in a year. All of them older than 70 years. Our automatized tool to detect adverse drug effects are focused to all patient admitted in geriatric department.
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Older people in general population, Patients in hospitals, People in day care centres , Patients visiting specialised physicians, Older people receiving care/living at home, People in care homes, People in nursing homes
TYPE OF PARTNERS INVOLVED	Hospitals, Research centres, Small-sized industry, Academia
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Diseases and Disorders - Health Systems and Services - Treatment - Medical Devices - Pharmaceuticals - Research and development – Ethics Musculoskeletal disease - Neurodegenerative disorders - Pain - Cardiovascular diseases - Diabetes - Other Nutritional Diseases - Frailty/physical decline – Multimorbidity Protocols - Guidelines – Adherence- Prescription - Polypharmacy - Adverse effects - Protocols - Pharmacovigilance
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input type="checkbox"/> Monitoring
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input checked="" type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training



<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input checked="" type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking

## 2. DESCRIPTION

Older people constitutes a group of patients who joins polypharmacy, co morbidity and pharmacokinetic and pharmacodynamic changes that cause an increased risk of adverse drug reactions (ADRs) and interactions.

ADRs in elderly patients represent a high percentage of hospital admissions, with a high health care costs. The main cause of ADRs in the elderly is the inappropriate prescribing of drugs and poor monitoring of prescribed treatments, so that a considerable part of these hospitalizations could be prevented.

### 2.1. Methodology, processes and target population

Two good practices to avoid polipharmacy and improve quality of prescription have been developed in our institution.

**A)** We have developed automatized tools to detect adverse drug effects in hospitalized older patients, using algorithm-based software stemming from the analytical data of the patients.

The Research Unit of the Hospital of Getafe (HUG) in Madrid (Spain) has implemented a Pharmacovigilance program for hospital-based laboratory signs (PPLSH) that certain analytical parameters may be associated with altered ADRs.

The main objectives of this program are:

- 1.To assess the association between serious ADRs (SADRs) detected from PPLSH and the use of medicinal products and to estimate the specific incidence rate in HUG.
- 2.To assess the performance of the PPLSH in the HUG.
- 3.To assess the quality of in and out-hospital prescription by applying the STOPP/START criteria on the geriatrics service at HUG, and to establish the correlation between the quality of prescription and the SADRs.

We will carry out an epidemiological registry of automatic laboratory signals (ALSs) generated of

patients with signal with/without SADRs of PPLSH in HUG since its creation.

In a first stage we defined automated laboratory signals (SLAs) which were going to be considered alerts.

Subsequently, we developed a specific application from Viewer Clinical through which identifies daily alerts raised in all hospitalized patients by the Geriatrics Department in the HUG.

After, patients were identified and reviewed their electronic and paper health data records by applying Clinical Viewer.

If after this review we will identify any alternative cause that explains the SLA, then the SADRs is considered unlikely.

In the remaining cases, we will visit the patient and / or interview the physician. If there is a temporal relationship to medication and after an appropriate investigation the event can be classified as suspected ADRs. In these cases, your doctor will discuss the removal or reduction of drug dosage and reported to regional Pharmacovigilance Center.

**B)** Develop a Center of Clinical Research in the Older People mainly focused on RCTs we have incorporated relevant changes in many of the procedures used in Clinical Trials in young and adult people. The clinical trial unit for old people in Spain (Hospital Universitario de Getafe) is running since 2010. The unit currently has four beds and a room for exploration. In human resources, we have qualified staff as clinical pharmacologist and a team of geriatricians and nurses.

At this time, we have designed general and specific SOPs of our unit as well as protocols and information sheets adapted to our population. From this same facility we have stressed the importance of not only participating in running RCTs but also in designing them according to the specificities and differences that RCTs for older people must show.



## 2.2. Specific health/ICT/innovation and/or social/economic objectives

Since its launch on January 1, 2012, we have observed that one suspicion of RAMG is confirmed for each 7 patients. In the literature, the general population ratio is 16:1, so the program results efficient and provides a useful tool for physicians.

From the economical point of view, the prior SADR detection reduces the number of admissions and shortens hospital stay by improving the quality of life and reducing the risk of disability.

## 2.3. Organisations involved

- Hospitals, primary care, pharmaceutical companies, university and SME;
- Servicio Madrilenio de Salud SERMAS;
- University of Bedfordshire UK;
- Cardiff University UK;
- Igen biotech sl igen Spain;
- CHU Hopitaux de Bordeaux France;
- Hexabio sarl France;
- Seconda Università degli Studi di Napoli Italy;
- Centre Hospitalier Universitaire de Toulouse France;
- Universitaet Ulm Germany;
- Universiteit Gent Belgium;
- Universidad de Castilla-La Mancha Spain;
- Univerzita Karlova V Czech Republic;
- Niche science & technology ltd UK;
- Universita Cattolica del Sacro Cuore Italy;
- Vrije Universiteit Brussels

## 2.4. Funding

Has the initiative already received some funding?		<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument		<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
	<b>7th Framework Programme for Research and Innovation</b>				
<input checked="" type="checkbox"/>	MID Frail study: a randomized clinical trial to evaluate the effectiveness of a multi-modal intervention in older people with type 2 diabetes on frailty and quality of life				
	<b>Public Health Programme, Second Health Programme</b> (Call for proposals 2013, pre-selected for funding)				
<input checked="" type="checkbox"/>	FRAILCLINIC: Feasibility and effectiveness of the implementation of programs to screen and manage frail older patients in different clinical settings				

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

**A)** This action will make a direct contribution to the promotion of health and quality of life in this population. It is going to contribute to make RCT with excellence and it will help to researchers in different countries to design and develop CT in elderly helping in the design, recruiting and analysing.

**B)** The development of clinical trials in older people will improve the adherence to treatment decreasing the adverse events that occur in this specific population. In addition it will impact the QoL (by decreasing adverse events and increasing the therapeutic goals) and the sustainability of care systems (adverse reactions are one of the most relevant issues in producing admission to hospitals in older people).

### 3.2. Evidence on the impact and outcomes

**A)** The value performance measurements will be the number of detected signals, number of electronic medical records checked, number of patients visited, and number of detected cases (which needed hospital admission or were during hospital admission). This data set will allow us to compare the performance of the program.

**B)** The main impact of the network will be measured by the number of licences given for commercialization of drugs to use in older people that have at least one trial specifically in this population before commercialization.

### 3.3. Formal or informal evaluation

Under evaluation; these actions are active and the results vary over time and the degree.



### 3.4. Success criteria used to determine that the initiative is working well

This device has been implemented with highly satisfactory results: we have carried out an epidemiological registry of automatic laboratory signals (ALSs) generated of patients with signal with/without Serious Adverse Reactions (SADRs) since its creation.

Data from the first months of implementation show that 1 suspicious SADRs each 7 patients was identified. In the literature, in the general population the ratio is 16:1; therefore the program provides to clinicians an effectiveness tool for early detection of SADRs, especially in the elderly, where the prevalence is much higher.

Taking advantage from this action we have increased the contact between clinical pharmacologist and clinicians in charge of the patients, training them health professionals in tools and skills that allow them to better communicate with each other.

### 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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Almost all hospitals in Madrid and the other regions in Spain have implemented the electronic registration system and the implementation of tools to detect serious adverse events in inpatients would be possible. Some hospitals in Community of Madrid are already developing the informatized tool and the program is already on going.

We have made some dissemination of our clinical trial unit among other hospitals and pharmaceutical companies, contributing to the goal that clinical trials units have similar operational programs (protocols, outcomes...) with similar objectives and the capacity to collaborate.

### 5. FURTHER INFORMATION

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#### Contact person:

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Clinical Pharmacologist, CICA (Centro de Investigación Clínica del Anciano), Fundación para la Investigación Biomédica, Hospital Universitario de Getafe, Ctra. Toledo Km 12,500, 28905 Getafe Madrid,  
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**ECAP (ELECTRONIC MEDICAL RECORDS) PROGRAMME WITH A COLLABORATIVE MODULE AND ACTIVE INTELLIGENCE**

**1. BACKGROUND INFORMATION**

<b>CONSORTIUM</b>	IDIAP-Institut Universitari d'Investigació en Atenció Primària Jordi Gol
<b>ORGANISATION NAME</b>	<b>Institut Català de la Salut (Catalan Health Institute)</b>
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Primary care centres, Nurses, General practitioners
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Spain
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	Catalonia
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	Regional
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	About 7.5 M
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	About 6 M
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	People visiting general practitioners, General practitioners, Nurses
<b>TYPE OF PARTNERS INVOLVED</b>	Hospitals, Primary care centres, Nurses, General practitioners
<b>TOPICS/DISEASES ADDRESSED</b> (KEYWORDS)	Clinical Variables, Health Programmes, Managed Care
<b>RELEVANCE TO A1 ACTION PLAN</b>	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input checked="" type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking



## 2. DESCRIPTION

ECAP is the electronic workstation of the health centres of the Catalan Health Institute (CHI), which is the public primary health care provider for 80% of the population in Catalonia.

This electronic workstation has different module or tools in order to support clinical decisions and improve patient safety.

Module to support clinical decisions: the screen Active Intelligence (AI) is a new module added to the ECAP in February 2013. This module incorporates in chronological order the clinical information of the patient and allows access to the clinical notes, prescriptions, referrals and medical tests.

The software selects the clinical variables requiring action or follow up based on the professional (type of health care practitioner, specialty, department) who has accessed the records and the patient's characteristics (age, gender, clinical history, risk factor clusters).

Based on previous clinical variables and prescriptions, reminders to measure clinical variables, request tests and referrals and prescribe treatments can appear on screen. A simple mouse right-click will request the tests and referrals related to the variables displayed.

The variables will be shared between the ECAP and the hospital electronic medical records (Argos) to allow interoperability and to facilitate the design of programmes to manage patients from both levels of care.

Tool to improve patient safety: SELF-AUDIT is a tool integrated in the ECAP in order to detect safety's warnings, duplicities, interactions, potential inappropriate medications, disease or patient drug

contraindications and other issues related with prescription and patient safety.

According to the drug involved, the software scan through medicals prescriptions, clinical variables and disease or patient conditions variables looking for matching possible drug contraindications in order to spotlight this possible prescription incidence to the general practitioner and force them a medication review. All patients involved in a prescription incidence, appears a red or orange mark (depending on seriousness of detected incidence) next to the name of the patient in patient's schedule.

### 2.1. Methodology, processes and target population

SIDIAP is a computerized database containing anonymised patient records for the 5.8 million people registered with a GP in the Catalan Health Institute. The SIDIAP database comprises the anonymised clinical information coded in the corresponding electronic health records (ECAP) that include data of demographics, consultations with GPs, diagnoses, clinical variables, prescriptions, and referrals, laboratory test results, and medications obtained from the pharmacists.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

Innovation is crucial in sharing information among different providers and different levels of care.

### 2.3. Organisations involved

Catalan Institute of Health

### 2.4. Funding

Has the initiative already received some funding?	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

ECAP database include information of almost all Catalan population. Thus, this project will allow interoperability among different providers and levels of care and will facilitate the design of programmes to manage patients from both levels of care. Furthermore, it is possible to obtain information for developing research projects.

### 3.2. Evidence on the impact and outcomes

Using computerized database is a good method to collect information of patients and improve patient safety using a tool that spotlights all the prescription incidences.



### 3.3. Formal or informal evaluation

An evaluation plan of the AI is currently underway. The decrease in the number of professionals that access the former monitoring data files from the AI screen will be used as a criterion in this evaluation.

The tool of SELF – AUDIT allows itself and evaluation of number of drug incidences solved, reviewed but not changed and pending to be solved.

### 3.4. Success criteria used to determine that the initiative is working well

SELF–AUDIT: number of incidences solved.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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AI is a technology that can be exported to other systems of electronic medical records with chronologically arranged information and codification systems for prescriptions and standardized medical conditions.

SELF – AUDIT contains all the information in tables that can be exported and adapted to other electronic medical records.

## 5. FURTHER INFORMATION

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### Link to web pages:

<http://www.youtube.com/watch?v=42TBQ8o7oRs>

### Contact person:

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Centre de Competència Funcional, Institut Català de la Salut, phone: +34-934824100 Ext 4197



## 1. BACKGROUND INFORMATION

CONSORTIUM	IDIAP-Institut Universitari d'Investigació en Atenció Primària Jordi Gol
ORGANISATION NAME	Institut Català de la Salut (Catalan Health Institute)
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Nursing homes, Primary care centres
COUNTRY INVOLVED IN THE GOOD PRACTICE	Spain
REGION INVOLVED IN THE GOOD PRACTICE	Catalonia
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Counties of Vallès Oriental, Vallès Occidental, Barcelonès North and Maresme.
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	1.5 M
GOOD PRACTICE DIRECT TARGET GROUP SIZE	9,900 patients living in 198 Nursing Homes
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	People in nursing homes
TYPE OF PARTNERS INVOLVED	Pharmacists, Nursing homes, Primary care centres, Nurses, General practitioners, Regional public authorities
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Nursing Homes; Primary Care; Adequacy of Prescribing; Elderly; Chronicity
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input checked="" type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input checked="" type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input checked="" type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking



## 2. DESCRIPTION

### 2.1. Methodology, processes and target population

Justification: 9,917 elderly residents living in 198 Nursing Homes (NH); 66% in the Clinical Risk Groups (CRG@3M, stratification system) 6-7, (with 2 or 3 chronic diseases).

Polypharmacy (12 drugs per patient), many patients with Alzheimer's dementia; cost in pharmacy: €15 million in 2011.

Multicenter intervention in 198 Nursing Homes (NH) assigned to our primary care centres. Target population: 9,917 patients from NH identified with the ICD-10 code (Z59.3).

1. Creation and implementation of a guideline for elderly patients prescription, with criteria based on safety, effectiveness and efficiency and in blog format (<https://farmageriatrics.wordpress.com>) to be able to share with GP's and all Geriatricians, responsible for the prescriptions of that patients.
2. Revision of the adequacy of Alzheimer's dementia treatments.
3. Revision of the adequacy of psychotropic drugs.
4. Creation of full-time care units (GP+nurse) with specific competences integrated in the primary care centre's team. Proactive care. Prevention of exacerbations; palliative care support. Optimisation of healthcare resources.

Direct target population: all patients (9,917) living in NH in the catchment area.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

To provide quality health care from the public health system to the elderly living in NH.

To develop a programme based on patient safety and quality of treatments, with efficacy and efficiency.

ICT innovation: access to electronic medical records and electronic prescriptions from the NH; access to clinical data repository (primary care and hospital datasets).

Other improvement objectives: coordination between different levels of care (Accident & Emergency, hospital admissions, day care) to ensure round-the-clock continuum of care.

### 2.3. Other organisations involved

Institut Català de la Salut (Catalan Institute of Health): health professionals (GP, nurses); electronic medical records; data repository.

Nursing Homes' Management: formal agreements to connect the NH to the data repository and to collaborate with our programme (education, information).

Departament de Salut (Catalan Department of Health): data repository.

Departament de Benestar Social i Família (Social Care Department).

### 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

Provide a quality health care from the public health system to the elderly.

### 3.2. Evidence on the impact and outcomes

1. Pla de Salut 2011-2015. (Health Plan of Catalonia 2011-2015)
2. Monterde D., secretaria tècnica. Institut Català de la Salut. Explotació dels grups de risc clínic, CRG, a l'atenció primària.
3. M. Díaz-Gegúndez, G. Paluzie, C. Sanz-Ballester, M. Boada-Mejorana, S. Terré-Ohme, D. Ruiz-

Poza. Evaluación de un programa de intervención en residencias geriátricas para reducir la frecuentación hospitalaria. Rev Esp Geriatr Gerontol. 2011; 46(5):261-264.

4. Góngora L, Puche E, García J, Luna JD. Prescripciones inapropiadas en ancianos institucionalizados. Rev Esp Geriatr Gerontol. 2004; 39:19-24.

5. Wild D, Nelson S, Szczepura A. Providing nursing support within residential care homes. 2009. Briefings of the Joseph Rowntree Foundation [updated 1 April 2008] [consulted on 17 Nov 2010].



Available on

<http://www.jrf.org.uk/publications/providing-nursing-support-within-residential-care-homes>

### 3.3. Formal or informal evaluation

Results (period: July 1, 2012 to 30 June, 2013)

Intervention in 66% (119) NH

Total target population: 9,917 (66% CRG 6-7)

60 NH connected to electronic medical records with access to data repository with electronically prescription access.

Adherence to *farmageriatrics*® guideline for elderly patient's prescription: 78.46% of prescriptions

#### Results of deprescribing

Alzheimer drugs inappropriately prescribed (decreased in 39.18%)

Cost difference in treatment plan pre- and post-intervention (decreased in 25.3%)

Decrease in number of drugs/patient 26%.

Adequacy of diapers prescription according to guidelines has demonstrated a decrease of 20% cost in Euros.

Adequacy of dressing's prescription reduced cost in Euros 41.17%.

### 3.4. Success criteria used to determine that the initiative is working well

#### Monitoring indicators:

1. Decreased of Avoidable Hospitalizations
2. Decreasing visits at emergency room's hospitals
3. Decreasing number of 30-day Hospital Readmission
4. Decreasing Avoidable Admissions (%)
5. Decreased of Pharmacy costs (€) per patient (stratified by CRG)

### 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

The *farmageriatrics*® guideline could be used elsewhere as it is evidence-based. Information posted in 'blog' format facilitates the dissemination of knowledge on prescription practices amongst health care professionals (GP's, Geriatricians, etc.).

This project could be applied to any other countries with electronically medical records and electronic prescriptions.

Targeted interventions aimed at a target population reduces variability and increases efficiency.

Specific units (GP + nurse) involved in specific tasks contribute to the improvement of medical records by updating health problems (66% patients in CRG 6-7).

Patient-centred care and coordination of locally available health resources based on network knowledge improves qualitative and quantitative results and increases the satisfaction of patients, families and professionals.

We consider it essential for NH to work in association and according to the standards of the public health system.

### 5. FURTHER INFORMATION

#### **Link to web pages:**

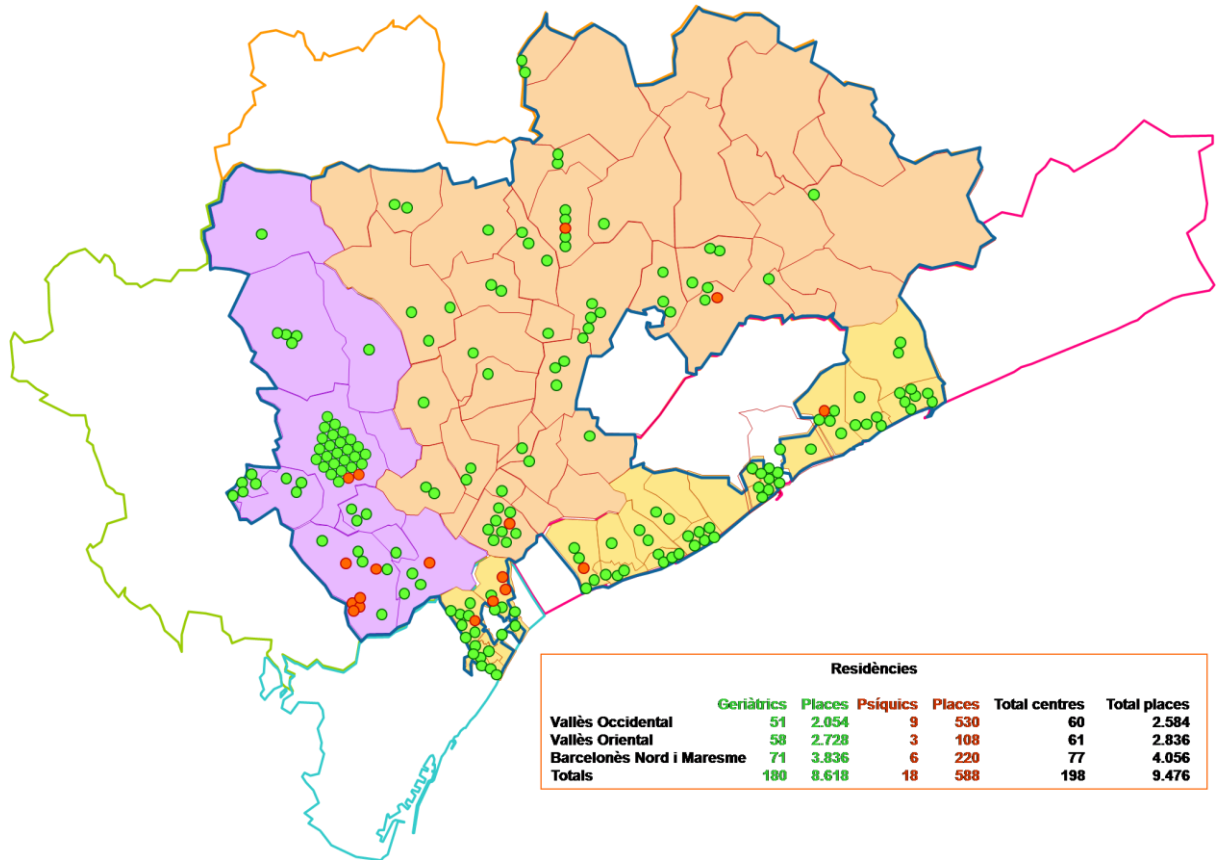
<https://farmageriatrics.wordpress.com>

#### **Contact person:**

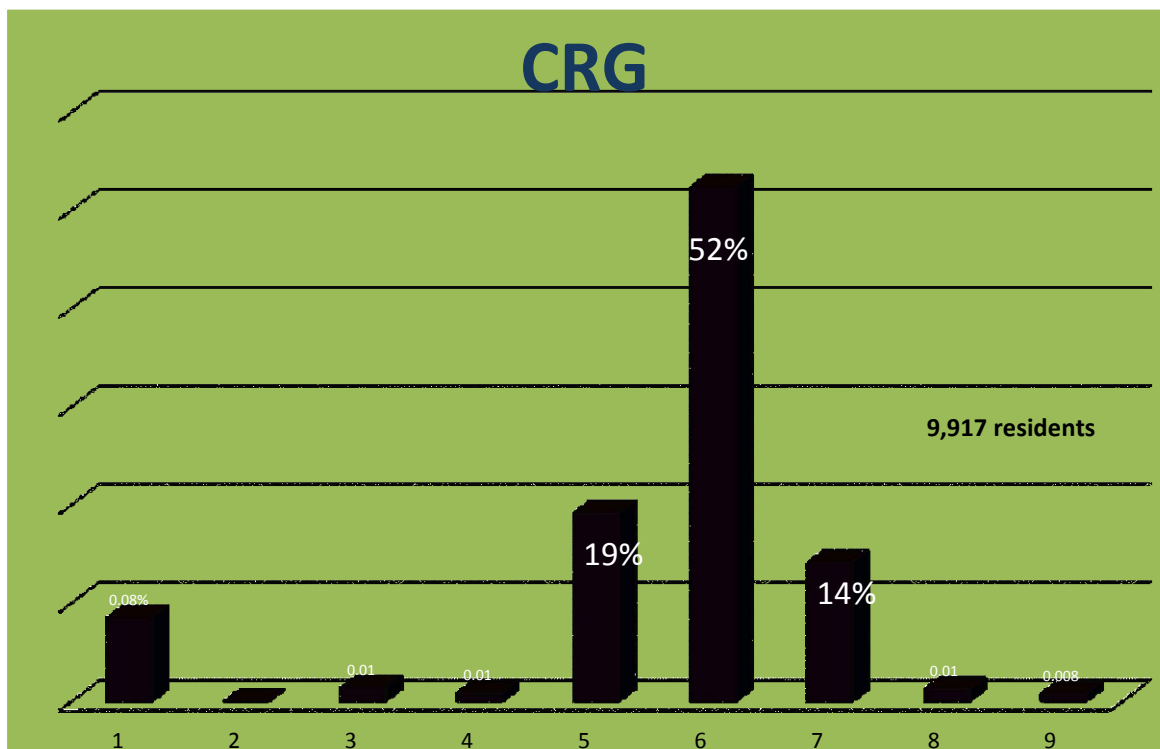
Dr Rosa Morral Parente ([rmorral.mn.ics@gencat.cat](mailto:rmorral.mn.ics@gencat.cat)), Director of Health Care of the North Metropolitan Primary Care Management (Responsable Àrea Assistencial de la Direcció d'Atenció Primària Metropolitana Nord), Catalan Institute of Health (Institut Català de la Salut), Phone: +34 93 728 44 57 / 607 07 45 99



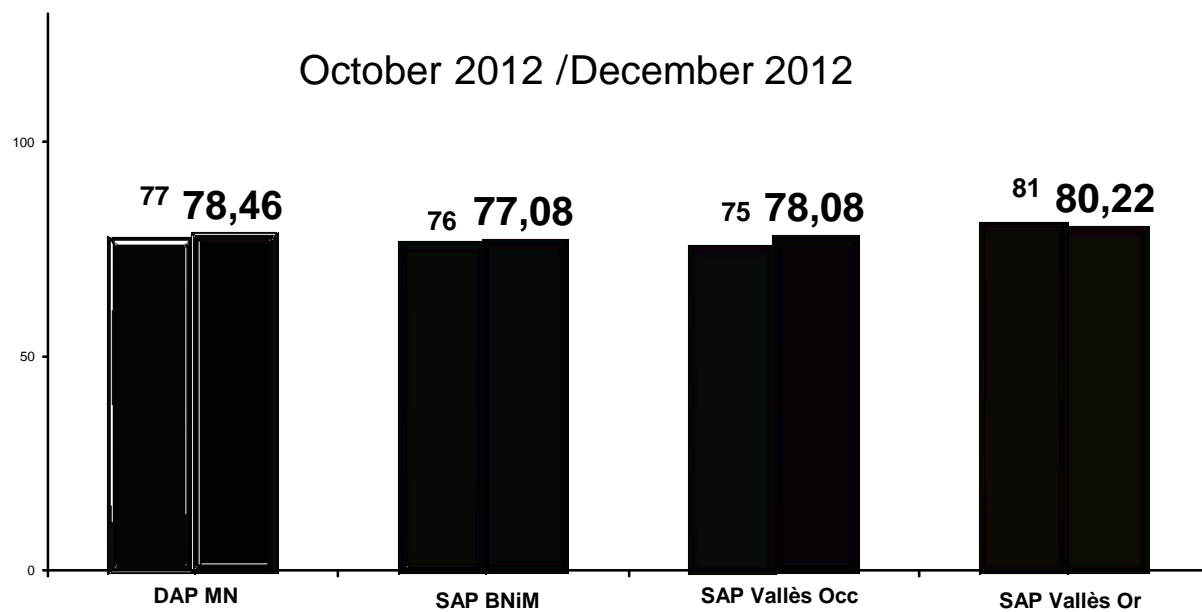
## Nursing Homes map – North Metropolitan Area



## Distribution of comorbidities



## Adherence to drug formulary (*farmageriatrics*)





## 1. BACKGROUND INFORMATION

CONSORTIUM	Institut Universitari d'Investigació en Atenció Primària (IDIAP) Jordi Gol
ORGANISATION NAME	<b>Institut Universitari d'Investigació en Atenció Primària (IDIAP) Jordi Gol</b>
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Research centres, Primary care centres, Academia, Regional public authorities
COUNTRY INVOLVED IN THE GOOD PRACTICE	Spain
REGION INVOLVED IN THE GOOD PRACTICE	Catalonia
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Catalonia
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	7,5 M
GOOD PRACTICE DIRECT TARGET GROUP SIZE	5,8 M
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Older people in general population, Patients in hospitals, People visiting general practitioners, Older people receiving care/living at home, People collecting prescriptions from pharmacies, Patients with a specific disease
TYPE OF PARTNERS INVOLVED	Hospitals, Research centres, Primary care centres, Nurses, Academia, Specialised physicians, General practitioners Regional public authorities
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Clinical Practice database, Primary Health Care, Pharmacological treatments, database management systems, validation studies, medical records, registers, pharmacovigilance, population studies
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

Catalonia, a Mediterranean region in north-eastern Spain, has a public health system in which every citizen is registered with a general practitioner and a nurse in a publicly funded primary care centre. At each centre, doctors and nurses work as a team caring for the total population of a determined geographic area. The Catalan Institute of Health (ICS) is the main health care provider, with more than 274 Primary Care Centres and 3,400 GPs. All their centres use the same software, called eCAP, to record their patients' clinical information.

The **SIDIAP (Information System for the Enhancement of Research in Primary Care)** database was created in 2010 under the auspices of the Primary Care Research Institute Jordi Gol (IDIAP JordiGol) and the Catalan Institute of Health (ICS) with the aim to promote the development of research based on clinical data from computerized medical records and other complementary sources of data.

The SIDIAP database stores information from 274 Primary Care Centres with a total population of 5.8 million patients (80% of the Catalan population). SIDIAP ([www.sidiap.org](http://www.sidiap.org)) contains anonymised longitudinal patient information since 2006 including the following information:

- Sociodemographic characteristics (date of birth, gender, country of origin, PHC centre)
- Clinical data: visits, life-styles, routine measurements blood pressure, BMI, spirometry, Framingham score, etc.), morbidity (ICD-10),

vaccines, specialist referrals, laboratory tests, prescriptions, sick leaves, etc.

- Drugs dispensed in community pharmacies (ATC codes, dates of dispensing, DDD, etc.)
- Hospital admissions
- Deaths: date and cause of death
- Other external databases (The Catalan Registry of Arthroplasties, Cancer Registries, results of retinographies, etc.)

### 2.1. Methodology, processes and target population

Anonymised database obtained from different sources of information and prepared to answer different research questions. Different processes of quality control, validation of the data, and data analysis have been developed.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

Different studies have been validating data from SIDIAP and have published their results in prestigious scientific journals making SIDIAP the best database of the south of Europe for research purposes.

### 2.3. Organisations involved

IDIAP Jordi Gol, Catalan Institute of Health

### 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
<input checked="" type="checkbox"/> 7th Framework Programme for Research and Innovation				
<input type="checkbox"/> Other, please specify				
<input checked="" type="checkbox"/> Some European companies that request the development of different studies with SIDIAP; Instituto de Salud Carlos III				

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

The key innovative elements of the SIDIAP database are:

- To offer different sources of information 100% linked to a unique database.
- A high representativeness with a high population coverage (~80% of the total population of Catalonia) with longitudinal data since 2006.
- The development of important processes of quality control, validation of the data, and data analysis.



- To have different research groups at the IDIAP Jordi Gol and ICS that develop different research projects using the SIDIAP data.
- SIDIAP is member of a network of European databases called EU-ADR-Alliance. Therefore, we can offer the use of different databases from Italy, Holland, UK, Denmark and Spain.
- SIDIAP offers data of paediatric patients.
- SIDIAP is carrying out different projects for the European Medicines Agency. It is participating in the European Network of Centres for Pharmacoepidemiology and Pharmacovigilance (ENCEPP).
- Analysis of the free text of the EMR.

### 3.2. Evidence on the impact and outcomes

With this database more than 50 research projects have been carried out.

The best evidence of the impact of such database is represented by the papers published in international scientific journals; some of them are:

- Bolívar B, Fina F, Morros R, Garcia MD, Hermosilla E, Ramos R, Rosell M, Rodríguez J, Medina M, Calero S, Prieto D. SIDIAP database: electronic clinical records in Primary Care as a source of information for epidemiologic research. [Article original]. Med Clin (Barc). 2012 May 19;138(14):617-21.
- García-GilMdel M, Hermosilla E, Prieto-Alhambra D, Fina F, Rosell M, Ramos R, Rodríguez J, Williams T, Van Staa T, Bolívar B. Construction and validation of a scoring system for the selection of high-quality data in a Spanish population primary care database (SIDIAP). Qual Prim Care. 2012;20(2):135-45.
- Pagès-Castellà A, Carbonell-Abella C, Fina Avilés F, Alzamora M, Baena-DíezJM, Martínez Laguna D, Nogués X, Díez-Pérez A, Prieto-Alhambra D. Burden of osteoporotic fractures in primary health care in Catalonia (Spain): a population-based study. BMC Musculoskelet Disord. 2012 May 28;13(1):79.
- Prieto-Alhambra D, Avilés FF, Judge A, Van Staa T, Nogués X, ArdenNK, Díez-Pérez A, Cooper C, JavaidMK. Burden of pelvis fracture: a population-based study of incidence, hospitalisation and mortality. Osteoporos Int. 2012 Feb 4. [Epubahead of print] PubMedPMID: 22310957
- Prieto-Alhambra D, Premaor MO, Fina Avilés F, Hermosilla E, Martínez-Laguna D, Carbonell-Abella

C, Nogués X, Compston JE, Díez-Pérez A. The association between fracture and obesity is site-dependent: a population-based study in postmenopausal women. J Bone Miner Res. 2012 Feb;27(2):294-300.

- Ramos R, Balló E, Marrugat J, Elosua R, Sala J, Grau M, Vila J, Bolívar B, García-Gil M, Martí R, Fina F, Hermosilla E, Rosell M, Muñoz MA, Prieto-Alhambra D, Quesada M. Validity for use in research on vascular diseases of the SIDIAP (Information System for the Development of Research in Primary Care): the EMMA study. Rev Esp Cardiol. 2012 Jan;65(1):29-37. Epub 2011 Oct 27.
- Vinagre I, Mata J, Hermosilla E, Morros R, Fina F, Rosell M, Castell C, Franch J, Bolívar B, Mauricio D. Control of Glycemia and Cardiovascular Risk Factors in Patients With Type 2 Diabetes in Primary Care in Catalonia (Spain). Diabetes Care. 2012;35(4):774-9.

Furthermore, an important amount of projects related to prescription and adherence in old people are being developed from SIDIAP:

- Factors related to the control and intensity of treatment in patients over 65 years of age with type 2 diabetes in primary care
- Therapeutic inertia and adequacy of the prescription in type 2 old diabetic patients
- Factors related to the adherence of the treatment in diabetic 2 patients in Primary Care
- Alzheimer's disease drugs: an analysis of treatment appropriateness and impact of novel therapies on drug use patterns
- Persistence on the osteoporosis treatments and predictors of adherence and persistence
- Multimorbidity, polypharmacy and health resources utilization in a sample of patients over 65 years of age in primary care.
- Cardiovascular risk associated with reduced glomerular filtration rate in patients older than 60 years in primary health care
- Effectiveness of the flu vaccine in winter mortality in patients over 65 years of age with chronic diseases.

### 3.3. Formal or informal evaluation

All projects are evaluated by a Scientific Committee and by an Ethical Committee.



### 3.4. Success criteria used to determine that the initiative is working well

Number of projects developed using SIDIAP data

Number of papers published in scientific journals

The possibility to share experiences on how this process has been made in different European successful databases is crucial. The experience of SIDIAP may be very helpful to other countries that want to develop such kind of databases and studies.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

Having a population database allows a better knowledge of the characteristics and use of services of the population. In this particular case of the elderly population different issues can be studied: diseases, multimorbidity, adequacy of prescriptions, adherence to them and adherence to clinical guidelines, etc.

In all countries there are different electronic databases that can be useful for research projects if they are adequately managed. There are many sources of bias that have to be controlled or minimized.

## 5. FURTHER INFORMATION

### Links to web pages:

[www.sidiap.org](http://www.sidiap.org)

### Contact person:

Dr. Bonaventura Bolibar ([bbolibar@idiapjgol.org](mailto:bbolibar@idiapjgol.org)), Scientific Director. IDIAP Jordi Gol, Gran Via Corts Catalanes, 587 Barcelona 08007 (Spain), Phone: +34 93 482 46 94

### Available information from SIDIAP

VARIABLES	SOURCE OF INFORMATION	AVAILABILITY
<b>Sociodemographic data</b> (date of birth, gender, country of origin, PHC centre)	SIAP (Catalan Health Service Database)	>2000 year
<b>Clinical data</b> (visits, referrals, vaccines, smoking, drinking, BMI, blood pressure, ICD-10 codes, CRG, sick leaves, etc.)	eCAP (Primary Care e-records)	>2005 year
Drugs dispensed in community pharmacies	Pharmacy Official Invoice Database (Catalan Health Service)	>2005 year
Lab tests (creatinine, HbA1c, etc.)	Primary Care Lab Database	>2006 year
Socioeconomic status = MEDEA Index (deprivation index aggregated by small areas)	Census data	>2001 year
Hospital Admissions	Inpatient Care MBDS (Catalan Health Service)	>2004 year
Date and cause of death	National Office of Statistics	>2003 year
Other external databases	The Catalan Registry of Arthroplasties, Cancer Registries, etc.	



**SECURITY IN ELDERLY PATIENTS WITH MULTIMORBIDITY AND POLYPHARMACY**

**1. BACKGROUND INFORMATION**

<b>CONSORTIUM</b>	Institut Universitari d'Investigació en Atenció Primària (IDIAP) Jordi Gol
<b>ORGANISATION NAME</b>	<b>Institut Universitari d'Investigació en Atenció Primària (IDIAP) Jordi Gol</b>
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Research centres, Primary care centres, Academia
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Spain
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	Catalonia
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	Catalonia
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	7.5 M
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	350.000 inhabitants
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	Older people in general population, People visiting general practitioners, General practitioners, Patients' groups
<b>TYPE OF PARTNERS INVOLVED</b>	Hospitals, Research centres, Academia ,
<b>TOPICS/DISEASES ADDRESSED</b> (KEYWORDS)	Multimorbidity, polypharmacy, elderly patients, Primary Health Care, complex interventions, informatics support tool.
<b>RELEVANCE TO A1 ACTION PLAN</b>	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input checked="" type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

The ageing of population increases multimorbidity and polypharmacy, leading to poor health and safety outcomes; this gives rise to the need to design interventions that allow better medication management.

This project aims to improve security in patients aged 65 years and older with multimorbidity and polypharmacy, attending Primary Health Care Centres by preventing problems with medication

### 2.1. Methodology, processes and target population

A complex intervention will be designed following Medical Research Council recommendations.

1. Phase 0, Preclinical/Theoretical Analysis, will review and synthesize evidence regarding interventions to improve medication safety in people 65+ with multimorbidity.
2. Phase 1, Modelling and operationalization, will determine the components of the intervention. Stakeholders involved in medication safety will be invited to participate in identifying barriers and facilitators in order to design a flexible and dynamic intervention tailored to the participants and the context. An algorithm based on clinical review and the conclusions of quantitative and qualitative analysis will allow implementation of a de-prescription tool. This web application allows

shared decision-making by general practitioners and patients.

3. Phase 2, Pilot test, will evaluate the feasibility and acceptability of the intervention. A randomized controlled trial will be then designed to test the effectiveness in everyday practice.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

Expected outcome:

1. Improved prescription security through reduced duplication, interaction, contraindicated medications, and therapeutic cascade in ageing patients;
2. Increased quality of life;
3. Improved control of diseases or risk factors in patients with multimorbidity;
4. Decreased number of inappropriate drug prescriptions; and
5. Decrease in costs attributable to the intervention

### 2.3. Organisations involved

IDIAP Jordi Gol, Catalan Institute of Health, Federation of Senior Citizen of Catalonia (FATEC)

### 2.4. Funding

Has the initiative already received some funding?	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

Multimorbidity is frequent in patients older than 65 years, affecting their quality of life. Its management goes beyond visits to the health clinic, constituting a social problem that requires involvement and participation by patients, health professionals, health care institutions, government agencies and patient associations.

The patient's shared responsibility for a treatment plan is a fundamental requirement. Better understanding of a health problem and the drugs prescribed can also lead to better awareness of the associated risks and benefits, and can favour healthier lifestyle choices, in areas such as diet and exercise. This in turn can help to reduce the treatment arsenal for each patient, while increasing adherence to therapy.

Health professionals must preserve the *primum non nocere* principle, but when multiple medications are prescribed and the individual enters into polypharmacy there is a potential risk of unsafe situations that can cause the patient harm.

The availability of an informatics tool that allows health professionals to optimize medication, using a systematic process to evaluate the treatment plan and shared decision-making between the doctor and patient, could offer invaluable assistance in achieving prescription safety.

The active participation of patients associations is essential in designing the intervention and developing the software application. It will enable the maximum incorporation of patient perceptions, interests and



needs, frequently distant from those of their health professionals.

One of the key project partners, Federation of Senior Citizen of Catalonia (FATEC ) is a well-recognized patients' association that will strengthen the social, cultural and political aspects of the project, due to its great experience in the field.

### 3.2. Evidence on the impact and outcomes

The implementation of a complex intervention programme for people 65 and older with multimorbidity and polypharmacy attending Primary Health Care Centres (PHCC) that improve safety by preventing problems with medication is expected to obtain the following outcomes:

- 1) Increase overall safety for the patient with polypharmacy. In the IG participants, we anticipate:
  - a) Avoidance of duplicate medications
  - b) Decrease in medications contraindicated by a patient's age or disease profile
  - c) Prevention of adverse reactions or interactions
  - d) Avoidance of a prescribing cascade in the treatment plan
- 2) Increase patient quality of life. Medication reconciliation, prevention of possible secondary effects and better awareness of their prescriptions can contribute to a better quality of life for patients with polypharmacy.
- 3) Improve the control of multimorbidity or of risk factors presented by patients with polypharmacy.
- 4) Improve the appropriateness of drug treatments. An individualized approach will allow adjustment of the patient's treatment plan to variables such as age, functionality, life expectancy, and clinical conditions, as well as particular aspects of the drugs prescribed (e.g., doses, guidelines, duration of treatment).
- 5) Strengthen adherence to treatment. Key points in treatment adherence include health literacy, especially concerning aspects related to treatments; empowerment in medication management; patient participation in shared decision-making concerning treatments; and agreement or acceptance concerning the treatment plan. Patient expectations concerning a prescription will facilitate shared responsibility for health and increased participation in individualized treatment planning.
- 6) Decrease economic costs of pharmacy in national health systems and at the personal level in

European countries that do not subsidize medications. This outcome will contribute to the sustainability of publicly funded health systems.

1. Patterson SM, Hughes C, Kerse N, Cardwell CR, Bradley MC. Interventions to improve the appropriate use of polypharmacy for older people. *Cochrane Database Syst Rev.* 2012 May 16;5:CD008165. doi: 10.1002/14651858.CD008165.pub2.
2. Amado E. Elementos básicos del abordaje de la medicación en el paciente crónico: Información al paciente, conciliación, revisión y adherencia. Sociedad Española de Farmacéuticos de Atención Primaria (SEFAP). Madrid 2012.
3. Scott IA, Gray LC, Martin JH, Mitchell CA. Minimizing inappropriate medications in older populations: a 10-step conceptual framework. *Am J Medicine.* 2012;125(6): 529-37.
4. Schuling J, Gebben H, Veehof LJ, Haaijer-Ruskamp FM. Deprescribing medication in very elderly patients with multimorbidity: the view of Dutch GPs. A qualitative study. *BMC Fam Pract.* 2012

### 3.3. Formal or informal evaluation

The protocol of the study was evaluated independently by two researchers of IDIAP, following the recommendations of EQUATOR Network. The project obtained a positive evaluation. This work has applied financial support by a grant from Ministry of Science and Innovation through the Instituto Carlos III (ISCiii) 2013, which has not yet been resolved.

### 3.4. Success criteria used to determine that the initiative is working well

Researchers of this project conducted studies on polypharmacy. The researcher's participants include professionals of different specialties: GPs, pharmacists, geriatricians, statisticians, one epidemiologist and one psychiatrist. This multidisciplinary team is probably a guarantee of a good approximation to the problem of the study.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

We develop an informatics support tool for health professionals that will be transferred to other organisations of primary care.

The software tool available in web format application facilitates healthcare professionals optimize



prescription with a focus on providing better information at the patient about the individual treatment plan and increase their ability to make decisions and share responsibility with their doctor and treatment plan (Patient Decision-Making Tools).

This support toll could be interesting for other regions adapting the software application to the idiosyncrasies of countries.

## 5. FURTHER INFORMATION

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**Link to web pages:** <http://www.idiapigol.org>

**Contact person:**

Quintí Foguet Boreu, MD, PhD ([gfoquet@idiapigol.org](mailto:gfoquet@idiapigol.org)),  
Institut Universitari d'Investigació en Atenció Primària-  
IDIAP Jordi Gol, Universitat Autònoma de Barcelona,  
Gran Via Corts Catalanes, 587 àtic, 08007 Barcelona,  
Phone: +34-934824124 Ext: 4605, Fax +34-  
934824174.



## GLYCAEMIC CONTROL AND ANTIHYPERGLYCAEMIC TREATMENT OF TYPE 2 DIABETES IN OLDER THAN 65 YEAR-OLD PEOPLE IN PRIMARY CARE

### 1. BACKGROUND INFORMATION

CONSORTIUM	Institut Universitari d'Investigació en Atenció Primària (IDIAP) Jordi Gol
ORGANISATION NAME	<b>Institut Universitari d'Investigació en Atenció Primària (IDIAP) Jordi Gol</b>
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Primary care centres, Nurses, General practitioners,
COUNTRY INVOLVED IN THE GOOD PRACTICE	Spain
COUNTRY INVOLVED IN THE GOOD PRACTICE	Catalonia
REGION INVOLVED IN THE GOOD PRACTICE	Catalonia
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	7.5 M
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	5.8 M
GOOD PRACTICE DIRECT TARGET GROUP SIZE	Older people in general population, People visiting general practitioners, Patients with a specific disease
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Research centres, Primary care centres, Nurses, General practitioners,
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Type 2 diabetes, primary care, elderly, glycaemic control, observational study
RELEVANCE TO A1 ACTION PLAN	
<input type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input type="checkbox"/> Monitoring
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input checked="" type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking



## 2. DESCRIPTION

### 2.1. Methodology, processes and target population

**Design:** Epidemiological, observational, cross-sectional study, from a population database (SIDIAP database) that includes all patients with T2DM registered and assisted by the Institut Català de la Salut (Catalan Institute of Health) in Catalonia.

**Study Subjects:** Patients with type 2 diabetes over 30 years old

**Instrumentation:** Using SIDIAP database, with analysis of the year 2011 data

**Determinations:** socio-economic measures and anthropometric, fasting glucose, HbA1c, lipid profile, blood pressure and antidiabetic treatment, the cardiovascular risk factors associated with T2DM and its chronic complications.

**Statistical analysis:** descriptive statistics of diabetic patients according to age subgroups categorization. Association of risk factors with the presence of complications in different age groups

**Objective:** To know the clinical characteristics of the population over 65 years with type 2 diabetes mellitus (T2DM) cared for in the primary care centres of Catalonia, the degree of glycaemic control and the use of antihyperglycaemic drugs.

**Expected results:** How the metabolic control is in T2DM subjects > 65 years in comparison with younger patients.

The use of formally contraindicated drugs (especially impaired renal function).

The strength of the association of risk factors with diabetes complications in different age subgroups.

**Applicability:** To describe the clinical profile of T2DM patients over 65 years

**Relevance:** the importance of finding the misuse of antidiabetic drugs in the elderly.

**Limitations:** Lack of properly some variables that is common in large databases

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

### 2.3. Organisations involved

Barcelona Diabetes Research Support Unit; IDIAP-Jordi Gol; Catalan Institute of Health

### 2.4. Funding

Has the initiative already received some funding?	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your notable practice

Multicenter descriptive study based on a global database in primary care; all primary care centres of the Catalan Institute of Health use the same electronic clinical records.

Data from clinical records, both hospital and primary care and pharmacy registries

### 3.2. Evidence on the impact and outcomes

- Sinclair AJ, Paolisso G, Castro M, Bourdel-Marchasson I, Gadsby R, Rodriguez Manas L, et al. European Diabetes Working Party for Older People 2011 clinical guidelines for type 2 diabetes mellitus. Executive summary. Diabetes Metab. 2011; S27-38.

- Huang, ES; Zhang, Q; Gandra, N; Chin, MH; Meltzer, DO.: The Effect of Comorbid Illness and Functional Status on the Expected Benefits of Intensive Glucose Control in Older Patients with Type 2 Diabetes: A Decision Analysis. Ann Intern Med. 2008; 149: 11-19.
- Selvin, E; Coresh, J; Brancati, FL. The Burden and Treatment of Diabetes in Elderly Individuals in the U.S. Diabetes Care. 2006; 29: 2415-2419
- Qaseem A, Humphrey LL, Sweet DE, Starkey M, Shekelle P, Clinical Guidelines Committee of the American College of Physicians. Oral pharmacologic treatment of type 2 diabetes mellitus: a clinical practice guideline from the American College of Physicians. Ann.Intern.Med. 2012; 3: 218-231.
- Mozaffarian, D; Kamineni, A; Carnethon, M; Djousse, L; Mukamal, KJ; Siscovick, D.: Lifestyle Risk Factors and New-Onset Diabetes Mellitus in



Older Adults. The Cardiovascular Health Study. Arch Intern Med. 2009; 169: 798-807

- Curb JD, Pressel SL, Cutler JA, Savage PJ, Applegate WB, Black H, et al. Effect of diuretic-based antihypertensive treatment on cardiovascular disease risk in older diabetic patients with isolated systolic hypertension. Systolic Hypertension in the Elderly Program Cooperative Research Group. JAMA 1996; 23: 1886-92.
- Helmer D, Tseng CL, Wrobel J, Tiwari A, Rajan M, Pogach L, et al. Assessing the risk of lower extremity amputations using an administrative data-based foot risk index in elderly patients with diabetes. J.Diabetes 2011; 3: 248-55
- Rodriguez-Manas L. A call for action in diabetes care for older people. Diabet.Med. 2011; 7: 757-758
- Brown AF, Mangione CM, Saliba D, Sarkisian CA, California Healthcare Foundation/American Geriatrics Society Panel on Improving Care for Elders with Diabetes. Guidelines for improving the care of the older person with diabetes mellitus. J.Am.Geriatr.Soc. 2003; 5 (Suppl Guidelines): S265-80.
- Worrall G, Knight J. Continuity of care is good for elderly people with diabetes: retrospective cohort study of mortality and hospitalization. Can.Fam.Physician. 2011; 1: s16- 20.
- Mata-Cases M, Roura-Olmeda P, Berengué-Iglesias M, Birulés-Pons M, Mundet-Tuduri X, Franch-Nadal J, et al. Fifteen years of continuous improvement of quality care of type 2 diabetes mellitus in primary care in Catalonia, Spain. Int J Clin Pract 2012; 66:289-98.
- Vinagre I, Mata-Cases M, Hermosilla E, Morros R, Fina F, Rosell M, et al. Control of glycemia and cardiovascular risk factors in patients with type 2 diabetes in primary care in Catalonia (Spain). Diabetes Care 2012; 35:774-9.

### 3.3. Formal or informal evaluation

SIDIAP analyzed 92.112 diabetic patients between 65-75 years old; we obtained the following characteristics:

- Patients with obesity (BMI  $\geq 30$ ): 46.4%
- Patients that smoke: 9.6%
- Treatments: Patient with Oral glucose lowering drugs: 62.0%; with Oral+ insulin: 13.1; insulin alone: 5.9%
- Patients with HbA1c  $>7$ : 45%

### 3.4. Success criteria used to determine that the initiative is working well

Evaluation of the results of control along several years can monitor the impact of different interventions that are carried out and the adherence to the clinical guidelines established: control of the HbA1c, control of hypertension, control of cholesterol, control of different life styles, adequacy of the treatments prescribed, etc.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

Elderly people constitute the main age group of T2DM patients in primary care. The coexistence of comorbidities and physiological conditions limit antidiabetic treatment options. Having a large population database allows a better knowledge of the patient's characteristics and pharmacological treatments and permits an accurate analysis of the variables. The results provided by this study and some recommendations for the management of T2DM in the elderly, can be useful for other Spanish and European regions.

## 5. FURTHER INFORMATION

Links to web pages:

[www.idiapigol.org](http://www.idiapigol.org);

Contact person:

Josep Franch-Nadal ([iosep.franch@gmail.com](mailto:iosep.franch@gmail.com)), CAP Raval Sud, Av. Drassanes 17-21 08001 Barcelona (Spain)



**BASIC PROTOCOL FOR ADHERENCE (BAP4ADHERENCE)**

**1. BACKGROUND INFORMATION**

<b>ORGANISATION NAME</b>	<b>Inversión y Desarrollos Socio Asistenciales SL</b>
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Hospitals, Nursing homes, Private companies, Other (Technological Company)
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Italy and Spain
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	Italy and Andalusia
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	Elderly population looked after in our centres in Andalusia (Sevilla and Cádiz)
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	3 M
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	250-300 residents
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	People in care homes, People in nursing homes
<b>TYPE OF PARTNERS INVOLVED</b>	Nursing homes, Micro-sized industry, Home care centres, Private companies, Other (Technological Company)
<b>TOPICS/DISEASES ADDRESSED</b> (KEYWORDS)	Monitoring, STOPP/START criteria, reduce effects polypharmacy, ITC, online services, education and empower patients, knowledge, social networks
<b>RELEVANCE TO A1 ACTION PLAN</b>	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input checked="" type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

- a) We want to implement a monitoring system to control the medical adherence and the correct use of the medicine.
- b) We are working to adapt the medicaments at the specific pathologies and chronic disease in elderly.
- c) Our company will work controlling the necessary use of medicaments in each case studying the clinical situation in the patients who we are in our trial.

### 2.1. Methodology, processes and target population

- a) We want to use the ITC, Teleservices, and Mobile Device to improve the adherence and to be able to control the interactions and avoid the complications disease and the worsening or deterioration of our patients.
- b) Our different target population at the beginning it will be the elderly people who are living in our nursing homes (Group Aura Andalusia) in Cadiz and Seville, around 250 residents, and the selected patients who belong at Villa Beretta, Valduce Hospital.
- c) In Our project are involved other organizations like training and technology companies. Our consortium is focused on to get results in the main objective: reduce the polypharmacy.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

We are using the technology and the monitoring system like tablets and mobile application to implementing the assistance protocols concerning the adherence to treatment. We are taking results care and controlling the patients at home by mean of the ITC and their clinical information, and this result are being registered in our informatics system. The objective is controlling the adherence, de medication and the treatment.

The economic objective is improve the quality of life of the patients, to avoid the interaction, the allergy, to control the chronic disease and then in the next future we want to be able to reduce the cost to help the public health services to be sustainable and efficient.

### 2.3. Organisations involved

- 1) GRUPO AURA ANDALUCIA (ANDALUCIA-SPAIN): LEADER COMPANY (<http://www.auraandalucia.es>)
- 2) TICTOUCH: SEVILLA-SPAIN (<http://www.tictouch.eu>)
- 3) AB.ACUS: ITALY (<http://www.ab-acus.com>)
- 4) HUMAN OVERALL: SEVILLA-SPAIN (<http://www.humanoverall.es>)
- 5) VILLA VERETTA HOSPITAL VALDUCE- ITALY

### 2.4. Funding

Has the initiative already received some funding?	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

At the moment we are at the beginning the project. We are selecting the appropriate patient's profiles to work in this action area.

The most important innovation in this area is the use the ICT and the online services to get results in empowering the patients and care givers and to train the professionals to reduce the polypharmacy.

Initially, at this level in the project, it hasn't been possible yet to have formal and informal evaluations. When we have it available, we will notify or we'll inform about the results.

### 3.1. Key innovative elements of your good practice

The technological solutions (ITC) tablets and mobile application in collaboration with two of our partners who is a technological company.(Ab.acus and TicTouch)

### 3.2. Evidence on the impact and outcomes

The most important innovation in this area is the use the ICT and the online services to get results in the patient's empowerments and caregivers and to train the professionals to reduce the polypharmacy.



### 3.3. Formal or informal evaluation

Initially, at this level in the project, it hasn't been possible yet to have formal and informal evaluations. When we have it available, we will notify or we'll inform about the results.

### 3.4. Success criteria used to determine that the initiative is working well

- 1) A good evolution of patients;
- 2) Less emergency requirements;
- 3) Use maximum 3 or 4 medication;
- 4) Reductions of interaction and allergies;
- 5) To avoid the exacerbation to chronic disease

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

This initiative it is very important at different geographic levels because it is very easy to transfer for the following reasons:

- a) It is an evidence and an example of the good practice and very positive to reduce the medications in the elderly people to avoid the complications of their chronic diseases.
- b) It is important to control the adherence to facilitate the symptoms and to improve the quality of live.
- c) We think that the control of polypharmacy is necessary, imperative and urgent if we want to do the public system sustainable and to be able to

d) reduce the cost of medicaments and to get invest in others health areas.

e) At this moment the technology could be the way to find inexpensive solutions at the polypharmacy problems and at the increase the public cost in health services.

f) Each day it is easier to use the technology at the global society where we are living now. We have the ITC near and achievable.

In every country exists an interest to work in that way to contribute with the increase the quality of live in elderly people and to help to the control the exacerbation of the chronic diseases and use the technology to get results. The reason is the wishes to make the pathway for contribute the maintenance of a public health care system.

## 5. FURTHER INFORMATION

**Link to web pages:**

[www.auraandalucia.es](http://www.auraandalucia.es)

**Contact Persons:**

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([esalud@auraandalucia.es](mailto:esalud@auraandalucia.es)), external advisor



# DESIGN, DEVELOPMENT, DEPLOYMENT AND EVALUATION OF ICT SERVICES AND TOOLS FOR OLDER PEOPLE AND CHRONIC PATIENTS, AS WELL AS CAREGIVERS AND CARE PROVIDERS MANAGING THEIR HEALTH AND WELLBEING

## 1. BACKGROUND INFORMATION

ORGANISATION NAME	Life Supporting Technologies–Universidad Politecnica de Madrid
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Academia
COUNTRY INVOLVED IN THE GOOD PRACTICE	Spain, Italy, Czech Republic, Germany, UK. France, Switzerland, Romania, Bulgaria, Greece
REGION INVOLVED IN THE GOOD PRACTICE	ICT solutions validated in in the cities of: Madrid, Pamplona, Parma, Modena, Prague, Aachen, Hull, Ginevra, Strasburg, Pisa, Florence, Newcastle, Bucharest, Plovdiv, Kaiserslautern, Ioannina
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	<u>Mood disorders</u> : a ICT solution has been tested in Geneve (CH), Strasburg (FR) and Pisa (IT) with 30 users; <u>Cardiac Rehabilitation of Coronary Artery Disease patients</u> (myocardial infarction and cardiac surgery): 50 patients used a rehabilitation system in Hull (UK), Aachen (DE) and Madrid (ES); <u>Heart Failure population</u> : 100 patients used a telemonitoring system for one year in Aachen, Heidelberg, Bad Oeyenhausen (DE), Malaga, Madrid and Murcia (ES); 80 Parkinson's disease patients and 12 patients with parkinsonism's disorders have been involved in the University of Navarra Medical School Hospital (Spain), the University of Ioannina Hospital (Greece), and the Nuovo Ospedale Civile S.Agostino-Estense of Modena (Italy); 54 <u>Diabetic patients</u> , type 1 and type 2, have been involved in an exploratory study, evaluating the effectiveness of a platform for diabetes disease management in Madrid (Spain), Parma and Modena (Italy) and Prague (Czech Republic); 130 older people have been using a "health remote monitoring application" in real settings and environments (usability assessment was performed).
GOOD PRACTICE DIRECT TARGET GROUP SIZE	Diabetes, Parkinson's disease, hearth failure, coronary artery diseases (heart attack and cardiac surgery), mood disorders, older people.
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Older people in general population, Patients in hospitals, people in day care centres, Specialised physicians, informal caregivers, Older people receiving care/living at home , People in care homes , Patients with a specific disease, People in nursing homes
TYPE OF PARTNERS INVOLVED	Hospitals, Research centres, Small-sized industry, Academia , Specialised physicians, Day care centres, Medium-sized industry, Private companies
TOPICS/DISEASES ADDRESSED (KEYWORDS)	User-centred design techniques, design / development/ deployment/assessment of ICT tools for treatment adherence support, E-health-specific regulatory certifications for clinical trials, diabetes, Parkinson's disease, hearth failure, coronary artery disease (heart attack and cardiac surgery), mood disorders, older people.
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring

## Action Group on "Prescription and adherence to medical plans"



<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input checked="" type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking

## 2. DESCRIPTION

We envision the co-management of patients as a solution to the current barriers of the current healthcare system.

We try to answer to the following challenges: how to select, compose, and generate empowerment content; how to give feedback to the user; how to promote compliance in self-care management; what are the characteristics of an effective self-management system, its content, and technology; how patient empowerment creates business and value; how it can be integrated into business processes and strategies; and finally, what is the future of patient empowerment. For that aim:

- We have developed the necessary tools to support the continuous and collaborative management of patients.
- We have developed frameworks for patient support and empowerment based on existing clinical guidelines.
- We have explored potential business models for the externalization of the management of chronic patients.

### 2.1. Methodology, processes and target population

Design, development, deployment and evaluation of ICT services and tools for older people, patients and professionals managing chronic diseases, adopting User Centred Design (UCD) techniques and aiming at reaching high acceptability levels.

Regulatory certification, deployment, maintenance and evaluation of ICT tools in clinical trials.

As far as the target population is concerned, solutions are already validated in diabetes, Parkinson's disease, cardio vascular diseases, mood disorders and older population.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

1. Contributing to set up a new standard for integrated management of long term disorders, understanding and addressing the current existing barriers:

- Technological Barriers: hiding complexity and boosting usability
- Social Barriers: Incorporating all actors, i.e. patients, caregivers and care providers in the design and development loops, setting up realistic user needs and requirements
- Health Care System limitations: fighting reluctances to change by using a credible scientific compliant validation process

2. Empower patients and caregivers to take a proactive role in their self-management

3. Establish the basis for an industrial and business network by designing and developing a reliable, solid and marketable system in the e-health sector:

- Certification and approval from regulatory agencies



- Health technology assessment specific for e-health tools

## 2.3. Organisations involved

Clinical Centres for User Requirements and Trials; Industrial Partners for coordination and business model creation.

## 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
<input checked="" type="checkbox"/> 7th Framework Programme for Research and Innovation				

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

Holistic (addressing all aspects of users' care needs, not only disease process and acute events) and comprehensive (stratifying the population and the disease according to the type of intervention needed) care approaches, coordination of multidisciplinary team (industry, healthcare, psychologists and educators, human computer interaction experts, biomedical and health informatics engineers).

### 3.2. Evidence on the impact and outcomes

System certifications have been provided and all regulatory aspects have been addressed, leading to protocols approval and trial executions in healthcare centres in Spain, Italy, Czech Republic, Germany, UK, France, Switzerland, Romania, Bulgaria.

All the technical solutions have been deployed and tested, providing maintenance and all the necessary means for system evaluation.

Preliminary results have been gathered and published, showing in general high acceptability levels.

Future publications will focus on describing results in terms of clinical, behavioural and usability outcomes.

### 3.3. Formal or informal evaluation

Formal evaluations, under analysis; results published so far:

- E. Gaeta, G. Cea, M.T. Arredondo, and J. P. Leuteritz, 2012, AmIRTEM: A Functional Model for Training of Aerobic Endurance for Health Improvement. IEEE Trans Biomed Eng, Vol. 59, n. 11, 3155-3161.
- E. Villalba, D. Salvi, M. Ottaviano, I. Peinado, M.T. Arredondo; A. Akay, 2006. Wearable and Mobile System to Manage Remotely Heart Failure. IEEE T INF TECHNOL B, Vol. 13, n.6, 990-996.

- Fico G., Fioravanti A., Arredondo M.T., Leuteritz J.P., Guillén A., Fernandez D. A User Centered Design Approach for Patient Interfaces to a Diabetes IT Platform. Engineering in Medicine and Biology Society, EMBC, 2011 Annual International Conference of the IEEE. 1169-1172
- Fico G., Fioravanti A., Arredondo M.T., Ardigo D., Guillén A. A Healthy Lifestyle Coaching-Persuasive Application for Patients with Type 2 Diabetes. Engineering in Medicine and Biology Society, EMBC, 2010 Annual International Conference of the IEEE. 2221-2224.
- M. Ottaviano, C. Vera-Munoz, M.T. Arredondo, D. Salvi; S. Salvi, J.M. Paez, A.D. de Barrionuevo, 2011. Innovative self-management system for guided cardiac rehabilitation. Engineering in Medicine and Biology Society, EMBC, 2011 Annual International Conference of the IEEE. 1559-1562
- Cancela J., Pastorino M., Arredondo M.T., A. Hurtado. A Telehealth System for Parkinson's disease Remote Monitoring. The PERFORM Approach. Engineering in Medicine and Biology Society, EMBC, 2013 Annual International Conference of the IEEE. 7492-7495.
- Pastorino M., Cancela J., Arredondo M.T., Pansera M., Pastor-Sanz L., Villagra F., Pastor M.A., J.A. Martín. Assessment of Bradykinesia in Parkinson's disease patients through a multi-parametric system. Engineering in Medicine and Biology Society, EMBC, 2011 Annual International Conference of the IEEE. 1810-1813.
- Cancela J., Pastorino M., Arredondo M.T., Pansera M., Pastor-Sanz L., Villagra F., M.A. Pastor, A.P. Gonzalez, 2011. Gait assessment in Parkinson's disease patients through a network of wearable accelerometers in unsupervised environments. Engineering in Medicine and Biology Society, EMBC, 2011 Annual International Conference of the IEEE. 1810-1813.



Society,EMBC, 2011 Annual International Conference of the IEEE. 2233-2236.

- Jiménez-Mixco V., Cabrera-Umpiérrez M.F., Arredondo M.T., Panou M., Struck M., Bonfiglio S. Feasibility of a Wireless Health Monitoring System for Prevention and Health Assessment of Elderly People. Engineering in Medicine and Biology Society,EMBC, 2013 Annual International Conference of the IEEE. 7306-7309.

### 3.4. Success criteria used to determine that the initiative is working well

Our initiatives included as outcome:

- Clinical and behavioural outcomes
- Quality of Life
- Satisfaction, acceptability and usability
- Technical Feasibility and performance

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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All the validations of results are under edition for publication so far. We can say, in the meantime, that feasibility of these solutions has been positively assessed in different settings of different European countries, proving to be useful tool for professionals and patients, so they are definitely transferrable.

We do think that one of the most important lessons learned is that these solutions may have a real impact if the healthcare organizations/institutions are committed to a re-design of their care delivery process and if the key personnel involved are committed and have the necessary financial and human resources.

Economic evaluation of these solutions is still underperformed.

## 5. FURTHER INFORMATION

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**Links to web pages:**

[www.lst.tfo.upm.es](http://www.lst.tfo.upm.es)

**Contact persons:**

Giuseppe Fico ([gfico@lst.tfo.upm.es](mailto:gfico@lst.tfo.upm.es)), Maria Teresa Arredondo ([mta@lst.tfo.upm.es](mailto:mta@lst.tfo.upm.es))



CHRONIC MEDICATION SERVICE: NEW MEDICATION AND REVIEW OF HIGH RISK DRUGS

1. BACKGROUND INFORMATION

ORGANISATION NAME	NHS 24 (representing NHS Scotland)
COUNTRY INVOLVED IN THE GOOD PRACTICE	Scotland
REGION INVOLVED IN THE GOOD PRACTICE	14 health boards across Scotland
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Scotland
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	5.2 Million
GOOD PRACTICE DIRECT TARGET GROUP SIZE	Overall population: 5.2 Million 40% of the adult population have a long term condition
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Older people in general population, pharmacists, general practitioners, patients with specific disease, people collecting prescriptions from pharmacies , people visiting GPs
TYPE OF PARTNERS INVOLVED	NHS 24 represents NHS Scotland and its partners in all matters relating to EIP AHA and thus as reference site. As a national health and care delivery organisation, the coalition is of substantial size and covers all 14 territorial Health Boards and 32 Health and Social care Partnerships as well as special health board with national coverage. In addition, the coalition includes national and local Government organisations; housing, independent and voluntary sector organisations, academic and enterprise partners and improvement organisations. Principal partners are the Joint Improvement Team, COSLA and the Health and Social Care Alliance
TOPICS/DISEASES ADDRESSED (KEYWORDS)	The number of people in Scotland over 65 years will rise by 63% by 2031; over 75s will increase by 83%. Prevalence of multiple morbidity, frailty and cognitive impairment increase with ageing. Four out of five people aged over 75 years take a prescription medicine and 36 per cent are taking four or more. However, up to 50 per cent of drugs are not taken as prescribed and many drugs in common use can cause problems, including falls. People on multiple medications are at increased risk of drug side effects this addresses any pharmaceutical care issues associated with prescribed medications and support patients to take their medications appropriately, minimising harm and supporting adherence.
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input checked="" type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input checked="" type="checkbox"/> Service models <input type="checkbox"/> Training



<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking

## 2. DESCRIPTION

### 2.1. Methodology, processes and target population [http://www.sehd.scot.nhs.uk/pca/PCA2012\(P\)19.pdf](http://www.sehd.scot.nhs.uk/pca/PCA2012(P)19.pdf)

The Chronic Medication Service (CMS) will improve the pharmaceutical care for up to 1.9 million patients in Scotland - integrating local services provided by GPs, pharmacists and other community practitioners. Its aim is to improve patient care through a systematic approach to the pharmaceutical care of patients with long term conditions. CMS formalises the role of community pharmacists in the management of patients with long term conditions by making better use of their skills and expertise to improve a patient's understanding of their medicines and to help to maximise the clinical outcomes from their therapy. It promotes a partnership approach between the pharmacist, the patient and their GP and will also save GP and GP practice staff time in respect of managing regular repeat prescriptions.

As of 14 April 2013, a total of 280,424 patients had been registered for CMS at 1240 community pharmacies.

The final stage of CMS will be to fully implement serial prescriptions – prescriptions lasting 24 or 24 weeks. This is expected to be in place by end of 2013.

**As part of CMS, new medicines intervention (NMIST) and high risk medication tools have been developed**

#### High risk and new medicines intervention support tools

Three assessment support tools have been developed to support community pharmacists in delivering CMS. The first two tools target medicines with a narrow therapeutic index (methotrexate and lithium) and the third tool aims to increase patient adherence to new medicines prescribed to treat long term conditions. These tools also assist in underpinning community pharmacists' contribution to the Patient Safety in Primary Care Programme. It is envisaged that, where appropriate, further assessment tools will be added to the Patient Care Record (PCR) over time. A tool for warfarin is due to be added in the autumn.

Circular PCA(P)(2012)19 provides more detail – it is available online at:

#### The New Medicine Intervention support tool (NMIST)

The New Medicine Intervention support tool (NMIST) is a quality initiative within the Chronic Medication Service (CMS) aimed at increasing patient adherence to new medicines prescribed to treat long term conditions.

It is based on a series of structured interventions and support with a pharmacist working with a patient in order to improve their understanding of a new medicine and to maximise the clinical outcomes from their therapy.

#### The High Risk Medicine assessment tools

The High Risk Medicine assessment tools are a patient safety initiative within the Chronic Medication Service (CMS) and outline a series of structured interventions based on the National Patient Safety Agency (NPSA) alerts and which link to the Scottish Patient Safety in Primary Care Programme.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

CMS will provide the following benefits:

- Improved clinical outcomes
- Improved concordance
- Reduced wastage
- Easier patient journey
- Promotion of self-care
- Better utilisation of the workforce

It is anticipated that CMS will deliver savings in relation to drug wastage, savings in GP time and will also reduce paper as there will be less repeat prescriptions once serial prescriptions have been implemented.

The core objectives of NMIST are to:

## Action Group on "Prescription and adherence to medical plans"



- improve patient adherence with newly prescribed medicines to treat long term conditions through a series of structured interventions and support;
- improve patient understanding of new medicines;
- enhance self-care and well-being;
- reduce wastage of new medicines;
- underpin the pharmacist's role in improving the management of long term conditions;
- document pharmaceutical care practice; and
- facilitate effective therapeutic partnerships
- improve patients' understanding of their therapy including awareness of interactions, precautions, side effects, toxicity and monitoring requirements;
- enhance self-care and well-being;
- reduce wastage;
- underpin the pharmacist's role in improving the management of long term conditions;
- document pharmaceutical care practice; and
- facilitate effective therapeutic partnerships.

### 2.3. Organisations involved

The core objectives of the High Risk Medicine tools are to:

- reduce the risk of harm;
- improve patient adherence with their therapy;

Community pharmacists, general practitioners, Scottish Patient Safety programme, Health boards, Scottish Government, Information services division.

### 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

Pharmacist works with the patient to identify relevant care issues relating to the patients medication for long term conditions.

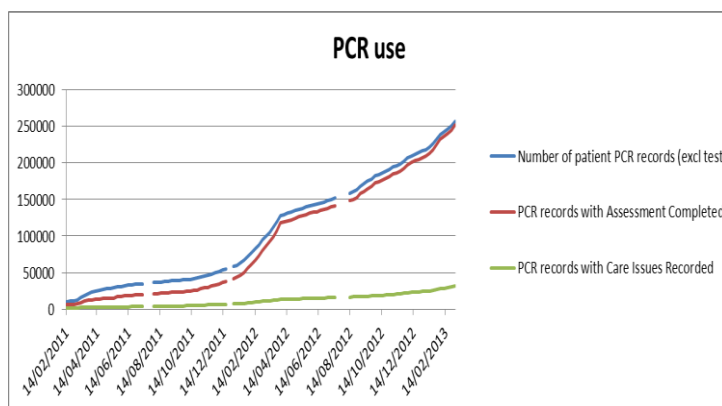
Electronic prescription transfer from general practitioners to pharmacy and transfer of prescription for up to 48 weeks to pharmacist from GP for serial dispensing.

Recording of patients pharmaceutical care issues electronically which can be shared with patients GP or across primary and secondary care if patient moves into hospital.

### 3.2. Evidence on the impact and outcomes

CMS is providing significant benefits for patients with long term conditions and the healthcare professionals who support them. An improved patient journey, continuity of care, improved patient safety with reduced adverse drug events, and reduced medicines wastage leading to overall efficiencies.

Over a quarter of million patients are now registered with CMS at community pharmacies across Scotland – some 99% of these have Pharmacy Care Record (PCR) care plans, with almost all having been assessed for on-going support.





### 3.3. Formal or informal evaluation

Electronic monitoring of number of patients registering for services and interventions made.

### 3.4. Success criteria used to determine that the initiative is working well

The focus in 2013 is the roll-out of the serial prescribing and dispensing element of the service. There are now some 580 community pharmacies and 260 GP practices enabled - with 200 pharmacies and 100 practices actively serial prescribing and dispensing. Over 83,000 items have been dispensed through CMS. There is continued monitoring of the number of people who are registered for CMS and care issues identified and number of high risk and new medicines.

### 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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The methodology and tools have been shared with other countries in the UK who have developed some services that are similar.

### 5. FURTHER INFORMATION

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**Link to web pages:** chronic medication service ([http://www.communitypharmacy.scot.nhs.uk/core\\_services/cms.html](http://www.communitypharmacy.scot.nhs.uk/core_services/cms.html))

**Contact person:** Alpana Mair ([Alpana.mair@scotland.gsi.gov.uk](mailto:Alpana.mair@scotland.gsi.gov.uk)), Deputy Chief Pharmaceutical Officer, Scottish Government



INDICATORS TO MONITOR APPROPRIATE PRESCRIBING FOR PATIENTS AND POLYPHARMACY GUIDANCE FOR REVIEW OF QUALITY, SAFE AND EFFECTIVE USE OF MEDICATION USING PATIENT SPECIFIC PRESCRIBING DATA

## 1. BACKGROUND INFORMATION

ORGANISATION NAME	NHS 24 (representing NHS Scotland)
COUNTRY INVOLVED IN THE GOOD PRACTICE	Scotland
REGION INVOLVED IN THE GOOD PRACTICE	14 health boards across Scotland
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Scotland
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	5.2 Million
GOOD PRACTICE DIRECT TARGET GROUP SIZE	Overall population: 5.2 Million 40% of the adult population have a long term condition and a proportion of these will be taking multiple medication or a high risk medication
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Older people in general population, older people in care homes, pharmacists, specialised physicians, older people receiving care at home
TYPE OF PARTNERS INVOLVED	NHS 24 represents NHS Scotland and its partners in all matters relating to EIP AHA and thus as reference site. As a national health and care delivery organisation, the coalition is of substantial size and covers all 14 territorial Health Boards and 32 Health and Social care Partnerships as well as special health board with national coverage. In addition, the coalition includes national and local Government organisations; housing, independent and voluntary sector organisations, academic and enterprise partners and improvement organisations. Principal partners are the Joint Improvement Team, COSLA and the Health and Social Care Alliance
TOPICS/DISEASES ADDRESSED (KEYWORDS)	The number of people in Scotland over 65 years will rise by 63% by 2031; over 75s will increase by 83%. Prevalence of multiple morbidity, frailty and cognitive impairment increase with ageing. Four out of five people aged over 75 years take a prescription medicine and 36 per cent are taking four or more. However, up to 50 per cent of drugs are not taken as prescribed and many drugs in common use can cause problems, including falls. People on multiple medications are at increased risk of drug side effects
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input checked="" type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input checked="" type="checkbox"/> Service models <input type="checkbox"/> Training

## Action Group on "Prescription and adherence to medical plans"



<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input checked="" type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking

## 2. DESCRIPTION

In November 2012, National guidance together with tools was provided to health boards and they were tasked to address polypharmacy in a multidisciplinary approach using pharmacists working with GP's and geriatricians. In addition to the work by health boards, from April 2013, this has been incorporated in a new contract will require GP practices working in multidisciplinary teams to develop Anticipatory Care Plans and undertake polypharmacy reviews for people identified at risk of emergency admission.

Indicators are being developed to monitor changed in prescribing using analysis of patient specific prescribing data.

### 2.1. Methodology, processes and target population

Using patient specific prescribing data, data has been analysed to help develop indicators that monitor changes in polypharmacy, in particular changes in high

risk medication. Clinicians will be able to compare their practice against each other to drive improvement.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

This is a new piece of data analysis to look at patient specific prescribing data and monitor changes in prescribing of patients that take high risk medication. This will be further analysed to see if there is impact on hospital admissions.

### 2.3. Organisations involved

Primary care pharmacists, clinical pharmacists working in NHS general practitioners, Scottish Patient Safety programme, Health boards, Scottish Government, NHS Scotland Information Services Division.

### 2.4. Funding

Has the initiative already received some funding?	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

Using patient specific prescribing data to develop indicators to drive improvement.

Success will be determined from Feedback from health boards and clinicians on the impact of indicators to drive change in behavior.

### 3.2. Evidence on the impact and outcomes

These indicators will be used to collect evidence on outcomes from the reviews in health boards.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

### 3.3. Formal or informal evaluation

Initial evaluation of data shows differences in health boards and this will be used to drive reduction in inappropriate variation.

The polypharmacy indicators will be developed at health board level then at general practice level.

This information will be shared with colleagues in A1, notably Naples who are also interested in use of prescribing data to drive improvement in prescription.

### 3.4. Success criteria used to determine that the initiative is working well



## 5. FURTHER INFORMATION

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### Link to additional references:

Circular CEL 36(2012), Appropriate prescribing for patients and polypharmacy guidance for review of quality, safe and effective use of medication, Scottish Government, November 2012

[http://www.qihub.scot.nhs.uk/media/458907/polypharmacy\\_guidance\\_for\\_clinicians\\_october2012.pdf](http://www.qihub.scot.nhs.uk/media/458907/polypharmacy_guidance_for_clinicians_october2012.pdf)

### Contact person:

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Deputy Chief Pharmaceutical Officer, Scottish  
Government



APPROPRIATE PRESCRIBING FOR PATIENTS AND POLYPHARMACY GUIDANCE FOR REVIEW OF QUALITY, SAFE AND EFFECTIVE USE OF MEDICATION

## 1. BACKGROUND INFORMATION

ORGANISATION NAME	NHS 24 (representing NHS Scotland)
COUNTRY INVOLVED IN THE GOOD PRACTICE	Scotland
REGION INVOLVED IN THE GOOD PRACTICE	14 health boards across Scotland
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Scotland
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	5.2 Million
GOOD PRACTICE DIRECT TARGET GROUP SIZE	Overall population: 5.2 Million 40% of the adult population have a long term condition and a proportion of these will be taking multiple medication or a high risk medication
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Older people in general population, older people in care homes, pharmacists, specialised physicians, older people receiving care at home
TYPE OF PARTNERS INVOLVED	NHS 24 represents NHS Scotland and its partners in all matters relating to EIP AHA and thus as reference site. As a national health and care delivery organisation, the coalition is of substantial size and covers all 14 territorial Health Boards and 32 Health and Social care Partnerships as well as special health board with national coverage. In addition, the coalition includes national and local Government organisations; housing, independent and voluntary sector organisations, academic and enterprise partners and improvement organisations. Principal partners are the Joint Improvement Team, COSLA and the Health and Social Care Alliance
TOPICS/DISEASES ADDRESSED (KEYWORDS)	The number of people in Scotland over 65 years will rise by 63% by 2031; over 75s will increase by 83%. Prevalence of multiple morbidity, frailty and cognitive impairment increase with ageing. Four out of five people aged over 75 years take a prescription medicine and 36 per cent are taking four or more. However, up to 50 per cent of drugs are not taken as prescribed and many drugs in common use can cause problems, including falls. People on multiple medications are at increased risk of drug side effects
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input checked="" type="checkbox"/> Service models <input type="checkbox"/> Training

## Action Group on "Prescription and adherence to medical plans"



<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input checked="" type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking

## 2. DESCRIPTION

There is recognition of the harm and waste associated with polypharmacy and the associated treatment burden for people living with multiple long term conditions.

A national review of pharmaceutical care in the community (Oct 2012) has made recommendations to enhance the role of pharmacists and encourage closer working with GPs and community services providing personalised care for long-term conditions (LTCs) and minor ailments to ensure people get the best results from their medicines, i.e. right medicine, right patient, right time, to cause the right effect. Aligning it with other specific medicines interventions (The Scottish Patient Safety Programme, Long Term Conditions Collaborative, Mental Health Collaborative, Reshaping Care for Older People and Quality, Efficiency and Productivity, Scotland will have a coherent quality programme to drive safe, effective, person centred practice and deliver pharmaceutical care that improves adherence and clinical outcomes.

### 2.1. Methodology, processes and target population

In November 2012, National guidance together with tools was provided to health boards and they were tasked to address polypharmacy in a multidisciplinary approach using pharmacists working with GP's and geriatricians.

In addition to the work by health boards, from April 2013, this has been incorporated in a new contract will require GP practices working in multidisciplinary teams to develop Anticipatory Care Plans and undertake

polypharmacy reviews for people identified at risk of emergency admission.

Practices will use an on line national risk prediction tool to identify those suitable for assessment, early interventions and a 'thinking ahead' or anticipatory care approach. They will discuss the individual's preferences in the event of a future deterioration in their condition, or a carer crisis, review appropriateness of medicines adherence to and signpost to appropriate interventions such as support for self-management, exercise programmes, services to prevent falls and remote monitoring support from telehealth and telecare.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

Drug review tools for process of medication review for appropriate prescription.

Reviews undertaken by pharmacists working with GPs and in discussion with the patient.

Ensure patients in care/ nursing homes or patients receiving care at home all have access to pharmaceutical care ensuring appropriate prescribing

Use of risk stratification tools to identify patients at risk

### 2.3. Organisations involved

Primary care pharmacists, clinical pharmacists working in NHS general practitioners, Scottish Patient Safety programme, Health boards, Scottish Government, NHS Scotland Information Services Division.

### 2.4. Funding

Has the initiative already received some funding?	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO



### 3. INNOVATION, IMPACT AND OUTCOMES

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#### 3.1. Key innovative elements of your good practice

Multidisciplinary team reviewing appropriateness of medication

Use of risk stratification tool to identify patients at risk

Introduction into general practitioner contract framework to undertake MDT review.

#### 3.2. Evidence on the impact and outcomes

Evidence has been collected on outcomes from the reviews in health boards and these can be found in the polypharmacy guidance. Evidence from these demonstrator sites led to all health boards implementing plans to address patients taking multiple medications with one or medications that have the potential to cause adverse drug reactions

#### 3.3. Formal or informal evaluation

As per 3.2

#### 3.4. Success criteria used to determine that the initiative is working well

Feedback from health boards on the impact of ongoing reviews, together with feedback from pharmacists and GPs undertaking the reviews.

#### 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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The polypharmacy work started out with project work in 4-5 health boards that used similar tools to undertake reviews for patients taking medicine which had potential to cause harm in frail elderly patients. Evidence from these demonstrated that, prescriptions are improved and also patient safety is improved.

As a result in Nov 2012 all health boards were tasked to look at patients on multiple medications that had potential to cause adverse events for the patient. The reviews were also then incorporated into the general practitioner contract working in partnership with pharmacists.

#### 5. FURTHER INFORMATION

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##### Link to additional references:

Circular CEL 36(2012), Appropriate prescribing for patients and polypharmacy guidance for review of quality, safe and effective use of medication, Scottish Government, November 2012

[http://www.qihub.scot.nhs.uk/media/458907/polypharmacy\\_guidance\\_for\\_clinicians\\_october2012.pdf](http://www.qihub.scot.nhs.uk/media/458907/polypharmacy_guidance_for_clinicians_october2012.pdf)

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Deputy Chief Pharmaceutical Officer, Scottish Government



## NATIONAL REVIEW OF PHARMACEUTICAL CARE IN THE COMMUNITY ACROSS SCOTLAND

## 1. BACKGROUND INFORMATION

ORGANISATION NAME	NHS 24 (representing NHS Scotland)
COUNTRY INVOLVED IN THE GOOD PRACTICE	Scotland
REGION INVOLVED IN THE GOOD PRACTICE	All 14 health Boards across Scotland.
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Scotland
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	5.2 Million
GOOD PRACTICE DIRECT TARGET GROUP SIZE	Overall population: 5.2 Million 40% of the adult population have a long term condition
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Older people in general population, patients in hospital, people visiting general practitioners, General Practitioners, formal and informal care givers, older people receiving care at home, people collecting prescriptions from pharmacy, pharmacists, patients with specific disease, people in nursing homes, patient groups
TYPE OF PARTNERS INVOLVED	NHS 24 represents NHS Scotland and its partners in all matters relating to EIP AHA and thus as reference site. As a national health and care delivery organisation, the coalition is of substantial size and covers all 14 territorial Health Boards and 32 Health and Social care Partnerships as well as special health board with national coverage. In addition, the coalition includes national and local Government organisations; housing, independent and voluntary sector organisations, academic and enterprise partners and improvement organisations. Principal partners are the Joint Improvement Team, COSLA and the Health and Social Care Alliance
TOPICS/DISEASES ADDRESSED (KEYWORDS)	The number of people in Scotland over 65 years will rise by 63% by 2031; over 75s will increase by 83%. Prevalence of multiple morbidity, frailty and cognitive impairment increase with ageing. Four out of five people aged over 75 years take a prescription medicine and 36 per cent are taking four or more. However, up to 50 per cent of drugs are not taken as prescribed and many drugs in common use can cause problems, including falls. People on multiple medications are at increased risk of drug side effects
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input checked="" type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input checked="" type="checkbox"/> Service models <input checked="" type="checkbox"/> Training



<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking

## 2. DESCRIPTION

### Undertake a national review of pharmaceutical care in the community across Scotland which will make recommendations to enhance the role of pharmacists and encourage closer working with GPs and community services

There is recognition of the harm and waste associated with polypharmacy and the associated treatment burden for people living with multiple long term conditions.

A national review of pharmaceutical care in the community (Oct 2012) has made recommendations to enhance the role of pharmacists and encourage closer working with GPs and community services providing personalised care for long-term conditions (LTCs) and minor ailments to ensure people get the best results from their medicines, i.e. right medicine, right patient, right time, to cause the right effect.

Aligning it with other specific medicines interventions (The Scottish Patient Safety Programme, Long Term Conditions Collaborative, Mental Health Collaborative, Reshaping Care for Older People and Quality, Efficiency and Productivity, Scotland will have a coherent quality programme to drive safe, effective,

person centred practice and deliver pharmaceutical care that improves adherence and clinical outcomes

### 2.1. Methodology, processes and target population

The review explored the needs of all people in the community and how they could access pharmaceutical care prioritising those in care homes and those taking multiple medications.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

Recommendations were made in the report to explore the pharmacist's use of telehealth to deliver pharmaceutical care and technology such as robotics to release capacity for pharmacists to deliver pharmaceutical care.

### 2.3. Organisations involved

Scottish Government, NHS, GPs, Pharmacists, Patient groups, care providers.

### 2.4. Funding

Has the initiative already received some funding?	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

A review was commissioned by the Cabinet Secretary for health, Nicola Sturgeon, was undertaken of stakeholders in Scotland.

A report was produced with key recommendations to ensure people across Scotland have access to pharmaceutical care delivered by pharmacists working in collaboration with other health and social care colleagues.

### 3.2. Evidence on the impact and outcomes

The review outcomes have discussed:

- the role of pharmacists to reinforce positive messages about treatment adherence.
- closer working of pharmacists with GPs and community services.
- Role of pharmacist in education programmes for patients and their carers on actions to improve adherence.



- ICT to share complete, timely, accurate medicines information

### 3.3. Formal or informal evaluation

The report has been well received by stakeholders and the Scottish Government will publish its response

### 3.4. Success criteria used to determine that the initiative is working well

The implementation of key recommendations from the Scottish Government's Action plan which will consider key recommendations from the action plan and other key policy documents.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

New models of collaborative working can be adopted across the UK and also in other European countries where healthcare professionals are seeking to work more collaboratively. In preparation for a research bid there was willingness to explore working in a multidisciplinary way.

## 5. FURTHER INFORMATION

### Link to additional references:

- Review of NHS Pharmaceutical care of patients in the community in Scotland, Scottish Government, August 2013.
- Improving Pharmaceutical Care in care homes, Royal Pharmaceutical Society Scotland, March 2012.
- Circular CEL 36(2012), Appropriate prescribing for patients and polypharmacy guidance for review of quality, safe and effective use of medication, Scottish Government, November 2012:
- [http://www.gihub.scot.nhs.uk/media/458907/polypharmacy\\_guidance\\_for\\_clinicians\\_october2012.pdf](http://www.gihub.scot.nhs.uk/media/458907/polypharmacy_guidance_for_clinicians_october2012.pdf)
- Prescription for Excellence, Scottish Government 2013:  
<http://www.scotland.gov.uk/Resource/0043/00434053.pdf>

### Contact person:

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Deputy Chief Pharmaceutical Officer, Scottish Government



**TO EVALUATE THE EFFECTIVENESS OF A NURSE TRAINING PROGRAM IN MOTIVATIONAL INTERVIEW TO IMPROVE PATIENTS ADHERENCE TO MEDICATION**

**1. BACKGROUND INFORMATION**

<b>ORGANISATION NAME</b>	<b>rediAPP. Primary Care Prevention and Health Promotion Research Network</b>	
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Primary care centres, Nurses,	
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Spain	
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	Balearic Island	
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	Balearic Island	
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	1.077.360	
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	127.000	
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	People visiting general practitioners and nurses	
<b>TYPE OF PARTNERS INVOLVED</b>	Primary care centres, Nurses and GPs,	
<b>TOPICS/DISEASES ADDRESSED</b> (KEYWORDS)	Motivational interview, Adherence, antihypertensive medication	
<b>RELEVANCE TO A1 ACTION PLAN</b>		
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input type="checkbox"/> Monitoring	
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks	
<input type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training	
<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines	
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking	



## 2. DESCRIPTION

Suboptimal adherence to antihypertensive medication is a frequent condition in hypertensive patients; a nurse-coordinated intervention program based on motivational interview and a simplification of dosing regimens by a pharmacist could yield in important improvement in adherence and in lowering blood pressure.

### 2.1. Methodology, processes and target population

The intervention consists of two components that were delivered during three interventional visits of about 30 min each.

1. Motivational interview: based on the Health Belief Model [25] and the Prochaska and Di Clemente stage of change [26], were design to explore non adherence to antihypertensive treatment, to resolve ambivalences that patients had regarding medication and to explore perceptions that patients had about their ability to control events (locus of control).
  2. Simplification of dosing regimens: antihypertensive treatment were recorded at visit 0, a pharmacists supervised the dosage and treatment and when possible simplify the dosing regimen at visit 1.
- Visit 1 (first month, 30 min total): motivational interviewing (25 min), simplification of dosing regimens (5 min).

- Visit 2 (third month, 25 min total): motivational interview (25 min).
- Visit 3 (ninth month, 25 min total): motivational interview (25 min)

We designed a two arm, parallel, multicentre, randomized controlled to evaluate the effectiveness of the intervention.

Target population: those patients attending a nurse consultation, aged 18-80 and had uncontrolled essential hypertension; the target population (patient on antihypertensive treatment with poorly controlled blood pressure in the Balearic Island) is estimated in 127.000 patients.

### 2.2. Specific health/ICT/innovation and/or social/economic improvement objectives

The main objectives are to evaluate the effectiveness of the intervention to improve the systolic and diastolic BP of patients with elevated BP and to improve proportion of participants with adequate BP control at 12 months.

### 2.3. Organisations involved

Primary Care Research Group - Cancer in Balearic Islands. (IB Salut)

redIAPP Network

Department of Health of Balearic Islands

### 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES*	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

\* The project has been funded by the Carlos III Health Institute of the Ministry of Economy and Competitiveness (contract No PS09/01456)

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

This is the first time a multifactorial intervention based in this two components is evaluated. The motivation has been shown to be effective in change patient habits as alcohol problems, drug addiction, smoking, obesity, and insufficient physical exercise.

### 3.2. Evidence on the impact and outcomes

The evidence in the literature recommends the simplification of dosing regimens as the most effective intervention to improve adherence to antihypertensive treatment.

There is a Cochrane review of the effectiveness of the intervention in improving adherence to antihypertensive medication; this review shows an increase efficacy in the multifactorial intervention and those interventions that incorporate the simplification of the dose regimen and that include motivational strategies.

There is only a clinical trial to evaluate effectiveness in reducing cardiovascular events, however it failed to find effectiveness, mainly because a lack of power to detect small differences and a poor effectiveness of the intervention in reducing the systolic blood pressure (2mm/Hg).



### 3.3. Formal or informal evaluation

The evaluation of the effectiveness will be carried out by the registry of the blood pressure in the final visit. It is expected to find a mean difference of at least 5mm/Hg in the systolic blood pressure between the intervention group and the control group.

The adherence of the prescribed medication will be evaluated by means of the medication possession ratio.

It will be monitored the adherence of the nurse to the intervention: percentage of patients that had a simplification of their medication and number of session of the motivational interview.

### 3.4. Success criteria used to determine that the initiative is working well

The success criteria in this study are:

1. the maintenance of adherence in the long term and
2. the application of this intervention in the nurse practices.

If there is enough evidence from this intervention, clinical guidelines should incorporate it and the intervention could be extended to other primary care practices.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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Because of the external validity of this clinical trial the intervention and the easy to implement intervention (8 hour training workshop for nurses in motivational interview, 25 minutes intervention), the intervention could be easily implemented in other regions or countries.

## 5. FURTHER INFORMATION

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### Contact person:

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Balears, Phone: +34-971175883.



**MINDFULNESS PILLS (LEARNING AND GUIDE OF MINDFULNESS THROUGH APP. EXTRAPOLATED TO OTHER PSYCHOLOGICAL THERAPIES AND DRUG THERAPIES)**

## 1. BACKGROUND INFORMATION

ORGANISATION NAME	<b>redIAPP. Primary Care Prevention and Health Promotion Research Network</b>
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Research centres, General practitioners
COUNTRY INVOLVED IN THE GOOD PRACTICE	Spain, Brazil
REGION INVOLVED IN THE GOOD PRACTICE	Aragón (Spain), Sao Paulo (Brazil)
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Spain, Brazil, Spanish and Portuguese speaking countries
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	The entire population that meets requirements (prevention and treatment, mobile with internet, etc.)
GOOD PRACTICE DIRECT TARGET GROUP SIZE	2 M
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	People visiting general practitioners, Patients with a specific disease
PARTNERS INVOLVED	Group of Aragón (redIAPP), Universidad Federal de Sao Paulo
TYPE OF PARTNERS INVOLVED	Research centres, Primary care centres
TOPICS/DISEASES ADDRESSED (KEYWORDS)	New Technologies, APP, psychological treatments, guide of treatments
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

We are working on the development of a APP from which guiding in the practice of mindfulness. Mindfulness is a third-generation psychological therapy that has demonstrated usefulness not only in healthy people (prevention of psychiatric disorders, particularly depression and anxiety) but also in people in treatment of psychopathology.

A qualitative study has been developed to design and define the services of this APP (including or not a contact with a tutor, social networks, videos, etc.). At this moment, we are working in a mobile application through which facilitate, guide and improve the practice of mindfulness. It is not decided yet if this APP will be free or will be financed through advertising.

As soon as this application is available, a study to test its effectiveness and users' satisfaction will be developed. Initially this APP will be tested in population without psychopathology and later in population suffering from any kind of psychological disorder, mainly in people with depression and anxiety.

The technical development of this application will be extrapolable to other psychological treatment that has demonstrated effective and feasibility of its development through APPs.

### 2.1. Methodology, processes and target population

Design of the content of the app through qualitative studies.

Design of the app

Evaluation of the effectiveness of the app.

Target population: first it will be tested in population without psychopathology and later in population suffering from any kind of psychological disorder, mainly in people with depression and anxiety.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

Development of an application for mobile to improve adherence and monitoring of psychological treatments.

### 2.3. Organisations involved

Group of Aragón from redIAPP; Universidad Federal de Sao Paulo

### 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

Development of an application for mobile to improve adherence and monitoring of psychological treatments, starting with the practice of mindfulness.

### 3.2. Evidence on the impact and outcomes

As it is a new initiative, there is no evidence on its impact and results.

### 3.3. Formal or informal evaluation

No evaluations performed yet

### 3.4. Success criteria used to determine that the initiative is working well

User satisfaction; usage register and possible commercialization.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

Modifying the language of the contents, this application can be transferred to any country.

Keeping the technical aspects but modifying the contents of the application, another type of psychological treatment can be directed through a APP (with / without professional support, etc.).

## 5. FURTHER INFORMATION

### Contact person:

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**THE BENZORED STUDY: COMPARATIVE EFFICACY OF TWO INTERVENTIONS TO DISCONTINUE LONG-TERM BENZODIAZEPINE USE: A CLUSTER RANDOMISED CONTROLLED TRIAL IN PRIMARY CARE**

**1. BACKGROUND INFORMATION**

<b>ORGANISATION NAME</b>	<b>redIAPP. Primary Care Prevention and Health Promotion Research Network</b>
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Primary care centres, General practitioners,
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Spain
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	The Balearic Islands, Catalonia and the Valencian Community
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	The Balearic Islands, Catalonia and the Valencian Community
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	13.747.328
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	412.419
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	General practitioners,
<b>TYPE OF PARTNERS INVOLVED</b>	Primary Health Care Teams
<b>TOPICS/DISEASES ADDRESSED</b> (KEYWORDS)	Benzodiazepines/adverse effects, Primary Health Care, substance withdrawal syndrome/aetiology
<b>RELEVANCE TO A1 ACTION PLAN</b>	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input type="checkbox"/> Monitoring
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

This study assessed two interventions: a structured educational intervention with gradual tapering backed up by fortnightly follow-up visits (SIF) and the same structured educational intervention supported by written instruction rather than follow-up visits (SIW), requiring less GP involvement.

### 2.1. Methodology, processes and target population

GPs assigned to the three groups attend a 1-hour workshop explaining the study protocol and providing training in filling out the case report form.

GPs assigned to the SIF and SIW groups attend a supplementary 3-hour workshop in structured interviews, individualized patient information, and training in managing benzodiazepine discontinuation and optimal gradual dose reduction.

In addition, GPs assigned to the SIF group attend a brief 30-minute workshop to standardize the dose-reduction follow-up visits. Training is provided by researchers with extensive experience in the management of benzodiazepine withdrawal.

### 2.4. Funding

Has the initiative already received some funding?

<input checked="" type="checkbox"/>	YES*	<input type="checkbox"/>	NO
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Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument

<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO
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\* The project has been funded by the Carlos III Health Institute of the Ministry of Economy and Competitiveness (contract No PS09/00947)

The BENZORED study is a three-arm, parallel, multicentre, cluster-randomised trial to evaluate the efficacy and safety of the interventions.

Target populations are patients aged 18 to 80 years who had been taking benzodiazepines daily for at least 6 months.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

To compare the effectiveness of these two interventions with that of usual care on the discontinuation of long-term benzodiazepine use in primary care patients, delivered at the level of the GP.

To determine the effectiveness of each intervention in relation to patient's characteristics.

### 2.3. Other organisations involved

Primary health care services from three Spanish regions (Balearic Islands, Catalonia and Valencia); the Primary Health Care services from Valencia and Catalonia are responsible of the patient inclusion and coordinate the study in their regions.

## 3. INNOVATION, IMPACT AND OUTCOMES

It is the first time that two brief interventions delivered at the GP level are evaluated. It is important from the National Health Service perspective because these interventions differ in the time consumed by the GP and the number of clinical visits.

We found that a structured intervention by a GP along with stepped-dose reduction, with or without follow-up visits, was up to three times more effective than routine care in discontinuing long-term benzodiazepine use. Both interventions have similar efficacy but the approach without follow-up visits required less GP involvement and fewer visits to the GP. This can be particularly relevant for busy public primary care services.

The interventions used in the present study can be considered safe, as they do not increase patient anxiety, depression levels, and dissatisfaction with sleep quality or alcohol consumption.

Subgroup analysis showed that patients who might have been expected to experience more withdrawal difficulties, such as those with higher anxiety levels and those taking higher benzodiazepine doses, were even more effectively helped by receiving an intervention specially the one including follow-up visits.

Thus in this subgroups, greater GP involvement resulted in higher rates of successful benzodiazepine withdrawal.

### 3.1. Key innovative elements of your good practice

Evaluation of the effectiveness of two brief interventions to be carried in primary care.



### 3.2. Evidence on the impact and outcomes

The medium-long term follow-up (12 months) outcomes of the Benzored study shows that 45 % of patient discontinue long-term benzodiazepine use (RR=3).

As long-term use of benzodiazepine has been related to several adverse effect as cognitive impairment, falls and hip fractures it is expected that reducing the extent of benzodiazepine consumption, patient will benefit in reduce related morbidity.

There are no randomized clinical trials to evaluate the impact in long-term health outcomes (mortality and morbidity) of a benzodiazepine discontinuation program.

### 3.3. Formal or informal evaluation

The medium-long term follow-up (12 months) outcomes of the Benzored study.

The long-term follow-up of the effectiveness of the intervention will be performed at 36 months.

The economic assessment of the intervention from the National Health System perspective.

### 3.4. Success criteria used to determine that the initiative is working well

The benzodiazepine discontinuation should be maintained in the long term and GPs should apply the intervention in their practices and the intervention should be incorporated in other GP practices.

For that reasons, the intervention will be assessed at 36 months, GPs will be monitored about their benzodiazepine prescription in their practices at 36 months and compare with their previous prescription.

If there is enough evidence to apply this intervention, clinical guidelines may incorporate this interventions and could be extended to primary care GPs.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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Because of the external validity of this clinical trial and the important results in efficacy and safety, National Health Services could easily implement a 3-4 hour workshop for GPs to reduce their long-term benzodiazepine users. It is recommended a structured educational strategy with gradual tapering as the first choice intervention and a structured educational intervention with gradual tapering backed up by fortnightly follow-up visits in those cases of patient with higher anxiety levels and those taking higher benzodiazepine doses.

## 5. FURTHER INFORMATION

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### Contact Person:

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**PRESCRIBE HEALTHY LIFE: OPTIMIZING MULTIPLE HEALTHY LIFESTYLES PROMOTION IN PRIMARY AND COMMUNITY CARE THROUGH IMPLEMENTATION RESEARCH**

**1. BACKGROUND INFORMATION**

<b>ORGANISATION NAME</b>	<b>redIAPP. Primary Care Prevention and Health Promotion Research Network</b>
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Research centres, Primary care centres,
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Spain
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	Basque Country
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	8 Primary Health Care Centres from which 130 Primary Care professional are collaborating (70% of total centres' professional), who provide health coverage to 83.000 citizens
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	About 2,2 M
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	During the project's implementation period 40.200 have visited at least once their respective Health Centre and constitute the study population. Eligible subjects aged between 45 to 65 years who at least do not meet one healthy lifestyles behaviour (150 minutes week of physical activity; at least 5 servings of fruit and vegetables; do not smoke) will be the target of the intervention program piloted in the four centres allocated to the experimental group (the other 4 centres are in control group).
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	Older people in general, People visiting general practitioners, General practitioners,
<b>TYPE OF PARTNERS INVOLVED</b>	Research centres, Local public authorities, Primary care centres, Nurses, Small-sized industry, Medium-sized industry, General practitioners, Private companies, Other (Community Resources: Schools, sport facilities, etc.)
<b>TOPICS/DISEASES ADDRESSED</b> (KEYWORDS)	Physical Activity, Diet, Smoking abstinence/cessation, Implementation research, Primary & Community Care, Healthy lifestyles, Health Promotion, Practice Change
<b>RELEVANCE TO A1 ACTION PLAN</b>	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input checked="" type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input checked="" type="checkbox"/> Service models <input checked="" type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input type="checkbox"/> Guidelines



<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository
	<input checked="" type="checkbox"/> Networking

## 2. DESCRIPTION

### 2.1. Methodology, processes and target population

The 'Prescribe Healthy Life "(PVS as for the initials in Spanish: "Prescribe Vida Saludable") research - action innovation initiated in 2006 which aims to optimize health promotion practice in primary and community care (PHC).

Its objective is to design, plan, implement and evaluate innovative programs for promoting multiple healthy lifestyles (tobacco abstinence, physical activity and healthy diet), feasible and sustainable in routine conditions of PHC.

PVS follows a stepwise framework, appropriate for the design and evaluation of complex interventions in clinical settings. First, a preclinical phase 0 was carried out in 2006-2008 to establish the problem of health promotion integration, analyse the causes and obstacles to change as well as theoretical fundamentals for solutions.

In 2008 we conducted the phase I or modelling phase, in which 4 Primary Health Care centres planned and designed intervention programs adapted to their specific contexts and resources, and identified implementation strategies to change and mechanisms through which interventions should operate (Figure 1).

This was done collegially among health professionals, researchers, health services organization, community workers and public health professionals.

Since 2011 is implementing the Phase II quasi-experimental clinical trial in eight municipalities, of which four constitute the intervention group, with the goal of optimizing the previously designed intervention programs and their assessment procedures, and to explore intervention programs adoption, implementation, sustainability, acceptance, effectiveness and efficiency potential.

#### Direct target population

The 'Prescribe Healthy Life "(PVS) research - action innovation has two main targets:

1. Health care centres and professionals, as the initiative seeks the improvement of health promotion practice through the mutual adaptation of evidence based interventions and centre's context and organization.

2. Primary care patients attending their health centres that do not meet at least one of the following lifestyle behaviour: regular physical activity, healthy diet or abstinence from smoking

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

#### General objective:

to describe the implementation of an innovative counselling and prescription intervention to promote multiple healthy lifestyles (physical activity, diet and smoking abstinence) in Primary Care and to assess its associated potential efficacy.

#### Specific objectives:

- To assess the reach, adoption, implementation and maintenance of the intervention programs
- To evaluate the potential efficacy of the intervention program in healthy lifestyles change
- To evaluate the usage of the IT tools
- To explore the perceptions of health care professionals and involved stakeholders regarding programs development, integration and implementation.

### 2.3. Organisations involved

Primary Care Research Unit of Bizkaia, Osakidetza;

Public Health Direction of Health Department, Basque Government;

City councils of Sondika and Matiena Municipalities

Primary Health Care Organizations: have facilitated changes in the structure and organization of centres, substitutions to cover the time devoted to project processes implementation in centres, and provision of material resources, among others.

Community: in collaboration with the Bizkaia Regional Department of Health of the Basque Government, public health technicians and the work of local coordinators, the project has attained active cooperation with different municipalities and community resources (Schools, small industries, Sport facilities,



etc.). Those resources collaborate in some aspects of intervention delivery.

## 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

- Implementation strategy: Involved agents adapted evidence-based interventions to the context of centers and collaboratively redesigned and reorganized their health promotion delivery system through the execution of a planning process, supported by external facilitators
- Innovative intervention: the 5'As framework (Assess, Advise, Agree, Assist, and Arrange follow-up) was identified as the most effective and feasible evidence based intervention strategy to promote healthy lifestyles in PHC. All primary care professionals within the centers and community partners were actively involved in different actions of the intervention delivery.
- IT tools and information systems: Within the project two IT tools have been developed: one integrated in the electronic medical records, which facilitates Health care professionals to implement the intervention with patients. Second, a Stand-Alone IT tool to be used outside the Health Care System by companies and institutions.

### 3.2. Evidence on the impact and outcomes

No clinical intervention has such a potential impact on public health as the promotion of healthy lifestyles.

Sedentary lifestyle, inappropriate diet, smoking and alcohol abuse are the main causes of mortality, morbidity, and burden of disease in industrialized countries.

Approximately 65-80% of cardiovascular diseases, 75-90% of type 2 diabetes and 20-30% of all cancers could be prevented if people followed a healthy diet, adopted an adequate level of physical activity and quit smoking.

Recent cohort studies attribute to a healthy lifestyle (no smoking, adequate physical activity, balanced diet, weight control, and moderate alcohol consumption) a population proportion of avoidable deaths higher than 50% and an increase in life expectancy greater than 11 years.

### 3.3. Formal or informal evaluation

There is formal on-going evaluation of different project's outcomes:

- Description of program reach and implementation indicators at centres and patient level
- Potential efficacy: preliminary results of healthy lifestyle change at patient level
- Perceived healthy lifestyle promotion practice by health professionals
- Qualitative evaluation of the implementation strategy
- Reliability and validity of measurement instruments PVS
- Economic evaluation of PVS program implementation

### 3.4. Success criteria used to determine that the initiative is working well

At professional and centres level the innovative aspects in the program planning and design are expected to have a stimulatory effect that will improve healthy lifestyles intervention delivery to patients at a double rate of that in the control centres.

At patient level, at least a 5% difference in the proportion of healthy lifestyle change attributable to the program is expected.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

Optimization and actual integration of healthy lifestyles promotion in routine health care setting is a complex and difficult task, being "How to attain it?" the main problem to resolve.

The present research-action initiative presents a hypothetically successful implementation strategy that if replicated in other settings/countries, may help and guide investigators, health care professionals, policy makers and planners to design, assess and implement innovative health-care and health promotion interventions in clinical settings.



The key elements of the stepped framework and of the implementation strategy that constitute the Prescribe Healthy Life innovation, have a great potential for dissemination, especially as they are focused in a participatory and context-specific approach that aims to improve effectiveness, impact and efficiency of interventions, as well as their feasibility.

However, further research is warranted as for example in how to shorten implementation's time-frames, how to manage on-going commitment of stakeholders, etc.

## 5. FURTHER INFORMATION

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### Links to web pages:

<http://uiapb.rediapp.net/>

### Contact person:

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THE SKÅNE MODEL FOR MEDICATION REVIEW AND RECONCILIATION

1. BACKGROUND INFORMATION

ORGANISATION NAME	Region Skåne/Skåne County Council
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Hospitals, Pharmacists, Local public authorities, Primary care centres, Nurses, Academia, Specialised physicians, General practitioners, Regional public authorities
COUNTRY INVOLVED IN THE GOOD PRACTICE	Sweden, Norway
REGION INVOLVED IN THE GOOD PRACTICE	Region Skåne, many of the councils in Sweden and Mitt-Norge. Initial contacts with Århus.
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Region Skåne
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	1.2 M
GOOD PRACTICE DIRECT TARGET GROUP SIZE	elderly patients ( ≥75 years), 7.8 % of 1.2 million inhabitants
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Patients in hospitals, General practitioners, Specialised physicians, Older people receiving care/living at home, Pharmacists, People in nursing homes, Nurses
TYPE OF PARTNERS INVOLVED	Hospitals, Pharmacists, Primary care centres, Nurses, Academia, Specialised physicians, General practitioners, Regional public authorities
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Medication, Medication review, Medication reconciliation, discharge information, multi-disciplinary teams, patient empowerment (when possible), adherence to medication guidelines
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input checked="" type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking



## 2. DESCRIPTION

Medication reconciliation is a method for preventing errors in the care transitions. This can be done at admission and / or hospital discharge, and aims to achieve consistency between prescribed and used medicines'. This may reduce the risk for medication-related problems.

Medication review is a method for optimizing medication. This is conducted by clinical pharmacists who analyse individual patients' medicine prescriptions and, if necessary, propose appropriate custom dosages and choice of medicine.

### 2.1. Methodology, processes and target population

The Skåne model is characterised by a standardised working-process in a multi-professional health care team. Drug-related problems are identified according to predefined risk categories.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

### 2.4. Funding

Has the initiative already received some funding?

☐

YES

☒

NO

Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument

☐

YES

☒

NO

Region Skåne's goal for 2013 is that at least 40% of all patients, 75 years or older with 5 or more types of prescribed medicines should have received a cross-professional medication review according to a specific Skåne model. In addition, 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. This must be accompanied by discharge information containing a medication report, and current prescription list.

To ensure good quality in the medication therapy for the elderly the primary care units also share responsibility for medication reviews. This responsibility encompasses all citizens living in special housing as well as for patients 65 years and older with municipal care service in their home.

### 2.3. Organisations involved

The model is implemented in the Region of Skåne and involves hospitals and primary care in the region

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

The Skåne model is characterised by a standardised working-process in a multi-professional health care team. For example drug-related problems are identified according to predefined risk categories.

In addition, 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. This must be accompanied by discharge information containing a medication report, and current prescription list. Moreover at least 20% of women 50 years or older with a fracture due to osteoporosis should receive a medicine related treatment against osteoporosis.

To ensure good quality in the medication therapy for the elderly the primary care units also share responsibility for medication reviews. This responsibility encompasses all citizens living in special housing as well as for patients 65 years and older with municipal care service in their home.

The primary care units also have the responsibility to map for patients 75 years and older or older patients

with at least 5 types of prescribed medicines the type of medication prescribed and the reason for the prescription. This mapping takes place during visits to the primary care units, during home care visits or when a patient is moved to special housing. The physician must check if the prescription list is correct and analyse whether the medication prescribed is the best possible for the ailments.

### 3.2. Evidence on the impact and outcomes

A health economic study has been conducted concerning a medication review process which in addition to savings, show that the model results in safer care and better health for patients.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

The model is already implemented in Mitt-Norge and is to be implemented in the whole of Norway. The objective of the model is that the patient receives the



right individualised treatment and gets an up-to date  
and correct medication list.

## 5. FURTHER INFORMATION

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### Link to web pages:

European Year for Active and Healthy Ageing:

<http://europa.eu/ey2012/ey2012main.jsp?catId=975&languageId=en&mode=initDetail&initiativeId=178&initLangId=en>

Läkemedelsrådet, Region Skåne:

<http://www.skane.se/sv/Webbplatser/Lakemedelsradet/Lakemedelssakerhet/>

### Contact person:

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+46 40 675 36 99



ADHERENCE AND PERSISTENCE TO MEDICATION IN COMMUNITY DWELLING OLDER POPULATIONS

1. BACKGROUND INFORMATION

ORGANISATION NAME	Trinity College Dublin EngAGE Centre for Research on Ageing
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Hospitals, Pharmacists, Primary care centres, Nurses, Informal caregivers, Academia, Advocacy organisations patients/users, Specialised physicians, General practitioners,
COUNTRY INVOLVED IN THE GOOD PRACTICE	Ireland
REGION INVOLVED IN THE GOOD PRACTICE	All regions of Ireland
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Ireland
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	1.5 M (the national population of Ireland aged 50 years or older estimated in 2011)
GOOD PRACTICE DIRECT TARGET GROUP SIZE	A representative cohort of approximately 3,000 adults aged 50 years or older
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	People visiting general practitioners, General practitioners, Formal caregivers, Patients visiting specialised physicians, Specialised physicians, Informal caregivers, Older people receiving care/living at home, People collecting prescriptions from pharmacies, Pharmacists, Patients with a specific disease, Patients' groups, Nurses
TYPE OF PARTNERS INVOLVED	Research centres, Academia,
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Medication taking behaviour in older community dwelling populations
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input checked="" type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

Medication taking behaviour (MTB) is a critical aspect of the treatment of chronic conditions (e.g. cardiovascular disease, diabetes) and a major predictor of patient outcomes.

The World Health Organization has reported an average non-adherence rate of 50% among those with chronic illnesses. MTB has been shown to be associated with markers of poorer clinical outcomes such as inadequate control of blood pressure or blood glucose and mortality.

There is also evidence of increased use of healthcare services such as hospitalization, emergency department visits and primary care appointments. Poor medication adherence has been estimated to cost approximately \$177 billion annually in total direct and indirect health care costs in the US.

The population over 65 years is increasing and this increase has consequences for health services with increases in disease prevalence and use of pharmaceuticals generally. For many community based older adults, the ability to remain independent depends on the ability to manage a complex medication regimen.

### 2.1. Methodology, processes and target population

The Irish Health Services Executive Primary Care Reimbursement Services (HSE-PCRS) pharmacy claims database has been linked to data from the Irish Longitudinal Study on Ageing (TILDA) for those aged ≥ 50 years (N=3,122). Prescription claims are classified using WHO ATC code and details of every drug dispensed and claimants' demographic data are available.

TILDA incorporates a wide range of data on the health, economic and social aspects of participants' lives through personal interviews, self-completion questionnaires and health assessment measures. MTB

will be assessed for individual drugs as well as drugs in the same therapeutic group to give an approximate measure of adherence to drugs prescribed for different conditions.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

A very wide range of factors have been identified which affect MTB and may act as barriers or enablers to MTB. These may be grouped as related to the medication (e.g. adverse effects, taste, complexity of regimen), to inherent characteristics of the patient (e.g. age, gender, ethnic group), to comorbidity (e.g. anxiety, dementia, depression), to the patient's attitudes and beliefs (e.g. about illness and medication) and to the patient's social environment (e.g. social support from family and friends, relationship with health professionals). The various factors are unlikely to be independent, but their inter-relationships are poorly understood. The linked HSE-PCRS TILDA data set will enable detailed examination of such factors associated with MTB and their inter-relationships.

The linked HSE-PCRS TILDA data set will also be used to examine the relationship between MTB and health outcomes. Different levels and types of MTB and achievement of clinically meaningful outcomes will be evaluated for certain drugs and disease groups, such as hypertension, cardiovascular disease and diabetes where numbers permit. Further research includes economic modeling of the costs associated with non-adherence and non-persistence to medication in older populations and the development of MTB interventions.

### 2.3. Organisations involved

Trinity College Dublin (Ireland), Royal College of Surgeons Ireland (RCSI) and John Hopkins University (USA)

### 2.4. Funding

Has the initiative already received some funding?	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

Given the cost of prescription drugs in the current health system in Ireland and the association between non-adherence/non-persistence and adverse health

outcomes, understanding why older patients do or do not take their medication is of particular importance.

Some of the factors associated with poor MTB may be potentially modifiable and interventions can be



developed for groups of patients at risk of non-adherence. In addition we will examine the costs of MTB and consider innovative methods of defining and measuring adherence/persistence using claims data.

complimenting and enhancing other EU longitudinal studies such as the EU SHARE study and the UK ELSA study.

### 3.2. Evidence on the impact and outcomes

Developing methods to assist older adults in accurate and safe management of their medications will provide cost-effective care and increase the quality of life of older adults managing complex medication regimens.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

The linked HSE-PCRS TILDA data set is unique among longitudinal studies in the breadth of physical, mental health and cognitive measures collected. TILDA will be a key EU resource on healthy and active ageing,

## 5. FURTHER INFORMATION

### Link to web pages:

<http://www.tcd.ie/research/themes/ageing/index.php>;

<http://www.tcd.ie/tilda>

### Contact persons:

Dr Caitriona Cahir, Trinity College Dublin,  
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Dr Kathleen Bennett, Trinity College Dublin,  
[bennettk@tcd.ie](mailto:bennettk@tcd.ie);

Dr Grainne Cousins, RCSI, [gcousins@rcsi.ie](mailto:gcousins@rcsi.ie)



**'LET ME DECIDE' ADVANCE CARE PLANNING AND PALLIATIVE CARE EDUCATIONAL PROGRAMME**

**1. BACKGROUND INFORMATION**

<b>ORGANISATION NAME</b>	<b>University College Cork School of Medicine, Centre for Gerontology and Rehabilitation</b>
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Hospitals, Nursing homes, Local public authorities, Advocacy organisations others, Primary care centres, Nurses, Informal caregivers, Academia, Advocacy organisations patients/users, Specialised physicians, Day care centres, National public authorities, General practitioners, Private companies, Regional public authorities
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Ireland
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	Counties of Cork & Kerry (on-going Pilot Study implementing this programme into 5 nursing homes in Cork City and County Kerry)
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	In 2011, the total population of persons aged $\geq 65$ years in Ireland was 535,393. Almost 16% of this age-group resided in the counties of Cork and Kerry, where 5.3% of this age-group were in long-term care <sup>1</sup>
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	In 2011, the total population of Cork & Kerry was 664,534; the total population of persons aged $\geq 65$ years in Cork & Kerry was 83,368 <sup>1</sup>
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	In 2011, the total population of persons aged $\geq 65$ years in Cork & Kerry was 83,368 and 5.3% (approx. 4,420 persons) of this age-group resided in long-term care. <sup>1</sup> The LTC providers included in our Pilot Implementation Study together have 488 beds, representing 11% of our target population of LTC residents in the Cork and Kerry areas
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	General practitioners, Specialised physicians, Informal caregivers, People in care homes, Patients with a specific disease, People in nursing homes, Patients' groups, Nurses
<b>TYPE OF PARTNERS INVOLVED</b>	Hospitals, Nursing homes, Research centres, Local public authorities, Advocacy organisations, Nurses, Informal caregivers, Academia, Specialised physicians, National public authorities, General practitioners, Private companies, Regional public authorities
<b>TOPICS/DISEASES ADDRESSED</b> (KEYWORDS)	Advance care directives, advance care planning, 'Let Me Decide', living wills, end-of-life care, end-of-life care planning, palliative care, patient autonomy, patient empowerment, healthcare proxy, assessment of capacity.
<b>RELEVANCE TO A1 ACTION PLAN</b>	
<input type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices



	<input type="checkbox"/> Service models
	<input checked="" type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence
	<input checked="" type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository
	<input type="checkbox"/> Networking

## 2. DESCRIPTION

### 2.1. Methodology, processes and target population

This programme simultaneously implements an advance care planning programme using the 'Let Me Decide' (LMD) advance care directive (ACD)<sup>2</sup> and a palliative care (PC) educational initiative into long-term care (LTC) settings. Advance care planning (ACP) offers a unique opportunity to proactively promote patient autonomy, empowering patients to take charge of their healthcare.

This initiative gives LTC residents (and their families) an active role in the decision-making process regarding end-of-life care. It ensures that treatment given is consistent with the patient's wishes, and may help to improve satisfaction with health care. In addition, by preventing futile and unwanted medical treatments, it may help to maximize the use of scarce resources.

The appointment of a proxy decision-maker as part of an ACD currently has no legal basis in Ireland; however, as part of this programme, an individual may nominate someone whom they would like to be consulted in the event that they themselves lose capacity.

Palliative care focuses on the total well-being of the person, embracing their physical, psychological, emotional, social, cultural and spiritual needs. The LMD-PC programme enables a LTC resident to make an informed choice as to where and how these needs would best be met, whilst facilitating and promoting the provision of high quality, holistic, and patient-centred end-of-life (EOL) care, through education and cyclical quality improvement measures.

The LMD-PC programme aims to develop an integrated, holistic care model for long-term care residents at the end-of-life, which maximises patient autonomy and dignity, and enhances the delivery of appropriate palliative care. This holistic treatment approach involves collaboration between different stakeholders involved in their care (i.e. nurses, care assistants, GPs, geriatricians, PC specialists, families).

We are currently undertaking a Pilot Implementation Study in five LTC institutions in Cork City and Kerry to assess the feasibility and acceptability of the LMD-PC programme. This includes:

- Training of healthcare staff (nurses and GPs) to give them the necessary skills and knowledge to promote and facilitate ACP, and to establish and respect resident's healthcare wishes
- Training of healthcare staff on the general principles and core competencies of palliative care
- Educational material for LTC residents and their families to facilitate informed decision-making in relation to end-of-life care
- The 'Let Me Decide' advance care directive as one potential output of ACP
- The tools to assess a person's capacity to complete an ACD<sup>3</sup>
- A programme for residents lacking capacity to proactively establish their expressed or perceived wishes and to plan future care to avoid reactive decision-making in a crisis.

The palliative care intervention aims to improve the quality and efficiency of general palliative care for LTC residents by equipping staff to:

- Appropriately apply the palliative care approach
- Understand the emotional needs of the dying
- Communicate effectively with dying residents and their families
- Recognise and optimally manage symptoms to ensure patient comfort and dignity
- Be aware of specialist palliative care resources available and how to access them
- Recognise when an appropriate, timely referral to specialist palliative care services would be of benefit
- Provide support to those experiencing loss and grief.



The palliative care program is predominantly educational, symptom-based, at a general (non-specialist) palliative care level, and focuses on care in the last week of life. The programme consists of:

- an educational programme (primarily symptom management)
- regular symptom assessment
- minor organisational changes to ensure continuity of care
- access to external resources, when needed.

At a minimum, long-term care staff will be trained in the palliative care approach as part of this Pilot Implementation Study. The educational programme takes the form of a series of workshops covering the following topics:

- 1) Principles of Palliative Care
- 2) Communication
- 3) Loss, Grief & Bereavement
- 4) Optimising comfort and quality of life including
  - a) Symptom assessment and management
  - b) Appropriate modes of drug delivery including use of the syringe driver
  - c) The "terminal" phase
- 5) End of life care: legal and ethical issues and advance care planning.

The syllabus and material for the palliative care educational program was developed and "fine-tuned" through information from a variety of sources including:

- Results of staff questionnaires on their palliative care learning needs and attitudes to end-of-life care for each pilot site
- The existing services relating to end-of-life care in each LTC residence
- Baseline data from chart reviews of residents who had died in each pilot site in the year prior to implementation of the programme
- Baseline data from surveys of relatives of residents who had died in each pilot site in the year prior to implementation of the program
- The syllabus structure was influenced by the proposed core competence domains as proposed in the Irish National Palliative Care Competence Framework.

#### Direct target population

This programme is aimed at residents of LTC institutions. The 2011 Irish national census indicated that of 4,588,252 people living in Ireland, 11.7% (535,393) were aged 65 years and over.<sup>1</sup> Almost 16% of this age group resided in counties Cork and Kerry

(83,368) where 5.3% of this age-group was in long-term care (LTC). In Ireland approximately 25% of all deaths occur in LTC.

Irish LTC residential services are only permitted to operate if they are registered with the Health Information and Quality Authority (HIQA). Based on data from HIQA, there are 4,453 beds in 93 residential care centres for older people in the Cork (3,447 beds) and Kerry (1,006 beds) area.

Although a minority of the older people occupying these beds do so on a short-term basis for convalescence or for respite, the majority of residential care beds are occupied by residents needing long-term care. The total number of beds in the LTC centres currently involved in piloting the LMD-PC programme is 488, representing 11% of the target population in the Cork and Kerry areas.

#### **2.2. Specific (i) health/ICT/innovation and (ii) social/economic objectives**

Advance care planning (ACP), advance care directives (ACD) and palliative care (PC) at the end-of-life (EOL) in long-term care (LTC) settings are under-utilised and under-researched. In Ireland we do not routinely offer ACP to competent LTC residents, nor do we routinely involve families of incompetent residents in the care planning process. A recent Irish national survey revealed 71% of people had never heard of ACDs, and only 5% claimed to have drafted one<sup>4</sup>. This is a highly topical initiative given recent publications of strategies and frameworks to improve end-of-life care and the impending new legislation on ACDs in Ireland.

The use of ACDs, which evolved out of the fear of unwelcome treatment, may prevent futile (and unwanted) medical interventions, while at the same time maximising patient autonomy and dignity. ACP empowers older people to play an active role in their own personal health management and places them at the centre of the decision-making process, promoting their autonomy by enabling their wishes to be documented *before* potential loss of capacity to decide or to communicate their wishes. Enhanced communication is a key feature of the ACP process and is fundamental to respecting a person's right to a dignified death.

Preliminary data indicate that families are extremely keen to be involved in the ACP process; this may help to avoid crisis healthcare decision-making and to increase the chances of the resident experiencing a "good" death. This directly addresses their emotional, social and cultural needs, and in turn, should positively impact on the bereavement process for families. This



programme may also help to change the culture that exists in Ireland of avoiding conversations about death and dying.

The majority of residents in Irish LTC institutions have some level of cognitive impairment which presents a challenge when educating this population to make informed healthcare choices. This has been addressed by tailoring the 'Let Me Decide' ACD forms and educational materials to the needs of this cognitively-challenged patient population. For residents lacking capacity, treatment decisions at the end-of-life are often made in reaction to crisis situations, putting unnecessary stress and strain on distressed family members.

One of the aims of our Pilot Study is to assess whether it is possible to prevent decision-making in a crisis for LTC residents (without an ACD) *who lack capacity* by making EOL care decisions in advance. While residents who lack decision-making capacity are ineligible to complete an ACD, their views on how they would like to be cared for at the end-of-life remain important and any views expressed are carefully noted.

The area of palliative care, end-of-life care, advance care planning and ACDs is vast. The palliative care initiative in this programme is predominantly educational, symptom-based, at a general (non-specialist) palliative care level, and focuses on care in the last week of life among LTC residents. In Ireland, primarily it is general practitioners (GPs), nursing staff and care workers who deliver general palliative care and end-of-life care for most people dying in the community or LTC. There is evidence however that the resources, skills and knowledge to provide such end-of-life care to a high standard, is often lacking.<sup>5-7</sup> Many dying in LTC have unmet palliative care needs<sup>8,9</sup> and bereaved carers are often dissatisfied with their relatives' end-of-life care.<sup>10</sup>

This programme aims to move current practice to a more holistic approach to EOL care for the LTC resident. It does not attempt to implement a *specialist palliative care* service in the LTC setting, but rather to improve the provision of *general palliative care* within LTC and facilitate recognition of when an appropriate, timely referral to *specialist palliative care* would be of benefit. It is hoped that the intervention would enable all staff to confidently and appropriately apply palliative care principles in their approach to patients and improve the ability of some to deliver *general palliative care* to patients at the end-of-life through further training.

#### The aims of this Pilot Programme are to:

- Build the capacity of LTC staff to deliver both ACP and PC
- Provide guidelines on ACP and palliative care to LTC providers
- Equip healthcare staff with the necessary communication skills and knowledge to promote and facilitate ACP and to establish and respect residents' healthcare wishes.
- Provide appropriate educational material for LTC residents and their families to facilitate informed decision-making in relation to EOL care.
- Offer LTC residents the opportunity to participate in advance care planning and to complete the 'Let me Decide' Advance Care Directive as part of the ACP process
- Implement systems to proactively establish and document the expressed or perceived wishes of those residents who lack capacity and to plan their future care so as to avoid reactive decision-making in a crisis
- Educate and empower LTC residents (and their families) to be at the centre of the decision-making process with regard to end-of-life health care choices
- Increase the proportion of LTC residents completing an Advance Care Directive, Advance Care Plan or a care plan for end-of-life decisions
- Respect and document the wishes of LTC residents with regard to treatment they would like to receive at the end-of-life
- Prevent futile (and unwanted) medical interventions at the end-of-life and promote better use of scarce resources
- Educate healthcare staff on the general principles of palliative care to facilitate the development of skills
- Promote a more holistic approach to end-of-life care, which encompasses not just the physical and medical needs of the patient, but also addresses their emotional, social, cultural and spiritual needs
- Reduce health inequalities by promoting access to an appropriate level of palliative care based on the needs of LTC residents, rather than on diagnosis or place of care
- Promote integrated, collaborative care between LTC providers, GPs, Specialist Palliative Care Services and Geriatricians
- Promote awareness amongst GPs and nurses, of appropriate prescribing practices as death approaches



- Assess the effects of implementing an ACP and PC educational programme on LTC residents and their families
- Assess the economic and organisational effects of implementing an ACP and PC educational programme.
- Assess the effects of implementing an ACP and PC educational programme on patterns of healthcare utilisation.

Irish Hospice Foundation (IHF), the Health Information and Quality Authority (HIQA), the All Ireland Institute of Hospice and Palliative Care (AllHPC), and General Practice Education. Representatives from each of these areas sit on our Study Research Steering Committee.

We are collaborating with a range of bodies including UCC School of Nursing & Midwifery, UCC Department of General Practice, the All Ireland Institute of Hospice and Palliative Care (AllHPC), PC Specialists, and local LTC providers to develop the online e-learning educational resources for both the Advance Care Planning component and the palliative care component of this programme.

## 2.3. Organisations involved

In our Pilot Implementation Study, we have formed a strong coalition with local long-term care providers, the Health Service Executive (HSE) in the Cork Region, the

## 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

The use of a combined end-of-life care initiative and a specific ACD such as "Let Me Decide", is relatively novel. Many initiatives aimed at improving EOL care in the general palliative care setting such as the UK Gold Standards Framework (GSFCH)<sup>11-13</sup> contain a prompt for advance care planning, but don't use ACDs such as "Preferred Priorities for Care",<sup>14</sup> or "Respecting Patient Choices"<sup>15</sup> or instructions as specific as in the "Let Me Decide" ACD<sup>16</sup>.

The "Let Me Decide" (LMD) programme takes an innovative approach to facilitating ACP and the completion of advance care directives (ACDs). In particular the programme addresses the barriers that exist in the long term care (LTC) setting to planning end-of-life care.

Proactively offering ACP to LTC residents is an innovative and efficient approach to targeting an older population for whom ACP is highly relevant. The LMD advance care directive (LMD-ACD) is designed to enable the individual to define and document their healthcare wishes in a way easily interpreted by healthcare professionals.

The ACP process can be a highly personal journey for older LTC residents and must be delivered with understanding, care, patience and support. The

familiarity LTC staff has with residents, means they are the ones best placed to effectively deliver and

appreciate the residents' differing needs in the ACP process.

### 3.2. Evidence on the impact and outcomes

Over 30 peer-reviewed papers relating to the LMD-ACD have been published and it has received enthusiastic support from a wide variety of people including doctors, nurses, patients, families, lawyers, clergy and advocates for the elderly.<sup>16</sup> Implementation of the LMD-ACD programme has been tested in a large RCT in the Canadian long-term care (LTC) setting.<sup>17</sup> Molloy and colleagues compared intervention LTC homes using LMD with control homes. In the intervention homes, 49% of competent residents and 78% of families of incompetent residents completed the LMD ACD.

The rate of hospitalisation was lower in the LMD homes than in controls (0.27 vs 0.48,  $p=0.001$ ). This represented a significant reduction in the cost of care (Can\$3490 per LMD home resident vs Can\$5239 per control home resident,  $p=0.01$ ) with no significant difference in resident or family satisfaction with care. The majority of residents completing the directive chose to remain in their nursing home at the end-of-life, to die cared for by the staff they trust rather than be transferred out to the local hospitals. Allocating resources according to patient's wishes may help to prevent unwanted treatment and potential "waste" of limited resources. This conserves resources for those



who want and need them, and who will benefit most from them. ACDs allow one to REFUSE but NOT demand treatments.

The LMD-PC programme aims to avoid inappropriate or unwanted treatment or hospitalisation of LTC residents at or near the end of life. This will facilitate the use of limited healthcare resources in a more cost-effective way. Assessing the appropriateness of a transfer to hospital either retrospectively or prospectively can be challenging. A study of LTC residents who died in hospital in our area (unpublished data) found that almost 10% died within hours of arrival, some on trolleys in the emergency department and some in transit there. It is often not clear who initiated or requested transfer, and some residents were hospitalised against their treating doctor's judgement because families requested transfer. Depending on how conservatively the circumstances of transfer were viewed, 14-37% of transfers were felt to be inappropriate or avoidable.

ACDs and ACPs become highly important if an individual loses the capacity to make medical decisions for themselves, when the burden of decision-making falls on the medical profession or others. From research we know that healthcare professionals choose more aggressive treatment for patients who lack medical decision-making capacity than for their own relatives, and would choose even less aggressive treatment for themselves. [18-20](#)

### 3.3. Formal or informal evaluation

We are currently carrying out a Pilot Study implementing the LMD-PC programme into five Irish LTC institutions to evaluate the transferability of LMD to the Irish LTC setting and to evaluate a general PC educational programme for LTC staff.

The primary outcome is to determine the intervention's effect on the quality of dying and death using the Quality of Dying and Death (QODD) questionnaire administered to relatives of deceased residents.

Secondary Outcomes include:

- The feasibility of implementing both programmes
- Study participation rate, compliance with ACD/ACP
- Place of death, transfers to hospital in the last week of life
- The effects of implementing both programmes on patterns of healthcare utilisation
- Staff confidence in delivering EOL care before and after the educational intervention.

Attitudes of LTC staff to ACP and EOL care may present a barrier to successful implementation; however, appropriate education of staff should overcome this. We are developing e-learning modules to deliver training in a more efficient and flexible manner to address the problem of releasing staff for training.

Results from our Pilot Implementation Study will be available by autumn 2014. The next phase planned in the evaluation of this programme will be to conduct a randomised controlled study in approximately 20 paired nursing homes in Ireland and Northern Ireland.

### 3.4. Success criteria used to determine that the initiative is working well

- The uptake of and acceptability of the LMD-ACP process among residents and their families
- The views of LTC staff on the usefulness of the LMD-PC programme in facilitating the delivery of ACP and the provision of EOL care
- Staff attitudes to ACP and confidence in delivering EOL care before and after the educational intervention
- Family satisfaction with EOL care provided to their dying relative (using the Quality of Dying and Death (QODD) questionnaire)
- Staff perception of the quality of end of life care delivered
- Improvements in pain and symptom management at the end of life
- Compliance of healthcare staff with patients' ACDs and advance care plans.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

### 4.1. How your good practice could be transferred to other regions / organisations

Prof. William Molloy originally developed the advance care planning (ACP) component of the 'Let Me Decide' (LMD) programme in Canada. Our on-going Pilot Study is currently evaluating the transferability of LMD to an Irish LTC setting. The LMD-ACP programme includes a book that has been published in seven languages; an Irish edition was published in 2011. [16](#)

A key step in the scaling-up of this programme is the education of healthcare staff to effectively deliver ACP and PC; however, one of the preliminary findings identified in our on-going pilot study was the difficulty faced by LTC management in releasing staff for training. To address these difficulties we are currently



developing e-learning modules to deliver training more efficiently. These online educational resources will facilitate the transferability of the programme to other organisations and regions in a flexible and sustainable way over the long-term. As part of the development of e-learning resources, an online forum/message board will be made available for users to share their experiences, problems encountered and solutions.

As part of this programme, questionnaires have been developed to measure barriers to implementation, staff attitudes to ACP and PC, and staff PC training needs.<sup>21,22</sup> These tools will help to tailor the successful implementation of the programme across different regions. Evidence shows that for palliative care educational programmes to be effective *"they must be based on an assessment of the learning needs of the participants, to ensure that new knowledge and skills are built upon the learners' experiences and existing knowledge and skills"*.<sup>23</sup>

One potential challenge in transferring this practice to another country is regional variation in the acceptability of ACP on a cultural level - this could be addressed by culturally-sensitive translation of key documents (in particular ACD forms, patient educational tools and the LMD book). During the translation process, key educational materials and ACP forms could be adapted to reflect regional variation in legislation on ACDs.

Results from our on-going Pilot Implementation Study will be available by autumn 2014 and will inform the wider development and implementation of the LMD-PC programme. The next phase planned in the evaluation of this programme will be to conduct a randomised controlled study in approximately 20 paired nursing homes in Ireland and Northern Ireland.

#### 4.2. How your good practice could be of interest to other regions / organisations

Implementation of this LMD-PC programme will help to:

- Educate and empower patients (and their families) to be at the centre of the decision-making process about the health care choices available to them at the EOL
- Increase the proportion of LTC residents completing an Advance Care Directive or End-of-life Care Plan

- Promote adherence by staff to patients' healthcare wishes by respecting and documenting the wishes of patients with regard to treatment they would like to receive at the EOL
- Potentially prevent futile or unwanted medical interventions at the end-of-life thereby maximising the use of scarce resources
- Promote a more holistic approach to EOL care, which encompasses not just the physical and medical needs of the patient, but also addresses their emotional, social, cultural and spiritual needs
- Promote access to an appropriate level of palliative care based on the needs of LTC residents, rather than on diagnosis or place of care, which will in turn contribute towards reducing health inequalities
- Promote integrated, collaborative care between LTC providers, GPs, PC specialists, and Geriatricians
- Through education equip healthcare professionals in LTC with the necessary skills to communicate with residents and their families about end-of-life issues and to deliver ACP
- Provide training to LTC staff on the principles of palliative care to facilitate the development of skills
- Provide guidelines on ACP and palliative care to LTC providers
- Promote awareness amongst GPs and nurses of appropriate prescribing practices at the EOL to improve the quality of care
- Improve the provision of high quality holistic palliative care to those nearing the end-of-life in LTC.

#### 5. FURTHER INFORMATION

Link to web pages:

[www.letmedecide.ie](http://www.letmedecide.ie); <http://www.collage-ireland.eu/>

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## **Glossary**

**LMD** – ‘Let Me Decide’

**ACD** – Advance Care Directive

**LMD-ACD** – ‘Let Me Decide’ Advance Care Directive

**ACP** – Advance Care Planning

**LMD-ACP** – ‘Let Me Decide’ Advance Care Planning

**PC** – Palliative Care

**LMD-PC** - ‘Let Me Decide’ Advance Care Planning & Palliative Care Programme

**EOL** – End-of-Life

**LTC** – Long-term care

**NH** – Nursing Home

**HSE** – Health Service Executive

**HIQA** – Health and Information Quality Authority

**AIHPC** - All Ireland Institute of Hospice and Palliative Care

**IHF** - Irish Hospice Foundation

**UCC** –University College Cork

**NHS** – National Health Service (UK)

**NI** – Northern Ireland

**RCT** – Randomised Controlled Trial



**EMBRACE: INTEGRATED CARE MODEL BASED ON THE CHRONIC CARE MODEL**

**1. BACKGROUND INFORMATION**

<b>ORGANISATION NAME</b>	<b>University Medical Center Groningen, Department of Health Sciences, Division of Community and Occupational Medicine, University of Groningen</b>
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Hospitals, Nursing homes, Research centres, Local public authorities, Primary care centres, Academia, General practitioners, Home care centres, Regional public authorities, Welfare organisations, Health Insurance companies, Elderly associations
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	The Netherlands
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	Northern part of the Netherlands: the province of Groningen
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	Three municipalities
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	The experimental study (randomized controlled trial examining the effectiveness of Embrace, completed in April 2013) was performed among about 1,500 elderly people registered in fifteen general practitioner practices.
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	Currently, initiatives for valorisation of Embrace into larger regions are in preparation so that within the next (about) ten years, at least 50% of the regional target population will receive Embrace care and support from the elderly care teams. Finally, all elderly people aged 75 years and older should be able to receive Embrace care and support.
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	Older people in general population, General practitioners, Formal caregivers, Informal caregivers, Older people receiving care/living at home, People in care homes
<b>TYPE OF PARTNERS INVOLVED</b>	Hospitals, Nursing homes, Research centres, Primary care centres, Academia, General practitioners, Home care centres
<b>TOPICS/DISEASES ADDRESSED</b> (KEYWORDS)	Integrated care model, personalized, coherent, proactive and preventive care and support, self-management, Case management, wellbeing, quality of care, quality of community support, cost-effectiveness, elderly, Community
<b>RELEVANCE TO A1 ACTION PLAN</b>	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input checked="" type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input checked="" type="checkbox"/> Service models <input checked="" type="checkbox"/> Training



<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input checked="" type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking

## 2. DESCRIPTION

### Embrace: Integration of services

Embrace is an integrated care model based on the Chronic Care Model.

An important feature of this model is that it is based on the integration of community resources and policies with health care organizations.

Embrace connects community organisations (welfare organizations and municipalities) with health care organisations (general practitioner practices home health care organisations, homes for the elderly, nursing homes and hospitals), and elderly associations.

All organisations collaborate in the care for the elderly people living at home to maintain and improve their wellbeing and independency so that they can live as long as possible and desirable in independently in their own homes in the community. This collaboration between these is laid down in a formal cooperation agreement signed by all stakeholders

### Embrace: integrated, proactive, and preventive care and support

Core element of Embrace in providing integrated, proactive, and preventive care and support to elderly patients is the Elderly Care Team (ECT). This multidisciplinary team, led by the general practitioner, further consists of an elderly care physician, a district nurse and a social worker (both district nurse and social worker acting as case managers).

The focus of the ECT is on realizing proactive, preventive and coherent care and support, viewed from the patient's perspective concerning all aspects of functioning and disability, and environmental aspects.

The district nurse or social worker, in their role of case manager, will navigate the patient through the complex processes of organizing appropriate care and support in the most efficient, effective and acceptable way.

The general practitioner and elderly care physician will manage the medical care for elderly with multimorbidity. Monthly ECT meetings will be

scheduled, in which (health) problems and treatment options of patients and caregivers will be discussed and evaluated. Particular attention will be paid to the patients' multimorbidity and polypharmacy, self-management ability, prevention and lifestyle and future expectations.

### Embrace: three profiles and three levels of care intensity

To provide a suitable level of care and support for all elderly people in a population, the Kaiser Permanente Triangle was applied in combination with a self-report screening instrument.

The screening and triage procedure results into three profiles. The aim for elderly people in the *Robust profile* (healthy elderly, 64% of the population) is to stay healthy and to enhance their self-management capabilities. Several interventions focus on this aim, for example community meetings in which the need for prevention is emphasized and a healthy lifestyle and self-management are endorsed.

Elderly in the two other profiles, the *Frail* (vulnerable but health elderly, 16%) and *Complex needs* (elderly with multimorbidity, 20% of the population) *profiles* will be visited regularly by their personal case manager.

For the Frail profile the case manager's role will be performed by a social worker, and for the Complex needs profile by a district nurse. During the first home visits the elderly person, assisted by the case manager, will assess the topics on the history taking form. Together with the elderly person and the ECT and integrated care- and support plan will be developed and put into practice. The caregivers and informal network around these elderly people is part of the plan.

## 2.1. Methodology, processes and target population

### Experimental study design

Embrace is currently put into practice in fifteen general practitioner practices in three municipalities in the



province of Groningen, the Netherlands. Municipalities differ in degree of urbanization: rural, urbanized rural, and an industrial municipality. In total 1474 elderly people (75+) living in the community and registered in one of the participating general practitioner practices are participating in the study.

The effectiveness of Embrace on patient outcomes, quality of care, service use and costs is examined in a stratified randomized controlled trial with balanced allocation of elderly participants to either the control group or the intervention group and a 1-year intervention period which recently finished (April 2013). We expect that within a few months the research results are available. About the same time a business plan for valorisation will be finished.

#### Study population

Recruitment of the participants was performed in two steps.

First, all general practitioners (GPs) working in the three municipalities were informed about the study and their consent to participate in the study was requested.

Second, patients from the participating GPs, aged 75 years and older and living at home or in a home for the elderly, were eligible for inclusion in the study and were invited to participate. Exclusion criteria at baseline were long-term stay in a nursing home, receiving an alternative type of integrated care, or participating in another research study.

Informal caregivers of participants in the intervention group were also eligible for participation in the study. An informal caregiver was defined as a person who is structurally providing voluntary and unpaid care to someone in his/her family, household, or social network with physical, mental, or psychiatric disabilities.

During the intervention, caregivers in the intervention group were invited to participate in the study only after the elderly participant agreed to their involvement in the study.

#### Stratification

Participants were stratified into three strata (or Embrace profiles), according to the Kaiser Permanente Triangle. These strata take into account:

1. the complexity of care needs measured with the INTERMED Elderly Self-Assessment (IM-E-SA) and
2. the level of frailty measured with the Groningen Frailty Indicator (GFI), both part of a triage instrument.

The strata are: (A) participants without complex care needs and with a relatively low frailty level; (B) frail participants at risk of complex care needs; and (C) participants with complex care needs.

#### **2.2. Specific health/ICT/innovation and/or social/economic objectives**

For Embrace the Electronic Elderly Record System (EERS), a web-based application was built for both clinical and research purposes.

This computer program is based on work by colleagues who developed a systematic approach to identify patients with complex care needs by scoring the patient and to subsequently systematically document the information.

In clinical practice, the EERS facilitates the Elderly Care Team members in providing effective care and support. Therefore, the EERS includes personal health records that contain individual triage data, the history questionnaire, an individual care and support plan with information about goal setting, actions performed, and evaluations.

For team management purposes, the EERS contains a panel overview and a team agenda. For research purposes, the EERS will be used to evaluate Goal Attainment Scaling (GAS) in the care and support plans, as well as the time expenditures of the Elderly Care Team members.

#### **2.3. Organisations involved**

General Practitioners (fifteen) in three municipalities in the province Groningen; Care-group Meander with home health care teams, homes for the elderly and nursing homes in Veendam in the province Groningen; Welfare organisation Tinten in Stadskanaal in the province Groningen.

#### **2.4. Funding**

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO



### 3. INNOVATION, IMPACT AND OUTCOMES

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#### 3.1. Key innovative elements of your good practice

Key innovation of Embrace is the combination of:

1. the four interacting Chronic Care Model (CCM) - key elements within the context of the community and health care system with
2. stratification of the population of elderly people who live in the community in three Kaiser Permanente (KP) triangle - based risk levels.

The CCM and the KP Triangle were translated to the Dutch setting and adapted to the full elderly population living in the community.

Embrace encompasses an Elderly Care Team per general practitioner practice, an electronic elderly record system, decision support instruments, and a self-management support and prevention program – combined with care and support intensity levels increasing from the elderly people in the Robust profile, Frail profile and Complex care needs profile.

#### 3.2. Evidence on the impact and outcomes

The aim of the Embrace study is to investigate whether Embrace improves patient outcomes and quality of care in a cost-effective way for all community-living elderly people. Several measurement instruments for patient outcomes, quality of care, service use, and costs were applied. Patient outcome measurements will differ per stratum as problems vary; primary and secondary outcomes are chosen according to how sensitive they are to change.

As a result from our experimental study we expect that the quality of care will be improved by Embrace and will be better compared to care as usual. Quality of care will be evaluated using self-report questionnaires for the elderly and for the professional in the health care teams. Furthermore, methods for Goal Attainment Scoring are applied and will give insight in the effectiveness of the individual care and support plans.

#### 3.3. Formal or informal evaluation

We recently finished two qualitative studies: one study was performed among participating elderly people receiving Embrace care and –support, the second study was performed among Embrace case managers. During the next months results will be presented.

Informal evaluations using self-composed questionnaires were performed to evaluate the community-days for the participating elderly people, and to evaluate the Embrace training programs for the Elderly Care Team members.

#### 3.4. Success criteria used to determine that the initiative is working well

Success criteria are positive results from the studies to examine the effectiveness of Embrace, but also acceptance of the intervention among the elderly participants, Elderly Care Team members and organizations involved.

### 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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Embrace is based on two general and global models for long term care and support, and therefore is transferable to other vulnerable groups with long term health problems (children, chronically ill, etc.) and suitable for global application.

### 5. FURTHER INFORMATION

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#### Links to web pages:

[www.samenoud.nl](http://www.samenoud.nl),  
<https://www.youtube.com/watch?v=80eD1vhkUm4>

#### Contact persons:

Reijneveld MD PhD ([s.a.reijneveld@umcg.nl](mailto:s.a.reijneveld@umcg.nl)), Klaske Wymia PhD [k.wymia@umcg.nl](mailto:k.wymia@umcg.nl)



## MULTI-COMPARTMENT DISPENSING AND PHARMACIST'S FOLLOW-UP IN THE IMPROVEMENT OF ADHERENCE TO THERAPY IN THE ELDERLY

### 1. BACKGROUND INFORMATION

ORGANISATION NAME	University of Coimbra, Faculty of Pharmacy
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Pharmacists, Research centres,
COUNTRY INVOLVED IN THE GOOD PRACTICE	Portugal
REGION INVOLVED IN THE GOOD PRACTICE	Center Region of Portugal
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Sabugal town
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	12,544
GOOD PRACTICE DIRECT TARGET GROUP SIZE	54 older patients
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	People collecting prescriptions from pharmacies
TYPE OF PARTNERS INVOLVED	Pharmacists, Research centres, Academia ,
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Multi-compartment compliance aids; Pharmacist follow up; clinical biomarkers; cardiovascular diseases; diabetes; rheumatology.
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

### 2.1. Methodology, processes and target population

The impact of Multi-compartment compliance aids and Pharmacist follow up improve adherence to therapy resulting in positive clinical biomarkers.

A prospective non-randomized controlled study was conducted from January to April 2011 in a community pharmacy (Central Pharmacy, Sabugal, Portugal). Individuals who met the following inclusion criteria were recruited: patients aged 65 years or over, autonomous, prescribed with 3 or more medicines, and being followed in the pharmacy for lipid profile, glycaemia or blood pressure.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

To evaluate the impact of multi-compartment compliance aids on adherence to therapy and on

### 2.4. Funding

Has the initiative already received some funding?

☐

YES

☒

NO

Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument

☐

YES

☒

NO

clinical biomarkers in a real-life elderly population that's also being cared with advanced clinical pharmacy services.

### 2.3. Organisations involved

Community pharmacy in Sabugal town: Institution implementing the good practice.

Research Institute for Medicines and Pharmaceutical Sciences (iMed.UL), Department of Social Pharmacy, Faculty of Pharmacy, University of Lisbon - research institution/academia

Group of Pharmacology and Pharmaceutical Care & Center for Pharmaceutical Studies (CEF), Faculty of Pharmacy, University of Coimbra - Ageing@Coimbra consortium, research institution/academia.

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

The good practice implemented in this pilot study takes advantage of an innovative approach addressing adherence to therapy by avoiding subjective analysis of adherence based on reported actions or non-rigorous measures of drug intake.

### 3.2. Evidence on the impact and outcomes

In this pilot, the outcome of multi-compartment compliance aids and Pharmacist follow up was measured by following physiological biomarkers: blood pressure, lipids and glycaemia levels.

The results show that the group of patients receiving multi-compartment compliance aids improved physiological biomarkers. However, when introducing correction for the 'time in follow up', a significant effect related with pharmacist counselling emerged even in the control group.

### 3.3. Formal or informal evaluation

The results of this pilot study were accepted for publication in the scientific journal "International Journal of Clinical Pharmacy".

### 3.4. Success criteria used to determine that the initiative is working well

The main criteria used in the present good-practice to determine efficiency rely on clinical biomarkers that reflect the general health status of old people involved in this pilot study.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

This pilot/good practice shows that personalised follow up by pharmacists reinforce adherence to therapy strategies based on Multi-compartment compliance aids, in +65 years old people in rural areas. This good practice may be adequate to a population suffering from mild-cognitive deficits and social isolation.

## 5. FURTHER INFORMATION

Link to web pages:

<http://www.uc.pt/ffuc/cef>

Contact point:

Margarida Castel-Branco: [mmcb@ci.uc.pt](mailto:mmcb@ci.uc.pt)



## 1. BACKGROUND INFORMATION

ORGANISATION NAME	University of Porto
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Hospitals, Research centres, Academia, Advocacy organisations patients/users, Day care centres, Home care centres,
COUNTRY INVOLVED IN THE GOOD PRACTICE	Portugal
REGION INVOLVED IN THE GOOD PRACTICE	North of Portugal
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	North of Portugal
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	3.689.682
GOOD PRACTICE DIRECT TARGET GROUP SIZE	634,626 persons
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Older people in general population, Formal caregivers, People in day care centres, Older people receiving care/living at home, People in care homes
TYPE OF PARTNERS INVOLVED	Hospitals, Research centres, Informal caregivers, Academia , Day care centres, Home care centres
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Ageing well, wellbeing, quality of life, Self-concept, web platform, online social community, asthma and chronic obstructive pulmonary disease
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

Development and adaptation of contents and tools for Asthma and chronic obstructive pulmonary disease (COPD), aggregated in a web platform.

The contents, covering several aspects of the diseases, will be created in several formats. For each article, 3 versions will be developed, oriented to physicians/students, patients/public and audiences with limited literacy.

### 2.1. Methodology, processes and target population

The target population will be physicians/students, patients/public and audiences with limited literacy.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

The main outcome is to promote patient education and health professional training, as contents covering different aspects of the diseases (asthma and COPD); tools to promote shared medical decisions, to support disease assessment and monitoring.

### 2.3. Organisations involved

- CINTESIS – Center for Research in Health Technologies and Information Systems;
- UNIFAI – Adult and Elderly Research and Training Unit;
- MUP – Mathematical Centre of the University of Porto;
- SPAIC - Portuguese Society for Clinical Immunology and Allergology;
- APAA – Portuguese Association of Patients suffering from Asthma and Allergies;
- APG – Portuguese Gerontopsychiatry Association;
- IPA – International Psychogeriatric Association;
- IFTA – International Family Therapy Association;
- Institute CUF;
- Day care centres; Senior Universities; Health Centres; Town hall;
- Start-up: Healthy Systems;
- Start-up: Virtual Care

### 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

### 3.1. Key innovative elements of your good practice

The innovative component of this project is the more effective connection between the healthcare givers and patients.

### 3.2. Evidence on the impact and outcomes

This web platform has already been tested by 100 of medical doctors and 350 patients; moreover, some of the results of this project were already been published in scientific literature:

- Azevedo P, Correia-de-Sousa J, Bousquet J, Bugalho-Almeida A, Del Giacco SR, Demoly P, et al. Control of Allergic Rhinitis and Asthma Test (CARAT): dissemination and applications in primary care. Primary Care Respiratory Journal. 2013;22(1):112-6.
- Fonseca JA, Nogueira-Silva L, Morais-Almeida M, Azevedo L, Sa-Sousa A, Branco-Ferreira M, et al.

- Validation of a questionnaire (CARAT10) to assess rhinitis and asthma in patients with asthma. Allergy. 2010;65(8):1042-8.
- Fonseca JA, Nogueira-Silva L, Morais-Almeida M, Sa-Sousa A, Azevedo LF, Ferreira J, et al. Control of Allergic Rhinitis and Asthma Test (CARAT) can be used to assess individual patients over time. Clinical and translational allergy. 2012;2(1):16.

### 3.3. Formal or informal evaluation

Formal – Official report evaluations from the projects' funding agency.

Informal evaluation – project's research group evaluation based on the success criteria; projects' research group partners' informal evaluation and participation.



### 3.4. Success criteria used to determine that the initiative is working well

Quantitative – Number of applications downloads; Number of patients involved; Number of medical doctors involved; Number of publications; Number of related scientific events.

Qualitative – Health services and medical society's adoption and validation of the method.

### 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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All projects that are in development can be applicable to other countries, regions and languages due their universal design guidelines and development concerns.

### 5. FURTHER INFORMATION

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#### Link to web pages:

<http://www.carat.med.up.pt>, [www.Caratnetwork.org](http://www.Caratnetwork.org)

#### Contact person:

António José Soares ([ajasoares@med.up.pt](mailto:ajasoares@med.up.pt)),  
CINTESIS



## 1. BACKGROUND INFORMATION

ORGANISATION NAME	University of Porto
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Hospitals, Micro-sized industry, Research centres, Informal caregivers, Academia, Advocacy organisations patients/users, Day care centres, Advocacy organisations physicians, Home care centres
COUNTRY INVOLVED IN THE GOOD PRACTICE	Portugal
REGION INVOLVED IN THE GOOD PRACTICE	Centre of Portugal
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Centre of Portugal
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	2.327.580
GOOD PRACTICE DIRECT TARGET GROUP SIZE	523,706 persons
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	People in care homes
TYPE OF PARTNERS INVOLVED	Research centres, Academia, Home care centres,
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Ageing well, Wellbeing, Quality of life, Self-concept and mood
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input checked="" type="checkbox"/> Social networks
<input type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input checked="" type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

### 2.1. Methodology, processes and target population

The iNeighbour TV research project aims to promote health care and social interaction among senior citizens, their relatives, and caregivers. The TV set was the device chosen to mediate all the action, since it is a friendly device and one with which the elderly are used to interacting.

A study, conducted among the project's target audience, using a participatory design approach. Its purpose was to better characterize this type of users, identify relevant features, and evaluate usability and user interface requirements targeted to television (in an IPTV infrastructure).

The analysis of the study results, which ensured the revision of the project's features, is also presented along with a comprehensive description of the validated features. Some of these include automatic user recognition system, medication reminder, monitoring system (of deviations from daily patterns), caregiver support, events planning, audio calls, and a set of tools to promote community service. It also focuses on the challenges to define the evaluation of the iNeighbour TV through an analysis of related projects and their lab or in situ approaches, concluding that, although the in situ methodology is more complex, it is more suitable for the iNeighbour TV project.

The process of implementing a field trial with this specific target audience is revealing important challenges, but the diversity of data that it potentially provides reinforces the relevance of such an evaluation.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

Interactive television promoting comfort and sociability among senior citizens (PTDC/CCI-COM/100824/2008)

<http://socialitytv.web.ua.pt/index.php/projects/ineighbour/v/>

[http://www.fct.pt/apoios/projectos/consulta/vglobal\\_projecto.phtml.en?idProjecto=100824&idElemConcurso=2786](http://www.fct.pt/apoios/projectos/consulta/vglobal_projecto.phtml.en?idProjecto=100824&idElemConcurso=2786)

### 2.3. Organisations involved

This project was developed in the university of Aveiro and research centre cetac.media and involved Aveiro's senior citizens in their real life context, Portuguese telecom.

### 2.4. Funding

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO

## 3. INNOVATION, IMPACT AND OUTCOMES

The innovative component of this project is the interactive television application with an effective connection between all the stakeholders, such as healthcare givers, patients, and family. The main output of this project is the interactive television application with the components of accessibility, usability and sociability adequate to comfort of the older people.

<http://socialitytv.web.ua.pt/index.php/contents/publications/>

### 3.1. Key innovative elements of your good practice

The innovative component of this project comes from the use of the TV set, in its interactive way, as the main digital interface with older people. Since older people tends to use intensively this equipment, using it as an

interface for promoting communication and health support minimizes the learning curve and allows providing a set of services and features without the need to add special equipment in the homes of the users.

### 3.2. Evidence on the impact and outcomes

This research project generated several outcomes. First, the project was developed with the support of the Portuguese telco easing a possible migration of the project to a commercial product. The project included a workshop about interactive assistive technologies for the elderly that allowed several national and international researchers in this field to share their projects and ideas



(<http://sociality.web.ua.pt/index.php/2012/06/programa-do-workshop/>).

Additionally, the results of the project have been shared with the society through several newspaper and TV presentations (e.g.

<http://sociality.web.ua.pt/index.php/contents/videos/>) along with several academic publications in international conferences and journals (<http://sociality.web.ua.pt/index.php/contents/publications/>).

### 3.3. Formal or informal evaluation

Both formal and informal evaluations have been performed. First a participatory design approach was carried. In the final phases, an in situ evaluation was performed, including the following steps:

- i) a face to face demonstration of the main features of the system and an explanation of the evaluation steps;
- ii) the deployment of the 1st sub-set of the iNeighbour TV features: the health and information modules;
- iii) the deployment of the 2nd sub-set of the iNeighbour TV features: the community, leisure and placard modules;
- iv) the deployment of the 3rd sub-set of the iNeighbour TV features: the communication module.

The field trial took a total of 5 weeks from May to June 2012. The participants were asked to freely use the application. Nevertheless, some contacts were established to ensure the dynamics of the evaluation and to maintain the close contact between the research team and the participants.

In order to gather all the necessary data, it was decided to develop and use the following collection instruments:

- i) Short think aloud sessions performed at the end of each stage of deployment. This allowed us to gain an idea of the learning curve from week to week;
- ii) Administration of brief questionnaires after each think aloud sessions - two questionnaires were developed: one after the stage 1 of deployment of features and another after stage 2 and 3;
- iii) Monitoring of system statistics – patterns of uses of the different areas;
- iv) Personal and phone contacts to gather more informal feedback;
- v) Photographic and video recordings – with the necessary approval of the participants;

- vi) A final questionnaire delivered after the experiment.

To some of the participants, an interview was carried.

### 3.4. Success criteria used to determine that the initiative is working well

The success criteria used to determine whether the initiative was successful or not consisted on the final in-situ evaluation of the developed prototype and the gathered results.

The results show that target users valued the proposed features and that the system was easy to use. Participants expressed a positive or very positive opinion towards the regular use of such an application.

The health and monitoring features could carry some privacy related questions but users, perceiving the usefulness of those features, expressed their total agreement towards providing personal information to their caregivers.

The development of iNeighbour TV and the results gathered in the evaluation allowed the team to strengthen their belief that TV, as a medium, complemented with other devices, can play an important role in supporting health features to answer to an increasing ageing population.

In addition the description of the processes inherent to the roll out of the in situ tests may also assist other researchers involved in the same type of evaluations with elderly people.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

The iNeighbour TV project was developed in Aveiro's city however the positive impact of the results demonstrated have being considered to prepare a consortium with the inter municipal region of Aveiro with perspective of the applicability of these projects to eleven councils. Nevertheless it is also applicable to other countries, regions and languages due their universal design guidelines and development concerns.

According with the developed research accomplished it is important to considered several groups, concerning the different literacy and age-bracket groups: the young-old (65 to 74 years old), the old-old (75 to 85 years old), oldest-old (85 years old and beyond) and the pre-seniors (50 to 64 years old).

These projects hoped to promote a better quality of life, self-concept and mood and also to promote communication, information sharing and entertainment among the older adults. Beyond those aspects aims



also to mitigate some problems that can arise daily, such as, reduced or difficult mobility of some seniors; the absence of social events; promoting their health and well-being; reducing the feeling of loneliness and promoting the feeling of usefulness to the local community.

## 5. FURTHER INFORMATION

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### Link to web pages:

iNeighbour TV - Interactive television promoting comfort and sociability among senior citizens

(PTDC/CCI-COM/100824/2008)

<http://sociality.web.ua.pt/index.php/projects/ineighbourtv>

### Contact persons:

Jorge Ferraz de Abreu ([jfa@ua.pt](mailto:jfa@ua.pt)), University of Aveiro – CETAC.MEDIA

Pedro Almeida ([almeida@ua.pt](mailto:almeida@ua.pt)), University of Aveiro – CETAC.MEDIA



## 1. BACKGROUND INFORMATION

ORGANISATION NAME	University of Porto	
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Hospitals, Micro-sized industry, Research centres, Informal caregivers, Academia, Advocacy organisations patients/users, Day care centres, Advocacy organisations physicians, Home care centres	
COUNTRY INVOLVED IN THE GOOD PRACTICE	Portugal	
REGION INVOLVED IN THE GOOD PRACTICE	Centre of Portugal	
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Centre of Portugal	
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	2.327.580	
GOOD PRACTICE DIRECT TARGET GROUP SIZE	523,706 persons	
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Older people in general population, Informal caregivers, People in care homes,	
TYPE OF PARTNERS INVOLVED	Hospitals, Nursing homes, Research centres, Informal caregivers, Academia, Day care centres, Home care centres,	
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Ageing well, Wellbeing, Quality of life, Self-concept, mood	
RELEVANCE TO A1 ACTION PLAN		
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring	
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input checked="" type="checkbox"/> Social networks	
<input type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input type="checkbox"/> Training	
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input checked="" type="checkbox"/> Guidelines	
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking	



## 2. DESCRIPTION

The SEDUCE research project aims to assess the impact of psychosocial and emotional effects through the use of ICT (Information and Communication Technologies) among older adults in the context of an online social community. It also has the purpose of building an online community with their full participation.

During the 36 months of the project, a comparative study of the psychosocial and emotional variables such as, the mood adapted to the Portuguese population from Philadelphia Geriatric Moral Scale (Lawton, 1976 adapted by Paúl, 1991), the self-concept (Vaz-Serra, 1986) and Quality of Life (WHOQOL Group, 1998 adapted by Vaz-Serra, 2006) has been carried out before and after the use of ICT by older adults, who participated in the project.

Regarding the online social community, it is being developed with the involvement of older adults, following a Participatory Community Centred Design approach. Furthermore, the study was conducted either in the context of social community (i.e. in co-presence and face-to-face communication) or in the online social community's context (i.e. technology-mediated communication).

This online community for older adults addresses five main modules of research: (a) Communication services (email and instant messaging); (b) Information (local, national and international news from online newspapers); (c) entertainment (brain training games to stimulate perception, memory and strategy, gestural based games and multiplayer video games), (d) health information (online physical exercises, healthy nutrition advices and games, glossary and an incorporated system of alerts), and (e) an area of sharing life experiences and memories, using an online diary.

For this study, 41 older adults were recruited from four residences for the elderly, in the city of Aveiro. The results suggest that there is a strong relationship between the use of ICT by older adults and the positive effects on the sense of wellbeing and ICT satisfaction beyond self-esteem.

Senior Citizen Use of Computer - mediated communication and information in web Ecologies (PTDC/CCI-COM/111711/2009)

<http://www3.ca.ua.pt/seduce/index.html>

[http://www.fct.pt/apoios/projectos/consulta/vglobal\\_projecto.phtml.en?idProjecto=111711&idElemConcurso=3654](http://www.fct.pt/apoios/projectos/consulta/vglobal_projecto.phtml.en?idProjecto=111711&idElemConcurso=3654)

### 2.1. Methodology, processes and target population

A participatory action-research method was used because its focus on the practical application of the knowledge in an immediate problem of society and the active participation of users as decision-makers suited the purpose and the main goals of this study.

Considering the fact that the action-research method also involves at least two cycles of products' evaluation with the user in early phases, several tasks and other methods were also used.

Thus, the different methods and technical tools used for data collection are described for each projects' stage.

#### 1<sup>st</sup> Stage – Sample's recruitment and the initial measurement of emotional variables (self-concept, mood, quality of life)

During the first stage, four day care centres of Aveiro were accepted to participate in the SEDUCE project. In each day care center, there was a group who got involved in online activities and another who did not have any contact with ICT (the group of control). The selection criteria of participants based on: (i) the interest for learning new technologies, (ii) the results of mini-mental state examination (MMSE) and (iii) being aged more than 65 years old. Then, participants' initial mood, self-concept and Quality of Life were measured using the scales mentioned before (in the description).

In each day care center, twice a week, a researcher went there in order to train the experimental group on online activities.

#### 2<sup>nd</sup> Stage – Online community and sociability plan

During the second stage, researchers generate online community-ideas and discuss the concepts related to sociability. This stage encompasses an exploratory study and action-research with several focus groups in order to elaborate a plan of communication and provide a set of recommendations for designing an online social community addressed to this target.

#### 3<sup>rd</sup> Stage – Prototype implementation and test with sociability and usability adjustments

After reviewing the literature on user centered design, contextual design and participatory design (Preece, 2001), a prototype of an online social community is developed according to a community centered development approach.

#### 4<sup>th</sup> Stage – Development of strategies for social online community nurturing and its consolidation

In this stage, the prototype developed in the 3<sup>rd</sup> stage is being tested iteratively with participants and redesigned and participant observation, focus groups and the



researcher diary are crucial to the development of the strategies for social online community nurturing and its consolidation.

#### 5<sup>th</sup> Stage – Comparison of different focus groups' variables after the involvement in the project

In this phase, participants' self-concept, mood and quality of life is measured again (1<sup>st</sup> stage) and the prototype developed in the 3<sup>rd</sup> stage is being tested iteratively with participants and redesigned.

## **2.2. Specific health/ICT/innovation and/or social/economic objectives**

This research has the following goals:

### Health objectives

- To promote older adults' healthy lifestyles by reaching them to schedule their health appointments (through medical reminders) and by providing video tutorials of doing physical exercises (considering the ageing issues).
- To prevent and manage health problems by keeping several health scientific concepts understandable and accessible (an interactive dictionary).
- To train older adults' working memory, improve their long-term memory and procedural memory, enhance their spatial, visual and selective attention skills, speed their process of decision-making and stimulate their reading comprehension and spelling through brain-training games.

### ICT

- To connect different generations through the development of email and instant messaging's interfaces for older adults designed with their full participation;
- To develop different and suitable techniques of participatory design for older adults' informants;
- To provide the latest local, national and international news to older adults in an easier-to-read layout;
- To analyze the potential of networked video games, exergames and brain training games for older adults and its impact on social, physical and cognitive effects of ageing;

- To create an older adults' generated content application, aimed at sharing their memories and life-experiences;
- To train older adults to use computers and compile a set of recommendations on how to address ICT as an essential issue for the autonomy, democracy and the social inclusion of older adults in society.

### Innovation

- To disseminate the research results for future investments;
- To encourage the creation and growth of multimedia applications taking into account the ageing issues;
- To develop multimedia applications "for older adults, by older adults and with older adults";

### Social

- To develop multimedia applications to improve the self-concept, mood and quality of life for older adults;
- To reduce social isolation and depression by facilitating communication between older adults and their relatives and friends (through social game-playing and communication services);
- To fight against ageism, techno-ageism or game-ageism;
- To help to recognize the valuable role of older adults in society.

### Economic

- To provide user-friendly products (available to a wider audience because of the accessible issues) and thus improve competitiveness;
- To create innovative products that corresponds to the different challenges of an increasingly ageing society.

## **2.3. Organisations involved**

This organizations involved in this study are the University of Aveiro (Principal Contractor and Host Institution), Cetac.Media - Communication Sciences and Technologies Research Center (Research Unit) and day care centres of Aveiro.

## **2.4. Funding**

Has the initiative already received some funding?	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument	<input type="checkbox"/>	YES	<input checked="" type="checkbox"/>	NO



### 3. INNOVATION, IMPACT AND OUTCOMES

The innovative component of this project is the online community developed for, with and by older adults. This community addresses the main issues of accessibility, usability and sociability and it has the purpose of incrementing older adults' social capital and strengthening their family and friends relationships.

Although the main output of this research is the developed online social community, there is also the impact of its use on older adults' self-concept, mood and quality of life. The immaterial outcomes such as connectedness (through communication services), information sharing and fun (entertainment) can help on overcoming mobility difficulties, the absence of social events and, that way, promoting older adults' health and well-being, reducing the feeling of loneliness and promoting the feeling of usefulness to the community.

<http://www3.ca.ua.pt/seduca/divulgacao.html>

#### 3.1. Key innovative elements of your good practice

The research project SEDUCE indicates a roadmap for design inclusivity based on the team's working experience on designing multimedia applications *"for, with and by older adults"*. Moreover, this project has some key innovative elements, such as:

- Involving older adults in the process of self-branding through participatory design sessions, users' evaluation of self-concept and its connection to the brand values and identity;
- Being pioneer in addressing the potential of networked video games in the social development of older adults;
- Compiling in an online community the five activities that seems to interest the majority of older adults when interacting with ICT (communicate, monitor their health, read the news, entertain and share their experiences);

#### 3.2. Evidence on the impact and outcomes

This research project promotes digital inclusion, eradicates social barriers, contributes to a democracy in the access of information and communications technologies, promotes healthy lifestyles and affects emotional variables (self-concept, mood and quality of life). In general, our results suggest that there is a strong relationship between the use of ICT by older adults and the positive effects on the sense of wellbeing and ICT satisfaction beyond self-esteem.

Concerning the development of the online social community, some of our results reveal that:

- this target group does not react particularly positively to online social communities with the name "older adults", "senior citizens", "senior", "old" and images of older people. Moreover, digital integration differs from digital inclusion. Whereas in the first, you address the online community exclusively to older adults, a scenario of digital inclusion is that you have the older adults' target in mind but the community is open to all. That was the first challenge of this project – understanding that a scenario of digital inclusion was the right way to this community.
- During the process of self-branding with older adults, they valued social connectedness and being between friends. They also seem to use email to communicate with their grandchildren and other relatives and chat for emotional support with friends.
- Although most of the health multimedia applications tend to focus on providing information about diseases and the cure, focus groups with participants revealed that they do not rely on this information and continue to prefer to see the doctor or ask to a relative. However, they have other worries related to health such as: (a) the dehydration of the skin - they want know whether they drank a lot of water (or not); (b) they need to be reminded of the time to take the pills and (c) they think it is important to be in a good shape and thus video tutoring can be a help.
- Concerning the module of information (news), participants prioritized the news by the following categories: 1.Local; 2. Culture, 3.World; 4. Sports; 5. Economy; 6. Education; 7. National; 8. Politics
- Concerning the module of video games, participants seem to prefer collaborative tasks over competition and off-game communication tools to extend their virtual relationships. Problem-solving and memory span tend to be the skills that participants like to practice when playing video games.

#### 3.3. Formal or informal evaluation

Formal experiments – assess overall effectiveness

Informal – formative evaluation, self-evident



### 3.4. Success criteria used to determine that the initiative is working well

The success criteria used to determine whether the initiative is heading in the right direction was defined for the different stages of the project. Thus:

#### 1<sup>st</sup> Stage – Sample's recruitment and the initial measurement of emotional variables (self-concept, mood, quality of life)

The first stage only ends up with the sample's recruitment and the initial measurement of emotional variables (i.e. when the Mini-mental state examination is used to document cognitive impairments on the sample, when participants' technological literacy is assessed and emotional variables (self-concept, mood and quality of life).

#### 2<sup>nd</sup> Stage – Online community and sociability plan

The outcome of this stage is a plan of online social community's technical specifications document, design document and the communicational and social model fundamental to the next task.

#### 3<sup>rd</sup> Stage – Prototype implementation and test with sociability and usability adjustments

The outcome of this stage is a functional online community prototype and a complete test plan that considers its functionality, compatibility, security, design, content, accessibility, sociability and usability.

#### 4<sup>th</sup> Stage – Development of strategies for social online community nurturing and its consolidation

The community's evolution and maturity depends on new members' recruitment. Thus there is a need to retain the participants already belonging to the online social community and encourage new members. A strategy and a sustainability plan are designed in order to develop a long-term and stable community.

#### 5<sup>th</sup> Stage – Comparison of different focus groups' variables after the involvement in the project

At this final stage, the emotional variables are assessed and compared with the results obtained in

the 1<sup>st</sup> stage. Besides that, there is a high-fidelity prototype of the online social community.

### 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

The SEDUCE project was developed in Aveiro's city however the positive impact of the results demonstrated have being considered to prepare a consortium with the inter municipal region of Aveiro with perspective of the applicability of these projects to eleven councils. Nevertheless it is also applicable to other countries, regions and languages due their universal design guidelines and development concerns.

According with the developed research accomplished it is important to considered several groups, concerning the different literacy and age-bracket groups: the young-old (65 to 74 years old), the old-old (75 to 85 years old), oldest-old (85 years old and beyond) and the pre-seniors (50 to 64 years old).

These projects hoped to promote a better quality of life, self-concept and mood and also to promote communication, information sharing and entertainment among the older adults. Beyond those aspects aims also to mitigate some problems that can arise daily, such as, reduced or difficult mobility of some seniors; the absence of social events; promoting their health and well-being; reducing the feeling of loneliness and promoting the feeling of usefulness to the local community.

### 5. FURTHER INFORMATION

#### Link to web pages:

SEDUCE - Senior Citizen Use of computer mediated Communication and information in web Ecologies (PTDC/CCI-COM/111711/2009),  
<http://www3.ca.ua.pt/seduce/index.html>

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**MONITORING OF PRESCRIPTION AND IMPROVING ADHERENCE TO ANTI-OSTEOPOROTIC TREATMENTS  
(MONADOS)**

**1. BACKGROUND INFORMATION**

<b>ORGANISATION NAME</b>	<b>University of Florence, University Hospital Careggi</b>
<b>TYPE OF STAKEHOLDER YOU ARE REPRESENTING</b>	Research/Academia
<b>COUNTRY INVOLVED IN THE GOOD PRACTICE</b>	Italy
<b>REGION INVOLVED IN THE GOOD PRACTICE</b>	Tuscany Region
<b>GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE</b>	Regional, multinational
<b>TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE</b>	3.667.780
<b>GOOD PRACTICE DIRECT TARGET GROUP SIZE</b>	74.000 patients receiving medications for osteoporosis 5.350 patients with severe osteoporosis (hip fracture)
<b>GOOD PRACTICE DIRECT TARGET GROUP CATEGORY</b>	Patients receiving medication for osteoporosis, osteoporotic patients, patients with severe osteoporosis (patients with fragility fractures)
<b>TYPE OF PARTNERS INVOLVED</b>	Research/Academia, Public health providers, Public care providers, Large industry, Advocacy organizations for care professionals, Advocacy organizations for patients, European scientific organizations, Regional/local administration, Large industries, SMEs
<b>TOPICS/DISEASES ADDRESSED (KEYWORDS)</b>	Osteoporosis, fragility fractures, fracture healing, muscular impairment, adherence, osteoporotic medications, pharmacological surveillance
<b>RELEVANCE TO A1 ACTION PLAN</b>	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input checked="" type="checkbox"/> Decision support tools (including mobile devices) <input checked="" type="checkbox"/> Dispensing and Prescribing <input checked="" type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input checked="" type="checkbox"/> Counselling <input checked="" type="checkbox"/> Education/Information <input checked="" type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input checked="" type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input checked="" type="checkbox"/> Service models <input type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input checked="" type="checkbox"/> Evidence <input type="checkbox"/> Guidelines
<input checked="" type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input checked="" type="checkbox"/> Data repository <input checked="" type="checkbox"/> Networking



## 2. DESCRIPTION

### 2.1. Methodology, processes and target population

Osteoporosis is a chronic condition and requires chronic treatment. Available antiosteoporotic treatments yield a long-term efficacy and offer protection against re-fracture. As defined by the WHO, adherence is the degree to which the patient's behaviour is in agreement with the health care provider's recommendations. Adherence to specific chronic regimens is frequently compromised because patients cannot fully appreciate the long-term or unseen consequences of not taking their medications and because of drug-induced adverse effects. For this reason adherence constitutes the next frontier in patient care. Programmes to improve adherence greatly modify cost-effectiveness, increasing drug benefits for the single patient and reducing costs for the community. The analysis of adherence is closely connected and relies both upon prescription monitoring and patient follow up. While the last is sometimes difficult to pursue, especially in the elderly, monitoring prescriptions is a good indirect way to check adherence for any drug (and antiosteoporotic drugs) in the general population and in particular at risk groups (i.e. patients with previous osteoporotic fractures).

The Italian public health national service is organized under the Ministry of Health and it is administered on a regional basis. In Tuscany, at a regional level, a system to monitor consumption of health resources was established since 2004. The system is based on individual databases, each recording use of different resources (i.e. drug prescription, hospital discharge, etc.). Data from each individual anonymous database can be univoquely connected with each other in a horizontal manner organized around the single patient. The system built to control health expenditure, includes information useful for statistical and epidemiological analyses.

In Tuscany about 6,000 hip fractures (in patients over 65) occur each year, with approximately 18% of patients dying within the first year. Over 50% of patients do not recover the ability to move and self-sufficiency. Approximately 6.5% undergoes a re-fracture of the femur within 4 years. The total direct costs for the public health system are more than 100 million euros. Less than 1000 elderly people with hip fracture were prescribed osteoporosis drugs and 60% of the ones put under antiosteoporotic therapy will interrupt the treatment almost immediately. The estimated total waste of money for Tuscany is 250.000 € per year. These data prompted the Tuscany Region to initiate a program for the prevention of hip fractures in over 65 years old. The Tuscany Region was indeed the first in Italy to implement a specific project with the

aim of reducing hip fractures in the elderly. The scope of the on-going T.A.R.Ge.T. project (*Trattamento Appropriato delle Rifratture Geriatriche in Toscana*, i.e. "Appropriate treatment of geriatric refractures in Tuscany"), funded by the Tuscany Region, has been to recognise the bone fragility in the hip fractured patient and to activate the recognized intervention to prevent re-fractures. The design of the study comprises a 4-year prospective phase (2011-2014), preceded by a preliminary phase (2009-2010) dedicated to basal data analysis and education of the participating centers with ad a retrospective control period (2006-2009). It is led by a "central Coordinating Unit" (MDs, Nurses, Analysts, Epidemiologists – A true "Fracture Unit") and 32 "Operating Units" connected within an operational diagram (Figure 1, next page)).

The MONADOS project aims to improve at regional level adherence to treatments for osteoporosis through community-based interventions after analysis of prescriptions, applying and improving the model of the T.A.R.Ge.T. experience above described and on-going.

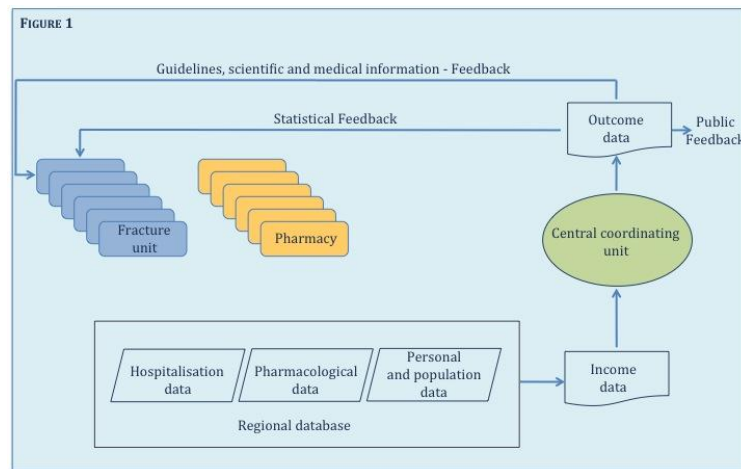
The build-up model will be applied in other countries, always at a regional level, but in a multinational setting to enlarge and empower the methodology and outcomes. Prescription monitoring is possible by the analysis of Regional univoque databases such as the ones on drug prescription and hospital discharge. The platform created for the analysis of the Target project and further applied in the MONADOS project is built by a system of relations among 6 different flows: the flow SDO (Performance Hospitalization), the flow SPF (Pharmaceutical Distribution Dataset), the flow FED (Direct Distribution Dataset), the flow SAA (Registry of Patients), the flow SPA (Specialized Outpatient), and the flow SEA (Board Exemption for Pathology). This monitoring system will also be validated and implemented by the contributions of the other Partners and Organisations included in the Commitment in order to create a strong model to be exported at a multinational level. A portion of the patients who have experienced a hip fracture will also be followed up directly in tertiary centers but in close connection with the General Practitioners in order to directly assess persistence and compliance to the antiosteoporotic therapy, the benefits and the potential adverse effects of the treatment.

After having developed a good and prompt system to assess adherence, specific novel interventions (such as health messages on television commercials, internet- or smart phone-based feedback systems, rewarding systems) will be developed in order to improve adherence to anti-osteoporotic treatments, taking advantage of the active collaboration with

## Action Group on "Prescription and adherence to medical plans"



Advocacy Organizations for health professionals and for patients already included in the Commitment. The model of prescription monitoring will be then re-applied to assess the outcomes of the interventions in the community.



### 2.2. Specific health/ICT/innovation and/or social/economic objectives

The objectives of the MONADOS project are:

- to set up a model to assess and improve adherence to antiosteoporotic treatments
- to export, adapt and validate the model in other Regional settings, at a multinational level
- to decrease the costs for the health system, for the community and for the single patient

### 2.3. Organisations involved

- University of Florence (Florence, Tuscany, Italy);
- University of Liege (Liege, Wallonia, Belgium);
- Autonomous University of Barcelona (Barcelona, Catalonia, Spain);
- University of Sheffield (Sheffield, South Yorkshire, United Kingdom);

- University of Ioannina (Ioannina, Greece);
- International Osteoporosis Foundation (IOF);
- European Society for Clinical and Economic Aspects of Osteoporosis and Osteoarthritis (ESCEO);
- Fondazione Italiana per la Ricerca sulle Malattie Ossee (FIRMO);
- Società Italiana di Ortopedia e Medicina (ORTOMED);
- Azienda Ospedaliero Universitaria Careggi-Dipartimento Interistituzionale Integrato (DIPINT);
- Region of Tuscany, Italy;
- Amgen Dompé, Milan, Italy;
- Stroder, Florence, Italy;
- EL.EN. Group, Calenzano, Italy

### 2.4. Funding

Has the initiative already received some funding?

☒ YES ☐ NO

Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument

☐ YES ☒ NO

## 3. INNOVATION, IMPACT AND OUTCOMES

Osteoporotic fractures increase morbidity and mortality in the population, deeply reducing Healthy Life Years (HLYs). The intervention with anti-osteoporotic treatments is primarily aimed at the elderly population. Good adherence to anti-osteoporotic drugs is associated with reduction of osteoporotic fractures and

related mortality and morbidity, as demonstrated by randomized controlled registrative trials and their extensions.

In clinical practice adherence to this kind of chronic treatments is low and action to improve adherence is needed. Interventions in the community, which can



remotely empower medical advice, are needed in order to improve health outcomes and lower health care costs by means of increasing disability-free life expectancy and to promote healthy ageing. It is conceivable that interventions to improve adherence by means of community approaches directly increase HLY, overall quality of life, indirectly improving care systems.

The MONADOS initiative is continuing and improving the successful unique, initiative of the Tuscany Region and is planning to export it in a multinational setting, thus serving as a model for the monitoring of prescription also to be applied in different settings. This is expected to have a huge impact in EU since it is the first step to ultimately decrease the costs for the health system.

### 3.1. Key innovative elements of your good practice

The T.A.R.Ge.T/MONADOS project is based on a diagnostic process aimed at achieving an adequate pharmacological treatment of hip fractures patients admitted to Hospitals in Tuscany.

The model that the initiative MONADOS (formerly T.A.R.Ge.T. project at a regional level) is pursuing is unique in that it considers the all population of an Italian Region (Tuscany) for particular medications (antiosteoporotic drugs), crossing data from hospital discharge and pharmaceutical records coming from electronic prescription recording, a system which has been set up formerly in the Tuscany Region in a wider setting.

This system of analysis can be exported and reproduced in other Regional settings and can be applied also for the analysis of other target populations.

### 3.2. Evidence on the impact and outcomes

Fragility fractures represent a major cause of morbidity and mortality in the overall population and in the elderly, in particular, greatly reducing their HLYs. Antiosteoporotic treatments greatly reduce the risk for osteoporotic fractures and further fractures after the first fracture. A model first to analyze adherence to antiosteoporotic medications at a regional level and then to improve it with interventions for the general regional population and also specifically dedicated to elderly people is expected to decrease the risk of (further) fractures, thus decreasing morbidity and mortality and increasing HLYs.

### 3.3. Formal or informal evaluation

Data obtained from Tuscany Region is being gathered, collected and analyzed in the Referral Center, both in a

retrospective study and in a longitudinal, prospective way.

The effect of the introduced good practice guided by the Fracture Unit (as described above) and of other initiatives in the community will be then quantified by means of the analysis of the adherence, incidence of new fractures.

### 3.4. Success criteria used to determine that the initiative is working well

The performance of the Project and the results for the period are monitored through the analysis of data from administrative Regional databases. These data provide the information needed to assess the effectiveness of the operational procedures undertaken at the level of the individual Center of the entire region and of procedures addressed to the general target population. The evaluation of the results can be instrumental to prepare the necessary corrections in a dynamic system of continuous improvement.

The practice will be enforced and progressively validated on a larger scale and longitudinally in order to empower the model to be then transferred and adapted to other Centers participating in the initiative. Appropriate feedback systems will be used within the Region and in different regional settings and results will be then compared.

## 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

The build-up model will be transferred, adapted and applied in other EU Countries taking advantage of the Partners already included in the Commitment and actively working in the definition of the protocols to be pursued. The model developed in Tuscany and further implemented, will be adapted and tailored on other Regional settings, easily becoming a multinational experience.

This will help to enlarge and validate the model in multinational regional settings, thus empowering the methodology/good clinical practice and outcomes. The expected results of specific interventions to improve adherence in osteoporotic patients are expected to reduce health costs for the single and for the community all over Europe.

## 5. FURTHER INFORMATION

### Contact persons:

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## QUALIFICATION OF ELDERLY POLYPHARMACY - QUELYPHARM

## 1. BACKGROUND INFORMATION

ORGANISATION NAME	University of Turin, The Department of Drug Science and Technology (DSTF)
TYPE OF STAKEHOLDER YOU ARE REPRESENTING	Hospitals, Pharmacists, Nursing homes, Academia, General practitioners, Regional public authorities
COUNTRY INVOLVED IN THE GOOD PRACTICE	Italy
REGION INVOLVED IN THE GOOD PRACTICE	Piemonte Region
GEOGRAPHICAL COVERAGE OF THE GOOD PRACTICE	Regional/ National
TOTAL POPULATION SIZE OF THE REGION INVOLVED IN THE GOOD PRACTICE	900.000 aged +65 (4.370.000 total regional population)
GOOD PRACTICE DIRECT TARGET GROUP SIZE	500.000
GOOD PRACTICE DIRECT TARGET GROUP CATEGORY	Older people in general population, Patients in hospitals, Older people receiving care/living at home, People collecting prescriptions from pharmacies People in nursing homes
TYPE OF PARTNERS INVOLVED	Hospitals, Pharmacists, Nursing homes, Nurses, Academia, Specialised physicians, General practitioners, Regional public authorities
TOPICS/DISEASES ADDRESSED (KEYWORDS)	Quality of Life (QoL), Elderly, Polypharmacy, optimized treatment
RELEVANCE TO A1 ACTION PLAN	
<input checked="" type="checkbox"/> 1. Improve patient adherence to care plans, including medication and healthy habits.	<input type="checkbox"/> Decision support tools (including mobile devices) <input type="checkbox"/> Dispensing and Prescribing <input type="checkbox"/> Interventions <input checked="" type="checkbox"/> Monitoring
<input type="checkbox"/> 2. Empower the patients and caregivers to take care of their health and to be independent	<input type="checkbox"/> Counselling <input type="checkbox"/> Education/Information <input type="checkbox"/> Online services <input type="checkbox"/> Social networks
<input checked="" type="checkbox"/> 3. Deliver improvements in the health care system to promote adherence	<input type="checkbox"/> Electronic prescription <input checked="" type="checkbox"/> Best-practices <input type="checkbox"/> Service models <input checked="" type="checkbox"/> Training
<input checked="" type="checkbox"/> 4. Contribute to the research and methodology on ageing and adherence	<input type="checkbox"/> Evidence <input checked="" type="checkbox"/> Guidelines
<input type="checkbox"/> 5. Foster communication between different partners/actors in the healing and caring process to improve adherence	<input type="checkbox"/> Data repository <input type="checkbox"/> Networking



## 2. DESCRIPTION

The quality of care for the elderly is unsatisfactory and uneven in European countries.

A key issue is that inappropriate polypharmacy can impair Quality of Life (QoL) in the elderly and unjustifiably increase public health expenditure.

To optimize the care of elderly subjects with multiple medical conditions is a complex task: in many cases the medical literature provides potentially contradictory advice concerning polypharmacy.

There are several reasons for this weakness:

- a. clinical data are often amassed from observing situations limited to hospital or nursing-home environments;
- b. drug-surveillance data-collection and reporting methods, and the resulting data, are still too poor, uneven and inaccurate to comprise adequate means of evaluating the effects of care on QoL

For this purpose:

- We have established a working group that directly integrate academic skills in the drug sciences, epidemiology and psychology, with the specialized knowledge and experience of clinical geriatricians and local pharmacists.
- We have agreed on the criteria for the collection and evaluation of data relating to polypharmacy in 65+ patients and citizens.
- We have agreed data collection in the archive (2011-2013) at regional hospitals S. Giovanni Bosco (TO) and Santa Croce e Carle (CN) relating the prescription of polypharmacy and the use of health products in 65+ patients.
- We have collected data relating the prescription of polypharmacy and the use of health products in 65+ patients, in the archives (2011-2013) of St. Luigi Gonzaga hospital (TO).
- We have contacted some national organizations of nursing home to have access to data in the database for the period 2009-2013.
- We are developing an information system for the collection, management and sharing of data. A web-based system composed by public and private

sections and project management tools is proposed.

- Through the elaboration of archive data in our possession, we are developing a suitable verbal questionnaire to survey types of polypharmacy and perceived QoL in 65+ independent patients (customers of regional pharmacies).

### 2.1. Methodology, processes and target population

Data will be collected directly and verbally from the subjects or their families, through geriatric specialists and local pharmacists, and will include a full analysis of therapeutic characteristics, adverse medical events, Drug Related Problems (DRP) and adherence to treatment regimens. Instantaneous data collection will be guaranteed by a robust web portal system.

Staff involved in the project will be: clinicians (geriatric specialists, nurses), experts in pharmaceutical and health-care products (academics, local pharmacists, hospital pharmacists) and IT specialists.

A distinctive aspect of the project is the highly qualified staff, covering multidisciplinary drug- and health-product-related expertise, epidemiological, psychological, and clinical-geriatric competence, as well as local drug-dispensing and IT skills.

### 2.2. Specific health/ICT/innovation and/or social/economic objectives

This initiative aims to overcome the limitations described in the background section, by providing an assessment of therapeutic quality in the 65+ age population, whether hospitalized, living at home, or in nursing homes.

### 2.3. Organisations involved

- Piedmont Region;
- Order of Physicians and Dentists in the Province of Turin;
- Order of Pharmacists of the Piedmont Region;
- Federfarma Piemonte: Association of Owner Pharmacists of Piedmont Region.

### 2.4. Funding

Has the initiative already received some funding?

☐ YES ☒ NO

Has the initiative received EU funding? If the answer is Yes, please specify which EU funding instrument

☐ YES ☒ NO



### 3. INNOVATION, IMPACT AND OUTCOMES

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#### 3.1. Key innovative elements of your good practice

The initiative is being developed in two phases:

1. Characterization of the drug-consumption profile in the elderly, and of determinants of polypharmacy other than comorbidity, including specific symptoms and functional/cognitive status; the innovative aspect of this phase is the manner in which the survey will be carried out: by direct contact of geriatrician/pharmacist with the elderly patient, through verbal administration of a questionnaire. The target subject perceives this method as medical consultation or drug counselling; it can thus provide details that cannot be obtained through written questionnaires. At the same time, misunderstanding and poor interpretation of the questions is reduced.
2. Development of measures to improve rational drug use in the elderly through the definition of guidelines for managing geriatric therapy targeting primary-care physicians, nurses and pharmacists and the distribution of an informative handbook to explain correct drug use, targeting the elderly, their families and caregivers

#### 3.2. Evidence on the impact and outcomes

The innovative aspect of the project is based on overcoming the inadequacy of standard approach to polypharmacy in the elderly (disease-specific therapeutics approach), in whom the normal age-related physical decline is underway.

Polypharmacy must thus be calibrated to the elderly patient's underlying condition, considering the sum of the diseases present, any polypharmacy-related events, and the patient's psycho-emotional condition, which is reflected in the perception of QoL. To preserve QoL is the goal of an adequate polypharmacy, which may actively contribute to adherence to treatment and to healthy ageing.

The results obtained have been collected but not yet published because preliminary and incomplete.

Future publications will be designed to describe the critical issues of polypharmacy in the elderly and the proposals for use of polypharmacy calibrated.

#### 3.3. Formal or informal evaluation

Formal evaluation: a team composed of representatives of each partner in coalition will be engaged in evaluation of collected data.

Informal evaluation: evaluation of collected and elaborated data, as well as evaluation of impact of dissemination of the project results will be periodically performed.

#### 3.4. Success criteria used to determine that the initiative is working well

Continuous and evenly distributed collection in Piemonte Region of information about polypharmacy and adherence to treatment.

Statistically significant sample of each target population for elaboration of data.

### 4. TRANSFERABILITY TO OTHER ORGANISATIONS /REGIONS

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The comparative study among European countries participating in the project will develop and establish appropriate national and international guidelines to standardize the management of geriatric polypharmacy.

The adoption of new, accredited therapeutic protocols will help to improve the documented primary-care-physicians' prescribing difficulties, the distribution of cuts to pharmaceutical spending, and public-health expenditure.

### 5. FURTHER INFORMATION

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## EUROPEAN INNOVATION PARTNERSHIP ON ACTIVE AND HEALTHY AGEING

### **A COMPILATION OF GOOD PRACTICES**

Action Group on Prescription and adherence to medical plans

*Brussels November 2013*