

Puglia, Italy, CKD integrated care

Part 1: General Information

Publication on EIP on AHA Portal	Yes
Copyright	Yes
Verification of the Good Practice	Yes
Evaluation of the Good Practice	NO
Type of the Good Practice	Promising practice

Part 2: Description of the Good Practice

Name of the Good Practice	Integrated telemedicine platform for predictive medicine, telemonitoring and empowerment of patients affected by Chronic Kidney Diseases (CKD)
Short name (Acronym)	CKD integrated care
URL of the Good Practice	www.smarthealthpuglia.it
Geographical scope	National level
Country	Italy
Region(s) involved	Puglia, Campania, Calabria, Sicilia, Piemonte, Emilia-Romagna, Lombardia
Status of the Good Practice	Completed
Stakeholders involved	<ul style="list-style-type: none"> • Hospitals • Specialised physicians • General practitioners • Primary care centres • Home care centres • Day care centres • Nurses • Nursing homes • National public authorities • Regional public authorities • Local public authorities • Informal caregivers • Private companies • Small-sized industry • Medium-sized industry • Large-sized industry • Housing organisations

	<ul style="list-style-type: none"> • Research centres & Academia • WHO • Advocacy organisations of patients / users • Advocacy organisations of physicians • Advocacy organisations of nurses
Size of population covered	>100,000
Targeted audience	Irrelevant
Summary of the Good Practice	
<p>Chronic kidney disease (CKD) has a high socio-economic impact, as it affects 10% of the world general population (700 M people). The Carhes Study reports an Italian CKD prevalence of 7.1% in the general population aged 35-79 years (2.2 million of Italians) that consumes about 2.5-4 % (around 5 billion euros) of the National Healthcare System's budget for each year. To be precise, the Italian government is spending 1.8-2.0% of its gross national product invested in health to guarantee the healthcare system to Italian people affected by stage I-IV of CKD (GFR between 90-15 ml/min) and the same amount (1.8-2.0% of GNP) to treat 200.000 patients with a GFR less than 15 ml/min (about 150.000) or already on dialysis (about 50.000).</p> <p>CKD is a silent disease that should be early identified by general practitioners (GPs) for an early referral to nephrologists to avoid its progression towards end stage kidney disease. The clinical characteristics of CKD patients have changed in recent years (aging and complexity), resulting in an increased burden of care for the healthcare facilities and the need for a more extensive involvement of families and social services.</p> <p>In this context, our practice aims to create a new technological system, based on a new "digital" healthcare model, involving cooperation among different territorial care entities. Specifically, our practice aims to prevent CKD in general population, to early identify patients affected by CKD, to increase de-hospitalization of patients with overt CKD starting dialysis, to improve quality of life and to reduce the healthcare costs.</p> <p>CKD integrated-care (Smart Health 2.0 project) is a platform with an e-learning environment, with edu-games for the empowerment of the general population (Help-Large) and patients affected by CKD with their caregiver, a business intelligence tool on board (ULYSSES) for the early identification of CKD patients through the analysis of clinical pathology data, a sofa (DIADOM), inspired by home living design and fully equipped with medical devices connected to a</p>	

<p>telemonitoring system (TELCARE) able to create an audio-video connection between patients, nurses and nephrologists.</p> <p>In addition, Smart Health 2.0 project has trained Care and Case managers, Nurses and Physicians with specific expertise on the use of Ulysses, Help-Large and telemonitoring/teledialysis system, those will be the new professionals required for the creation of virtuous paths between hospital and territory.</p>
<p>Key words: neurology, teledialysis, care and case manager, eHealth, mHealth, empowerment, predictive medicine</p>
<p>Good practice being part of the larger programme</p> <p>Yes.</p> <p>Smart Health 2.0 project has create an innovative technological infrastructure, on which several high value-added services have been developed and integrated to provide innovative options in the area of health and well-being, and for an effective management of patients affected by CKD.</p>
<p>Challenges / problems addressed by the good practice</p> <p>Smart Health 2.0 would like to support:</p> <ol style="list-style-type: none"> 1. The constant and progressive increase of aging in general population and the related increase prevalence of chronic degenerative diseases with an e-health platform able to empower them 2. The early identification by general practitioners (GPs) of CKD, a silent disease, that should be early referred to nephrologists to avoid its progression towards end stage kidney disease. 3. The de-hospitalisation of chronic patients on in-centre hemodialysis 4. The demand for a good quality of life and the risk of marginalization of the most vulnerable people. 5. The commitment of financial and human resources to guarantee access to healthcare: rationalization and redistribution of resources is needed to provide the best quality of care with the least possible financial commitment, in assistance retraining, client empowerment and integrative social health.
<p>Importance of the challenges / problems before starting to implement good practice</p> <p>They were very important since dialysis treatment impact on quality of life, hospitalization and health spending. The development of predictive medicine could lead to significant cost savings. In fact, the implementation of prevention programs able to reduce the rate of progression of chronic kidney disease in 10% of the total renal population in has been shown to lead to a savings in health spending of 2.5 billion euros in five years.</p>
<p>Environment before the good practice was implemented</p>

Before our innovative practice, CKD patients had haemodialysis treatment at the hospital for at least three times a week, with a reduced quality of life in terms of time spent at the hospital and stress due to transportation from home to the hospital and vice versa.

In previous attempts to bring the dialysis at home, no one included the support of a technological platform to create a dialog between the doctor and the patient and to promote the empowerment of all involved stakeholders.

Key innovative elements of the good practice and how the good practice improved situation compared to previous practice

The use of the platform brings assistance directly to the patient's home, allows consultation among distant specialists, promotes the sharing of knowledge and diagnostic and therapeutic protocols, providing to the whole welfare system a powerful and efficient clinical information management infrastructure. The other innovative element introduced is the empowerment of the patient and caregiver through a social network and e-learning system, with a related quality of life increase.

Part 3: Transferability of the Good Practice

Cost-effectiveness of the good practice (including all kind of costs and outcomes such as better health, quality of life or other resources)	Lower costs, improved outcomes
Resources required for the deployment of the good practice (personnel, equipment, facilities, ICT and other resources required)	
<ul style="list-style-type: none"> • Adequately equipped control room (PCs, monitors, network, etc.); • Specialized physicians (Case manager); • Specialized Nurses (Care manager); • ICT specialist (software maintenance and improvement) • Home telemedicine kits (sofà + medical devices + HD camera); • Smart devices (tablet, PC, smartphone, etc.); • ICT regional structure, with privacy and security systems; • Training facility. 	
Total budget of the Good Practice	€1M - €5M
Source of funding	National funding
The main actions that have to be done to deploy the Good Practice	
<p>As part of the SH 2.0 project, we have formed new specialists - Care (nurses) and Case (physicians) Managers, with specific expertise in telemedicine. From a planning policy point of view, we have presented the results of our Good Practice to the regional government, in order to promote the implementation of these new</p>	

telemonitoring systems in daily clinical practice. In terms of technical issues there are some requirements that is important to take into account to starting, like telecommunications availability at Patient Home and Control Room organisation in terms of technology (like a multi connection audio-video platform).

Issues during the implementation of the Good Practice

- Technical interfacing problem with the existing ICT structure
- Difficulties in the use of devices by older patients
- System scalability related to the increase in the number of patients
- Privacy Policies

Additional resources required to scale up Good Practice

No

Basis to support sustainability of the Good Practice

Large amount of data in the medical literature documenting the possibility of reducing, with appropriate care interventions, at least the rate of progression of chronic renal diseases towards the dialysis. This leads to the conclusion that an approach which is not reactive (increase in the number of dialysis places), but proactive (primary and secondary prevention in the vicinity of people) can be more methodologically correct.

Regarding cost sustainability for ESRD Patient (End Stage Renal Disease), we have performed a preliminary analysis that suggests the reduction of costs for home telemedicine haemodialysis treatment compared to traditional hospital one. Savings during 3 year follow-up would be about € 200,000 for 10 patients and € 2,800,000 for 100 patients.

Evidence to observe the Good Practice

Video or other digital media (web page, audio)
A visit to an implementation site.
<https://www.youtube.com/watch?v=cUoLWDs1-98>

Part 4: Viability assessment of the Good Practice

Time needed to deploy the Good Practice

Between one year and three years;

A site/region that want to prepare the implementation needs to verify different aspect basically related to his organisation in term of CKD Clinical Pathways adopted. First of all is important to identify immediately the target of the Patient and after that start to identify and dimensioning all the necessary resources in terms of technological resources needed and human resource (Case Manager,

<p>Caregiver, etc..) to be formed. It is necessary to identify additional resources to industrialize the experimental prototype. Therefore, we are evaluating the paths to follow and possible funding sources.</p>
<p>Investment per citizens / patient / client in terms of financial resources</p> <p>Between €100 - €1.000 per targeted citizen / patient. We estimated an additional cost of about 23 € for each telemonitored home treatment, which is still adequately covered by the savings on home - hospital transportation and still generates the savings suggested above. Further investigations are still necessary.</p>
<p>Evidence behind the Good Practice</p> <p>Documented evidence. Evidence is based on systematic qualitative and quantitative studies.</p> <p>We have enrolled 8 CKD patients followed with CKD integrated-care platform for 3 months. We measured dialysis adequacy (Kt/V), compliance (therapy adherence) and quality of life (SF-12 questionnaire). Results showed a good satisfaction for the telemedicine service provided and increased quality of life. We have presented the results to the regional government and it is believed that the new model of care experienced is aligned with the health planning of the Puglia region, relevant and useful for health spending optimization.</p>
<p>Maturity of the Good Practice</p> <p>There is evidence that the practice is economically viable and brings benefits to the target group. Further research and development is needed in order to achieve market impact and for the practice to become routine use.</p> <p>At the moment, the system is a prototype, tested on a small group of CKD patients. During the experimental phase (3 months), the system showed adequate functionality, stability and efficiency, and an appropriate degree of integration with existing systems. The system is designed for scalability and interoperability, but we need a further focus on this aspect.</p>
<p>Estimated time of impact of the Good Practice</p> <p>Long term and sustainable impact - e.g. a long time after the pilot project ended and routine day-to-day operation began</p>
<p>Impact observed</p> <p>Better care integration (economic and societal)</p> <p>We verified an average time-to-impact of two weeks, through psychological interviews and questionnaires on psychological state, self-perceived quality of life and satisfaction with the service, throughout the experimental period.</p>

Transferability of the Good Practice

Ready for transfer, but the innovative practice has not been transferred yet. The innovative practice has been developed on local/regional/national level and transferability has been considered and structural, political and systematic recommendations have been presented. However, the innovative practice has not been transferred yet.

The Good Practice has been designed and developed considering the replicability of the service also outside the Puglia region. The identified model foresees the creation of a centralized control room in the entities accredited for telemedicine by the regional government, and enrolment of the whole region. There are no evidence of impediments to replicate this model and related services in other regions.

Part 5: Your organisation

Name of the organisation	Nephrology, Dialysis and Transplantation Unit - University of Bari - Bari Polyclinic
Address of the organisation	Giulio Cesare square, 11, 70124 Bari (Italy)
Type of organisation	Hospitals
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