

TeleRehabilitation programme, Cyprus

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Currently, an estimated 50 million people in the European Union live with multiple chronic diseases (multimorbidity) and this number is expected to further increase in the near future. As multimorbidity deeply impacts on people's quality of life -physically, but also mentally and socially-, there is a growing demand for multidisciplinary care that is tailored to the specific health and social needs of these people. Integrated care programmes have the potential to adequately respond to the comprehensive needs of people with multimorbidity by taking a holistic approach while making efficient use of resources. Such programmes are characterized by providing patient centred, proactive and coordinated multidisciplinary care, using new technologies to support patients' self-management and improve collaboration between caregivers.

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



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Summary of the TeleRehabilitation programme
<ul style="list-style-type: none"> - The TeleRehabilitation programme is a home-based rehabilitation service that applies advanced telemedicine for intensive care unit (ICU) patients after discharge from hospital. - In Cyprus living in remote areas impedes access to health care, rehabilitation and care provision. - The target population often experiences both financial and mobility-related limitations preventing them to attend in-hospital rehabilitation services (). - The TeleRehabilitation provides a “tower kiosk”, which is installed at patients’ homes, enabling the interaction with a physiotherapist at distance. This latter one can monitor the patient’s exercises, as well as vital signs from wearable devices in real time. - The programme improves adherence to rehabilitation, the health status of patients and reduces the possibility of a return to the ICU. - It proved to be cost-effective and satisfactory for both users and health professionals.

1. Care for people with multimorbidity in Cyprus

Cyprus follows the global trend of an ageing population and an increasing incidence of chronic diseases. In 2013, among a total population of 866,000 inhabitants, respectively 13.2 and 2.9% were aged 65 or 80 and over (1). Of the population aged 16 to 64 years, an estimated 24.2% had at least one (self-reported) long-standing illness or health problem (2). Although the ‘multimorbidity rate’ in the population over 50 years old is not available for Cyprus (3), previous research found that, out of a sample of 465 adults, 28.5% reported at least two diseases and 80% in the group of 75 years and older(4). Information regarding the Cypriot health and long-term care system can be found in Appendix 1.

2. Introduction to the TeleRehabilitation programme

Aim

The TeleRehabilitation programme is an innovative home-based rehabilitation service for patients suffering from cardio-respiratory problems provided by the Nicosia General Hospital. It aims to support patients discharged from the intensive care unit (ICU) during their rehabilitation by using telemedicine tools and tailoring activity according to their morbidity profile. This service improves accessibility to health care services, increases adherence to the rehabilitation programme, reduces costs and it enables a more efficient provision of high quality telemedicine services. The advanced telemedicine tool enables home-based rehabilitation sessions, which has a positive impact on patients and health care providers in terms of avoiding further hospitalisations because of missed rehabilitation sessions (5).

Key features

The TeleRehabilitation programme consists of three rehabilitation sessions (45 minutes each) per week at home, for a period of eight weeks. A physiotherapist and a group of five to seven patients are connected through a video-communication system. The physiotherapist can hear and see all patients, while the patients, in order to ensure privacy, can only see the physiotherapist and hear the other patients. Patients use wearable sensors which monitor vital signs (electrocardiogram, ECG; blood pressure; SpO₂) and the data is sent to the physiotherapist, enabling him to monitor the effects on the patient of the rehabilitation training. Exercises consist of a mix of aerobic training, resistance training and stretching activities, which are tailored to the physical condition and abilities of each patient. This personalized training also allows health care providers to address other existing health problems and co-morbidities (6).

Founders

The programme started as part of a research project running from 2012 to 2014 which was co-funded by the European Commission under the European Cross-border Cooperation Programme “Greece-Cyprus 2007-2013”. The ICU of the Nicosia General Hospital was lead partner with the following collaborating partners: the ICU of the Heraklion General Hospital in Crete (Greece); the Department of Computer Science of the University of Cyprus. Additionally, the Hellenic Society of Ergospirometry Exercise and Rehabilitation, the Cypriot non-profit organisation Intensive Care Forum and the Medical School of the University of Nicosia participated in project activities as research collaborators. After the initial research project had proved its viability, the TeleRehabilitation programme was included into annual budget of ICU of the Nicosia General Hospital and became a standard service offered to patients.

Target group

The patients discharged by ICUs usually have a complex health status and often patients suffer from multiple chronic conditions. The TeleRehabilitation programme is not explicitly addressing multimorbidity in general, since it focuses on patients with cardiorespiratory problems discharged from ICUs. These patients suffer from multiple health problems, both acute and chronic in nature which are taken into account by comprehensive assessment based on which the individual rehabilitation plan is designed. The programme applies a multimorbidity approach by tailoring the intervention to the specific health needs of patients. At the Nicosia General Hospital ICU an estimated 1,200 critically ill patients are hospitalised every year, of which around 1,000 survive. Approximately 25-35% of them are not able to resume their regular life and to participate in their daily activities immediately after being discharged. They often require specialised, tailored cardio-

respiratory rehabilitation, as well as multidisciplinary support, in order to improve their health condition. However, there are major barriers in the Cypriot context that negatively influence the access of patients to such rehabilitation services. There is limited availability of formal services provided by hospitals and rehabilitation centres. A significant share of the Cypriot population lives in rural areas with less health infrastructure. Moreover the direct and indirect costs of travelling to the hospital are considered a substantial barrier for many people. In addition, patients might also suffer from mobility problems which make travelling very difficult. This situation may result in non-attendance and non-adherence to the rehabilitation plan. Dependence on relatives or carers is perceived as a significant burden. The programme was initiated to fill this gap.

The target group of the programme are adults (aged 18 and over) discharged by the ICU after a stay of more than 48 hours, where they needed mechanical ventilation and had symptoms of the systemic inflammatory response syndrome and/or multi-organ failure. The patients eligible for participation in the programme are those with moderate mobility problems (Rivermead Mobility Index, (RMI), ≤10/15) (7). Patients diagnosed with quadriplegia or paraplegia and those suffering from cognitive impairments (failing the Mini-Mental State questionnaire, evaluated by a physician) are excluded from the programme. So far, the majority of users were adults between 35 and 50 years old, with only a few cases of older people accepted to participate in the programme.

3. The use of e-Health technology

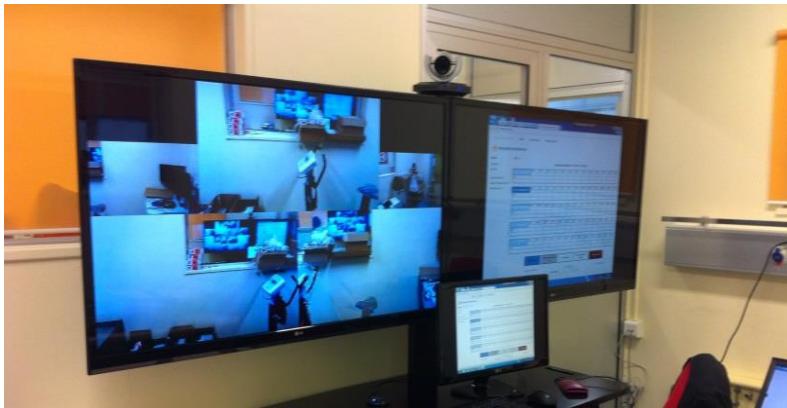
The TeleRehabilitation programme is a telemedicine service which exploits different technical components both in the hospital and at the patient's home (6).

At the hospital

At the Nicosia General Hospital a room is available in which the central station is situated (a system enabling group audio/video communication and vital sign monitoring) which is controlled by the physiotherapist. The station (Figure 1) includes a teleconference system (with high definition camera and speakers enabling video-communication through the internet) and a vital sign central station monitoring system (enabling group monitoring). The videoconference system communicates with audio/video streams, enables connecting to all patients and depicts their streams in different windows (in screen tiles). If needed, the physiotherapist can speak privately to a specific patient. The system also allows monitoring of vital signs of patients, which are collected in real time during the sessions. The clinical information (from electronic health records, EHRs) of each participating patient is also available during the sessions. The rehabilitation sessions are recorded and afterwards

accessible for all care providers. Patients are asked to sign an informed consent that allows the use of collected data for research and developmental purposes.

Figure 1: Central station of the physiotherapist at hospital



In patients' homes

Each enrolled patient has a station (Figure 2) installed in their home consisting of a touch screen computer (enabling audio/video communication and access to multimedia training materials), a portable wearable vital sign monitoring system (collecting clinical data during sessions), and secure network equipment for the internet connection (enabling access to a dedicated virtual private network, VPN, for transmitting data to the central station at hospital). Patients switch on the system at the scheduled time and a connection is established centrally. All devices are embedded in a closed “tower kiosk” which is not manageable by the patient (apart from the touchscreen). In case of an error and technical support is needed, it is available, although almost no problems have occurred during the last years. Additionally, web-based services are accessible by the patients at home: a management system for scheduling rehabilitation sessions, an on-line training module and a clinical report form (CRF) system collecting and providing information on personal health status and clinical measures.

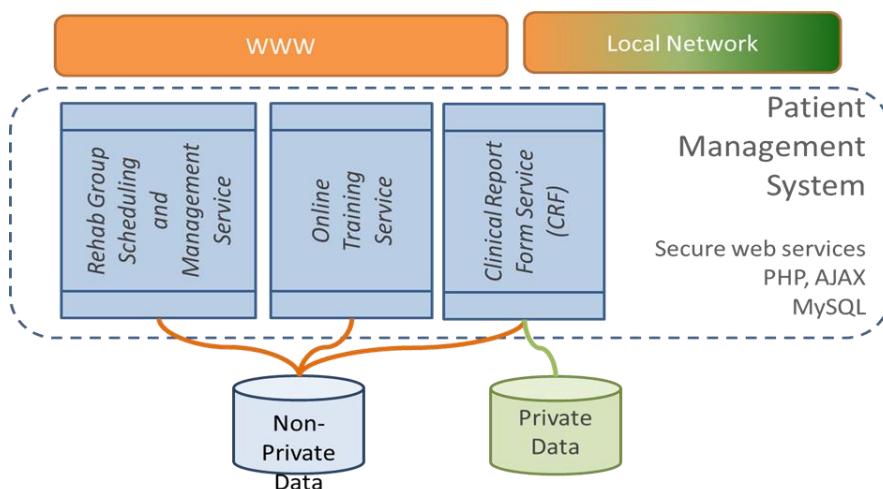
Figure 2: The station in the patient's home



Servers for data storage

In a secured room at the hospital, two servers are hosted for storing and processing all data collected during rehabilitation sessions (Figure 3). One of them is dedicated to 'private data', which is a specific set of data encrypted for security and accessible only by health professionals at the hospital. These data concern the majority of information included in the CRF. The other server contains 'non-private data'. Through a dedicated web application patients and family carers can access the rehabilitation group scheduling and management service, the on-line training service, and specific personal data from the CRF. The possibilities for a cloud-based system are currently being reviewed as this is believed to be more (cost-) efficient than hosting physical servers at the hospital.

Figure 3: Use of private and non-private data for each service and network



Additional innovative services

The TeleRehabilitation programme is implemented alongside two other innovative services initiated by the Nicosia General Hospital ICU and the Intensive Care Forum (8). These two projects are complementary to the TeleRehabilitation programme:

- *TelePrometheus*: an e-learning system which allows the provision of tailored information and training to health professionals, patients and family carers. It consists of a web platform (for virtual classrooms and e-learning) and a number of interactive info-kiosks installed within the ICU. Health professionals can access virtual classrooms and view presentations and seminars on relevant health topics via the web platform. The info-kiosks within the unit provide useful information such as guidelines and training videos for daily practice and interventions. Patients and family carers can access information related to ICU treatments and activities both on the web and at the info-kiosk in the waiting room of the ICU.
- *Ariadne*: this new pilot service aims to provide psychological support for children of critically ill patients who are admitted to the ICU. A web platform has been designed and developed for this purpose. A private virtual room allows audio- and video-communication between a psychologist and the child at home. The web environment includes a multimedia board for drawings and document sharing (texts and videos). After an initial face-to-face consultation, children can be supported in coping with the emotional and psychological distress they may encounter because their loved-one is in the ICU.

All these services are part of a wider strategy of integration of ICU services between the hospital (ICU; high dependency units, HDU; outreach; psychological support) and community settings (home ventilation; rehabilitation; education; follow up). Through information and communication technologies (ICTs) and the additional expertise of researchers and technical staff, different systems are being created to address different needs of health professionals, patients and their families. By making the systems interoperable, they contribute to general medium- and long-term goals of integration and efficiency within the hospital.

4. Patient-centredness

Patient satisfaction

The programme provides a basic, although efficient, home-based rehabilitation service to patients discharged from ICU, who often suffer from multiple chronic conditions. It seems to have reached the goal of patient satisfaction: results show that all patients enrolled in the TeleRehabilitation programme were enthusiastic and thankful for this opportunity. No major problems with

communication with the physiotherapist or technical issues concerning the internet connection or the station installed at home were reported..

Improved quality of life

The use of video-communication and remote monitoring systems have a positive impact on quality of life as it overcomes the aforementioned logistic and financial barriers which would otherwise lead to high rates of non-attendance of an in-hospital rehabilitation programme. Especially patients living in remote areas can benefit from this service. This way, the service enables patients to return home sooner and helps avoiding stressful situations of travelling while still in a precarious health condition. Family members and other carers are also relieved in this respect, since the patient does not need help with transportation from and to the hospital.

Tailored intervention

Patients are evaluated by a multidisciplinary team both before and after the rehabilitation programme in terms of: severity of disease(s); ergospirometry; power assessment of arms and legs; functional capability; cognitive capability, anxiety and depression. The rehabilitation needs are tailored to the specific cardio-respiratory problems and to existing co-morbidities that might influence recovery during and after rehabilitation.

Psychological support

During the whole intervention, psychological support to patients and their family can be provided by a psychologist of the Intensive Care Forum.

Reduced hospitalization

Health professionals working in the TeleRehabilitation programme state that it can contribute to avoiding re-hospitalisation of patients. By participating in and completing the rehabilitation programme, the risk of a decreasing health status and subsequent need to return to the intensive care seems to become significantly lower. This benefits the patient's quality of life and reduces cost (see Financing aspects).

5. Integration, management, competencies

Collaboration

The TeleRehabilitation programme is continued as usual care in the Nicosia General Hospital thanks to a strong collaboration between the ICU-team and the Intensive Care Forum. The latter is a non-profit organization initiated in 2006 by health professionals of the ICU who believed that it would be beneficial to deliver more innovative services to their patients (8). The Intensive Care Forum serves as a sort of operative branch of the ICU with the required freedom to develop, test and implement support services. Physicians and nurses working at the ICU have no time or resources to spend in this respect.

The forum is divided in three divisions, concentrating on (a) patients and family support, (b) research and development, and (c) training and documentation. The organisation employs two engineers (including the programme manager), two physiotherapists, one full-time and two part-time psychologists (for emotional and psychological support for patients as well as their family carers). The level of integration between staff from ICU and Intensive Care Forum is very high, since patients do not seem to be aware that services are provided by two entities, and they seem to consider them as only one executing unit. The programme delivered is recognised under the name of the Nicosia General Hospital, which assures patients reliability and continuity of services throughout their stay.

Staff and patient training

Staff involved in the programme has been trained to operate the telemedicine system. They indicate that it is easy to use for both professionals and patients. When a patient is enrolled in the programme, the patient (and if necessary also their family carers) is trained by a nurse on how to use the technical equipment. For this purpose the nurse visits the patient at home and installs the equipment, showing how it works and providing instructions. This usually takes half a day in total.

6. Financing aspects

Costs and financial analysis

In the initial phase of the programme (2012-2014), the service was developed and tested through co-funding from the European Commission, which provided 1,200,000 Euros overall for research and development activities in the two sites of Nicosia (Cyprus) and Heraklion (Greece). The costs for technical equipment (including video-communication system, wearable sensors, IT infrastructure, central and patient stations, web applications, exercise equipment) amounted to 600,000 Euros. The expenditure for human resources involved (clinical, IT and home care staff) was approximately 150,000 Euros. Considering that the programme can support around 75-96 patients annually and,

with a worst case scenario, lifetime of the technical equipment being 5 years, it was estimated that the cost per patient was around 2,100 Euros, the same amount of the daily costs for one ICU patient (6).

Furthermore, a detailed financial analysis was conducted by an external company in order to evaluate the programme's sustainability in Nicosia over the years (9). The evaluation was based on a discounted cash flow (DCF) analysis, which estimates the return of investment adjusted for the time value of money using two measures of success: the net present value (NPV) and the internal rate of return (IRR). The financial prediction assumed an increasing number of users of the TeleRehabilitation (including both rehabilitation sessions and successive follow-ups) over a 5-year period (in the fifth year, 122 full users and 200 follow-ups). The initial investment for technical equipment (including devices, systems, software etc.) amounted to 382,000 Euros. In this respect, the analysis found out that both measures were positive. The NPV estimation calculated the sum of cash flows (both costs and benefits) of every year in a five-year period with an annual discount rate of 10%, assuming that any positive result of NPV means that the investment is worth and would add value: the NPV for Telerehabilitation is 30,000 Euros. IRR estimation calculated the rate of return which makes the NPV equal to zero, with the consequence that if the IRR is higher than discount rate the investment is acceptable by the organisation: in this study, the IRR was 11.8%. Thus higher and more convenient compared to a standard discount rate of assumed 10%. These results indicate that the TeleRehabilitation programme is worth the initial investment and leads to better financial outputs compared to re-hospitalisation of patients in the ICU because of failing recovery.

Part of the annual ICU budget

Due to the positive results, the budget for continuation of the programme seems to be ensured for the next couple of years. However, apart from intensivists and nurses affiliated to the ICU, a major role in the programme is played by the staff of the Intensive Care Forum. This non-profit organisation has its own budget, which is mainly sustained by donations and funds through research projects it participates in. This lack of secure funding could be a risk for the existence of the Forum and the programmes it is involved in. The programme does not have any financial incentives for staff or for patients.

7. Conclusions and observations

7.1 Innovative aspects

Filling the gap

The TeleRehabilitation programme is an innovative home-based rehabilitation service provided as part of ICU care for patients with complex health problems that often suffer from multiple chronic conditions. It fills a gap in the provision and continuity of out-of-hospital services. TeleRehabilitation has added value for those patients who are unable or cannot afford travelling to the Nicosia General Hospital for rehabilitation sessions. With the introduction of this home-based rehabilitation service, patients can stay at home and schedule rehabilitation sessions with physiotherapist at designated times. This enables them following an adequate rehabilitation plan while safety is secured through the wearable vital sign monitoring.

One of the major strengths of the programme is the fruitful partnership between a clinical unit – the ICU of the Nicosia General Hospital – and a non-profit organisation – the Intensive Care Forum. These two entities act in a complementary way, with the Intensive Care Forum working on those aspects, which the public ICU cannot offer because of budget and time constraints. The integration of additional professionals as part of the ICU team such as informatics, engineers, physiotherapists and psychologists, in addition to traditional ones (intensivists, nurses, other ICU staff), leads to a multidisciplinary team with well-designed roles that can provide tailored care services.

Introduction of e-health

The introduction of a telemedicine service in a country with limited experience in e-health is a challenge, but it has been successful according to both professionals and users. Motivation and willingness at both sides played a major role in achieving positive results. Professionals considered the TeleRehabilitation as a natural extension of the ICU activity. They appreciate the programme as a valuable service to be provided to patients, who otherwise would have had fewer opportunities to access rehabilitation services. Care providers indicate that the programme significantly improves recovery. Patients reported to the staff at the ICU to be satisfied with the programme and the dropout rate was very low so far.

Evaluation

Since the TeleRehabilitation programme was initiated with a European Commission co-funding, the project had to carry out an evaluation of the service. The collection and analysis of data, as well as individual feedback by users, provided a complete picture of effectiveness and efficiency. For patients, the service proved effective in terms of avoiding re-admissions after the TeleRehabilitation programme. Additionally there were positive health outcomes such as improved mobility and body

strength. The programme also proved its cost-effectiveness as the cost for the programme per patient is approximately 2,100 Euros, which is the same cost of a single patient staying one-day in the ICU. This means that, assuming that a patient discharged without doing any rehabilitation will at least have two extra hospital days after re-admission to the ICU, the programme saves cost.

Transferability

The programme would be interesting for other areas/countries where rehabilitation services are underdeveloped or not easily accessible as in remote areas. The potential of the programme for expansion to other fields of medicine lies in its flexible design. The telemedicine service could easily be transferred and adapted for rehabilitation, monitoring and training that are required for other (chronic) health problems and diseases. The technical equipment allows the connection of other sensors to monitor vital signs. The video-communication system can also be applied for medical consultations from a distance. However, it is important to realize that the initial investment of the home-stations is high and the cost-effectiveness that is realized in this case is mainly due to the high cost of admittance to the ICU. Other units at the hospital have already shown interest in the system for their own home-based or community service provision. The possibilities for community services should be explored as stations could also be installed at community centres for the provision of all kinds of health-related care or prevention.

7.2 Challenges

Expanding the programme

Currently, the programme has the capacity for enrolment of 75-96 patients annually, while there is a potential number of 250-350 patients in the ICU with a moderate need for rehabilitation, who would benefit from the service. This means that the service, even though offered as usual care at the Nicosia General Hospital ICU, does not reach even half of the patients who could really benefit from it. Investments in this respect should be a key for enlarging the scope and coverage of the programme in a few years. Not only more stations are needed which requires financial investments, there would also be a need for more well trained staff requiring investments in human resources as well.

Technology acceptance

The acceptance of the new technology by the users was considered positive. The frailest target group of older people however did report drop-outs and resistance towards this technology. This is a challenge which should be addressed in order to allow the inclusion of older patients. Education and

promotion of e-health technologies is important. Additionally, the equipment could perhaps be made more compact (older people may fear that the ‘kiosk tower’ is too big to be installed at home). It might be interesting to explore opportunities for a mobile version of TeleRehabilitation (using smaller devices like smartphones and tablets). This would benefit the entire eligible population and might increase its implementation scope.

Budget sustainability

Concerning budget and sustainability, the initiators of the programme have been successful in realising a budget for continuation after the initial research project phase. So far, TeleRehabilitation is guaranteed and supported by the hospital’s annual budget. However, this budget allocation has to be agreed upon on a yearly basis. This results in some uncertainty about the future of the service in a long-term perspective. Furthermore, the new national health reform, which is currently under discussion in Cyprus and which should be implemented in 2016 (more details in Annex 1), will likely introduce considerable changes in the funding system that may greatly impact the funding of the Nicosia General Hospital. This may have an impact on the internal redistribution of funds and perhaps jeopardize the continuation of the TeleRehabilitation programme.

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Colophon The ICARE4EU project and the selection of ‘high potential’ programmes

The ICARE4EU project aims to identify, describe, and analyse innovative integrated care practices for people with multimorbidity in European countries, and to disseminate knowledge and experiences from these practices to all European countries in order to support further implementation of effective and sustainable care approaches for European citizens with multimorbidity (www.icare4euro.org).

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

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

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

This case report is based on information about the ‘Telerehabilitation programme’. For this case report, the previously collected survey data were verified and enriched by data from internal (e.g., presentations) and external (e.g., papers, reports) documents, as well as qualitative interviews with the programme manager, an intensivist, a nurse and a psychologist involved in the initiative. The interviews were conducted by two members of the ICARE4EU project team, and were recorded. Interviewees received the draft text of the case report for validation, and approved the final report. All interviewees signed a written agreement to publish this case report.

Appendix 1 Some characteristics of the health care systems in Cyprus

The health care system in Cyprus suffers from a division between the public and private sectors. The tensions and fragmentation between the sectors are more pronounced than in other European countries. The total health expenditure is 7.4% of gross domestic product (GDP), with a lower proportion of public expenditure (3.2%) than private expenditure (4.2%), which makes Cyprus an outlier in the EU. In terms of co-payments by users, almost half of the total health expenditure is composed by out-of-pocket contributions, which leads to a substantial financial burden for individuals (10).

The public health system is not universal and highly centralized. The Ministry of Health is responsible for its organisation and administration. Despite issues concerning the provision of services, inefficiencies and relatively low health care expenditure, the Cypriot health system has been reported to have good outcomes. The following indicators were positively assessed: life expectancy at birth, low infant mortality rate, low incidence of communicable diseases, as well as satisfaction and perception of care quality by patients (11). A network of public hospitals and health centres is providing primary and specialist care to users. This network is however not equally distributed leading to regional disparities in access (especially with respect to long-term care, rehabilitation and palliative care). Moreover, general practitioners (GPs) do not act as 'gatekeepers' in Cyprus, with users having direct access to secondary care. This fragmentation is restricting the continuity of care and impedes the communication between care providers. This situation is aggravated by the lack of an adequate referral systems and EHRs. In the case of chronic care, the issue of affordability for users is a reason for concern since patients have to bear the majority of costs. Furthermore, since the budget for each health facility is planned annually by the Ministry of Health according to required needs, there are no incentives for resource optimisation. The link between health and social care is not systematic and still informal, with the Ministry of Labour and Social Affairs having the main responsibility over social care (4, 10,11).

After the financial crisis started in 2009, a memorandum of understanding (MoU) for reforming the health care system was agreed between the Cypriot government and the so-called Troika – European Commission, European Central Bank and International Monetary Fund – in 2013 (with some successive updates) (12). The planned reform is aimed at restructuring the General Health Insurance System (GHIS) and includes major changes, namely: to provide universal coverage; to create a health insurance scheme financed by contributions of employers, employees, pensioners; to apply a primary care-driven referral system; to introduce diagnosis-related groups (DRGs) for remunerating inpatient care; to make GPs the compulsory first point of access to the health care system and to introduce a new scheme of co-payments for secondary care in order to avoid misuse of public care services by patients. These measures should lead to improved chronic care in terms of higher quality care, better coordination and continuity of care, use of best evidence-base medicine and more efficient use of resources. At the moment, the reform is delayed according to agreed timetable and might be finally approved in 2016 (12, 13).

References

1. Eurostat, 2013 data. Population structure and ageing. http://ec.europa.eu/eurostat/statistics-explained/index.php/Population_structure_and_aging, last access: 20.05.2015
2. Eurostat, 2013 data. People having a long-standing illness or health problem. population 16-64. http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=hlth_silc_04&lang=en, last access: 20.05.2015
3. Börsch-Supan, A., Brandt, M., Litwin, H., et al. (Eds.) (2013). *Active ageing and solidarity between generations in Europe. First results from SHARE after the economic crisis*. Berlin, Boston: De Gruyter. Retrieved from www.degruyter.com/view/product/185064
4. Kiliari, N., Theodosopoulou, E., & Papanastasiu, E. (2014). Multimorbidity and unmet citizens' needs and expectations for reforms in the health system of Cyprus: a questionnaire survey. *Journal of the Royal Society of Medicine Open*, 5(1), doi: 10.1177/2042533313515860
5. Website of the Department of Intensive Care of the Nicosia General Hospital: www.intensivecare.com.cy/index.php/en/
6. Stylianides, N., Papadopoulos, A., Constantinou, I., Tsavourelou, A., Dikaiakos, M., & Kyprianou, T. (2013). TeleRehabilitation: A novel service oriented platform to support tele-supervised rehabilitation programs for ICU patients. *Bioinformatics and Bioengineering (BIBE), 2013 IEEE 13th International Conference*, 1-6. doi: 10.1109/BIBE.2013.6701624
7. Rivermead Mobility Index <http://www.medicaleducation.co.uk/resources/Rivmob.pdf>
8. Website of the Intensive Care Forum: www.intensivecareforum.org.cy/index.php/en/ Website of the Intensive Care Forum, ibid.
9. Conquest Business Advisors (2014). *Μελέτη βιωσιμότητας και αειφορίας και μελέτης προστασίας πνευματικών δικαιωμάτων του έργου «τηλε-αποκατάσταση» του προγράμματος διασυνοριακής συνεργασίας Ελλάδα – Κύπρος 2007 – 2013*. Report. Nicosia: CBA. Translated by thebigword - Translation, Interpreting and Technology: "Viability and sustainability study and study copyright protection project "tele-rehabilitation" of CBC Greece - Cyprus 2007-2013".
10. Mercer (2013). *Actuarial study of Cyprus national health expenditure and national health*. Report. London: Mercer. Retrieved from : [www.moh.gov.cy/moh/moh.nsf/EEBCAF0CDB3C0C4FC22577BB0026941E/\\$file/2013_10%20MERCER%20Actua](http://www.moh.gov.cy/moh/moh.nsf/EEBCAF0CDB3C0C4FC22577BB0026941E/$file/2013_10%20MERCER%20Actua)

[rial%20Study%20of%20Cyprus%20National%20Health%20Expenditure%20and%20National%20Health%20Syste
m.pdf](#)

11. Theodorou, M., Charalambous, C., Petrou, C., & Cylus, J. (2012). *Cyprus: Health system review*. *Health Systems in Transition*, 14(6), 1-128. Retrieved from www.euro.who.int/_data/assets/pdf_file/0017/174041/Health-Systems-in-Transition_Cyprus_Health-system-review.pdf

12. Website of the European Observatory on Health Systems and Policies, the Health Systems and Policy Monitor section on Cyprus: www.hspm.org/countries/cyprus30042014/countrypage.aspx

13. Anastaiou, A. (2015, January 29). New delays for NHS. *Cyprus Mail*, retrieved from <http://cyprus-mail.com/2015/01/29/new-delays-for-nhs/>