



## MOMENTUM

*European Momentum for Mainstreaming Telemedicine Deployment in Daily Practice*

(Grant Agreement No 297320)

### Deliverable 3.1a: Report on the Knowledge Gathering

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<b>Authors:</b>	<p><b>Executive Summary and Foreword:</b> Diane Whitehouse.</p> <p><b>Chapter 1:</b> Based on materials provided by Claus Duedal Pedersen and Janne Rasmussen.</p> <p><b>Chapter 2:</b> Based on materials provided by Marc Lange, Peeter Ross and Diane Whitehouse and developed out of the work of all the members of all four special interest groups.</p> <p><b>ANNEXES 1 and 2:</b> Xavier Alzaga, Eli Arild, Francesca Cañas, Ellen K. Christensen, Kirstine Dyrvig, George E. Dafoulas, Souhel Flayeh, Matjaz Flezar, Ann-Karin Forskognes, Jean D. Giakoumis, Ulf Hertin, Peter Hesse, Rachelle Kaye, Miguel Gallofré López, Antoni Sicras Mainar, Brian McKinistry, Susanna Noesgaard, Francesc Moya Olvera, Robert Peel, Stavroula Petropoulou, Ardo Reinsalu, Vivianne Van Kranen-Mastenbroek, Peeter Ross, Eva Skipenes, Vanya Söderberg, Mariann Svanes, David Lacasta Tintorer, Jose Maria Tormos, Michalis Tsagkaris, and Christina Wanscher. All items have been combined in a single document that constitutes an ANNEX to the original Del 3.1 (submitted to the European Commission on September 2013).</p>
<b>Reviewed by:</b>	<p><b>Executive summary, Foreword, Chapters 1 and 2:</b> Marc Lange; Michael Strübin.</p> <p><b>ANNEXES 1, 2 and 3:</b> Ellen K. Christensen, George E. Dafoulas, Ann-Karin Furskognes, Alistair Hodgson, Lars Hulbaek, Rachelle Kaye, Nils Kolstrop, Marc Lange, Montse Meya, Claus Duedal Pedersen, Janne Rasmussen, Peeter Ross, Diane Whitehouse.</p>
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**Abstract:** This deliverable contains nine country reports developed by the Momentum consortium. It also includes all the associated short descriptions of 26 telemedicine services. These descriptions cover those

services that are currently functioning in daily use as well as a smaller number which are either no longer functioning or operational. All of these descriptions of telemedicine services were submitted in response to a second version of the Momentum survey questionnaire circulated to respondents in November 2012.

**Keyword List:** beneficiaries, care, country, EU 28, EU30+, financing, health care, health system, key actor(s), legislation, Momentum, operational, organisation, outcome(s), non-operational or not operational, patient(s), result(s), service, set-up, social care system, strategy, system, targeted population.

## Change History

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### Version Changes

- 01 Initial draft template.
- 02 This version of the document incorporated a re-ordering of materials.
- 03 Added to this version were the two country, and various service, descriptions for Spain and Greece.
- 04 Modifications to this version included the removal of a number of country reports.
- 05 Report from Sweden altered and report from the United Kingdom added.
- 06 Addition of terms and matrix ("table of attributes").
- 07 Addition of terms and matrix ("table of attributes").
- 08 Final quality checking undertaken by Diane Whitehouse.
- 09 Changes requested by experts at annual technical review made.
- 10 Following discussion with co-ordinator, a simplified version of this deliverable was developed. This version of the deliverable was submitted to the coordinator and consortium for quality review.
- 11 Removal of duplicated materials; some simplification of expressions. Re-submitted for further quality review.
- 12 Approved and submitted to EC
- 13 Re-submitted after the inclusion of the text of Annex 1 and 2 as published on the web site

## Statement of originality

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

Authors have made their best efforts to identify where any association with particular websites or specific documentation has been needed in relation either to the individual country or specific service submission.

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## Executive Summary

This document D3.1a is the first part of D3.1 as defined in the Momentum Grant Agreement. It reports on the knowledge gathering while the second part, called Del 3.1b, provides the Outline of the Momentum Blueprint: *Towards a Personalised Blueprint*.

It contains a short description of knowledge gathering process and its results as per the end of 2013. In ANNEX are all the relevant country reports developed by the Momentum consortium as of August 2013 (see ANNEX 1). In Annex too are all the associated short descriptions of 26 telemedicine services (called “service descriptions”) (see ANNEX 2). These descriptions cover 21 example telemedicine deployment services that are currently functioning in different European countries or regions in daily use. A third ANNEX (see ANNEX 3) includes a much smaller number of services which are either no longer functioning or operational. All of these descriptions of telemedicine services were collected by the Momentum project. They were submitted in response to a second version of the Momentum survey questionnaire, circulated to respondents in November 2012, and which were analysed in the period of spring and summer 2013, until July 2013.

Throughout the spring to autumn 2013 time-period, these country reports and service descriptions have been used in a dynamic way by the Momentum consortium members. Firstly, Momentum's special interest groups (SIGs) and, secondly, its consortium as a whole, have used particularly the service descriptions to develop their generic understanding of telemedicine deployment. These descriptions are now being used to create a greater understanding and awareness of telemedicine scale-up, and the requisite surrounding contexts, in a wider variety of countries.

The country reports and service descriptions have now been placed on the Momentum website <http://www.telemedicine-momentum.eu> for public viewing, learning, and constructive criticism.

## Foreword to the re-submission (V12)

The reviewers at the annual technical review of the Momentum project, in September 2013, commented on two elements of this Annex to Deliverable 3.1. They referred to this document's general lack of information with regard to knowledge gathering methodologies and data. They were critical of its lack of attention to a wider range of countries than the nine which were included in the data collection process undertaken by the Momentum project, until November 2012.

The reviewers stated specifically that:

*"The deliverable should focus and justify knowledge gathering (e.g. sample size criteria) and knowledge discovering [sic] methods (e.g. data collection and analysis).*

*In addition, it is not clear why information from a considerable number of countries (e.g. Austria, France, Germany, Portugal, Slovenia, and other home countries in the UK) has not been included, which may be a result of deficits in the consortium / partners' ability to provide representative data of telemedicine services in Europe."*

First, the introductory chapter to this deliverable has been revised so as to concentrate on and justify its knowledge gathering and knowledge discovery methods.

Second, the limiting of the data gathered to nine countries was a deliberate, but initial, position taken by the Momentum consortium. This limitation to a select number of cases was made by the consortium with the intention of permitting in-depth data analysis and understanding. This stance was considered to be limited to Momentum's early data collection stage.

In fact, as per January 2014, the Momentum consortium now contains many partners and members from a range of 13, soon to be 14, countries. Throughout autumn 2013, Momentum has already been seeking, and will continue to seek, to enlarge the sample of the data that it is collecting and the numbers of countries that are represented within the consortium. Momentum continues to invite participants from a wide variety of countries to join its meetings and workshops.

This deliverable continues to contain the country reports from nine countries, and the service descriptions from 26 services. The collation of a wider range of data is, nonetheless, underway, and has been progressing since October 2013. These additional reports and data collection will be included in later revisions of D3.2, which is provisionally still entitled, *Report on Knowledge Gathering and the Blueprint* (and its ANNEXES).

Specifically, with regard to the two criticisms made above, the content of this deliverable has now been revised in the following ways:

- Overall, various small editorial changes have been made.
- An executive summary has been added.
- This "Foreword to the re-submission (V11)" has been added, so as to explain all the changes made to the previous version of the document seen by the reviewers (v08).
- Chapter 1: Considerably more detail on the knowledge gathering and discovery methods used by Momentum, and the range of countries covered by the original Momentum survey, has been included. Ultimately, materials from this chapter will be placed in future versions of the Blueprint (i.e., D3.2 and D3.3).
- Chapter 2: There have been slight modifications made to the chapter title and in the wording of the text.
- Two short introductions have been added to ANNEX 1 and ANNEX 2. They describe the kind of content that is included in these two ANNEXES.
- ANNEX 1: All the country reports dated July/August 2013 have been added here. As noted elsewhere, the **current** versions of these country reports are now located on the Momentum

project website <http://www.telemedicine-momentum.eu>, following review and revision by the Momentum project members.

- ANNEX 2: All the service description reports dated July/August 2013 have been added hereto. As noted elsewhere, the current versions of these country reports are now located on the Momentum project website <http://www.telemedicine-momentum.eu>, following review and revision by the Momentum project members.
- ANNEX 3: Only the introductory text has been modified slightly.



## **1. Report on the Knowledge gathering process**

This report brings together materials to be used in an adapted format in the proposed Chapters 2 and 3 of the **D3.2** Report on Knowledge Gathering and Blueprint.

Before introducing the nine country reports of example countries where telemedicine deployment is taking place (see ANNEX 1), this chapter outlines the way in which the questionnaire survey – from which the data has been extracted – was designed, developed, and undertaken.

### **1.1 Overall approach**

The methods used in the Momentum project to gather and further discover knowledge with regard to telemedicine service deployment were as follows:

- Design, development, testing and launch of an on-line questionnaire.
- Drafting of D3.1, the synopsis of the blueprint, which was used by each of the Momentum SIGs to organise their analytical work (and which can be read today as Momentum deliverables, D4.1, 5.1, 6.1 and 7.1).
- In-depth analysis of a select number of (four) service descriptions of telemedicine deployment.

Initially, in the period throughout spring-autumn 2012, data was collected from 26 telemedicine services through the use of the Momentum questionnaire.

The Momentum project did not use a specific data sampling technique. Rather – as a thematic network whose role was at least in part to build up a learning community around the challenge of telemedicine deployment – it aimed to identify appropriate service descriptions from the work on scaling-up undertaken by its own Momentum members, partners and community.

### **1.2 Designing and prototyping the questionnaire**

The Momentum data collection process was planned in several phases in order to facilitate a staged analysis of the data collected.

To summarise: a questionnaire template was designed in spring 2012 by a team based in the Region of Southern Denmark: this draft was refined in several rounds, after multiple commentary by the consortium members. During this 2012 time-period, the Momentum consortium recognised that the questionnaire that it proposed to circulate would be more complex than had been initially expected. The Momentum consortium considered that the project would benefit from taking time to prepare its questionnaire carefully, since this would add scientific rigour to the preparation. At the design and development stage of the questionnaire, WP3 received the help of a University of Southern Denmark professor with a speciality in data gathering and analysis.

A prototype of the questionnaire was launched in May 2012. Its initial respondents consisted largely of those members of the consortium who have themselves successfully launched telemedicine services into daily operation.

The usability of the questionnaire and the quality of the collected information was discussed in June 2012, during the project's first plenary workshop in Luleå, Sweden. A revised version of the questionnaire was therefore launched publically in September 2012. It remained open for completion throughout a two-month period to allow sufficient data to be collected. At this stage, respondents came from the wider community, and not simply from members of Momentum.

It was decided that the survey process would benefit highly from the support of information and communication technology. It was decided that an on-line questionnaire survey tool would enable the data collection process to be run over a longer time-period than had been initially planned. That is, the survey process would continue to remain open to further submissions. This whole process of incremental revision enabled the questionnaire design to be robust, despite the questionnaire's comprehensiveness and complexity.

### **1.3 Completing the questionnaire**

The Momentum questionnaire was completed on-line. It remains online today on the Momentum website <http://www.telemedicine-momentum.eu>. Data on additional countries and telemedicine initiatives continues to be collected as per January 2014. It is also intended that further data collection will continue during spring 2014. These questionnaire results will be analysed by the four SIGs, and the wider Momentum consortium, during the second period of the Momentum project.

In November 2012, a second version of the Momentum survey questionnaire was circulated to respondents willing to complete either the part of the survey relevant to a particular country or to specific telemedicine applications. The ANNEXES to this deliverable therefore draw on the general information given to the Momentum community as a result of the responses to the autumn 2012 version of the Momentum questionnaire.

As noted earlier, the questionnaire was developed in May-June 2012. As a result of additional comments made during the 21 June 2012 Momentum workshop held in Luleå, Sweden, and a gap analysis undertaken by the four SIGs, the content of the questionnaire was enhanced in early October 2012. Additional questions were added to the questionnaire particularly with regard to legislation and standards; procurement; and the business model(s) used. In addition, a collection of questions originally posed in the Momentum Description of Work were reviewed and were then adapted and inserted in the questionnaire template.

### **1.4 Status of the Momentum survey**

Currently, Momentum has in its possession 27 fully answered questionnaires. This set of data will continue to seed Momentum's initial data gathering process.

A further 16 questionnaires are – or are likely to be – in the process of being answered. Thirty-one further questionnaires have been distributed. The respondent organisations have not started to answer them yet; however, they will be encouraged to do so. A more interactive and dynamic approach will be proposed that enables telemedicine "doers" to directly comment on the findings of the project so that they can enrich these findings with their own experiences.

This report contains information on nine countries: Denmark, Estonia, Greece, Israel, the Netherlands, Norway, Spain (Catalonia), Sweden, and the United Kingdom (Scotland). At the initial time of the submission of this deliverable (D3.1a) in August 2013, the way in which these countries' descriptions would be presented on the Momentum website was under consideration: <http://www.telemedicine-momentum.eu>. Decisions about how this is to be handled have now been made, and the country report data as well as the service descriptions are now present on the website: <http://www.telemedicine-momentum.eu/europe/>.

With regard to country-specific information, this report covers two main elements with regard to each country that has responded to the survey (see ANNEX 1). First, therefore is a description of some generic information about the country's health system and its social care system; second, more specifically, there are details on its organisation in terms of payment structures and reimbursement. Each country report covers, for example, information about whether the health system is insurance-based or publically funded. In some example descriptions, there is also information available about the country's legislative context with specific regard to telemedicine.

The content of ANNEX 1 to this report corresponds to three specific, but generic, questions in the Momentum questionnaire version dated November 2012. These three questions were classified as A, B and C. Each of these questions contains a number of sub-questions (of which there are up to 11 relevant sub-questions within these three separate sections of the questionnaire).

It is these questions which form the “background information” to an understanding of the context and organisational setting related to telemedicine service deployment.

Other details with regard to each telemedicine service, such as strategy/management; organisational and change management; legal, regulatory and security issues; and technical and infrastructure issues, are not reported here. They are instead taken up in four other deliverables created by the project consortium entitled D4.1, D5.1, D6.1, and D7.1.

The limitation of the data collection to nine countries was a deliberate approach on the part of the project partners. This was because they sought to acquire data that would permit an understanding of **their own** telemedicine deployment contexts, and – at the same time – enable them to collaborate on understanding **each other's** situations and contexts. These contexts can, at least superficially, immediately be seen as being quite different, each from the other. Hence, for analytical purposes, a basic question remains: what are the basic similarities among systems and services that are to be deployed at larger scale?

The Momentum consortium always intended that, at a later stage of the project, country reports and service descriptions data to be collected would be sought from a wider community or “orbit”. This more comprehensive collection of data is likely to occur in winter 2013/2014 throughout spring 2014.

For a number of countries – including Austria, France, Germany, Portugal, Slovenia, and additional home countries in the United Kingdom – country-level background data has been provided as of January 2014. Data continues to be provided. A specific example of such a case is Portugal.

The consortium intends to enlarge this data-gathering process further during the spring/summer 2014 time-period.

## **1.5 Supporting the exploitation of the answers received**

Momentum's WP3 has drafted texts that analyse and describe those parts of the questionnaire

(specifically Parts A and B) which were not subject to analysis by the SIGs. This data covers the service descriptions of the telemedicine services, as well as the health care system of which they are part. They are represented by the “country reports” and “service descriptions”. These sets of descriptions have been reviewed with the help of experts who were identified by the consortium as national telemedicine champions. The service descriptions have been reviewed with the help of the “service owners” themselves. These texts are contained in the ANNEXES to this report.

WP3 has also developed a deployment maturity model, and a table of telemedicine service attributes. These two activities were found to be necessary in order to enable each of the SIGs to concentrate on and further refine its analysis. WP3 undertook an overview of the literature in order to define this model. This deployment model will be more explicitly included in the next version of the blueprint, D3.2.

## 2. Telemedicine services - start of the data analysis

Each of the countries involved in the Momentum survey until November 2012 reported between one and six telemedicine applications. Most reported two or three.

Two countries approached as of November 2012 did not immediately provide descriptions of the country-level health or social care system, yet they provided an overview of specific telemedicine services.<sup>1</sup>

This brief chapter should be read in conjunction with ANNEXES 1 and 2 of this report (each particular telemedicine deployment description) where the different countries' telemedicine services are described.<sup>2</sup> The ANNEXES identify the person and organisation on whose part the response (or responses) were given.

Each service description describes who the questionnaire respondents were, their organisations, and the countries in which they are based.<sup>3</sup> Each gives the titles of the service(s) and a description of the service(s), including the main beneficiaries. They describe the current status of the telemedicine service (and especially whether it was discontinued or never launched). See ANNEX 3 for the details of discontinued services or services whose status is unknown.<sup>4</sup>

The descriptions give an overview of the targeted population and the clinical condition(s) that the patients are experiencing, the characteristics of the service, the numbers of people who receive the service in relation to the national level including those who receive it on a monthly basis. Some general characteristics, categorisations and descriptions of the services involved are given as well as the relationships between the key actors involved in the services. Descriptions of the types of conventional treatments that telemedicine services were seeking to replace are also described. Last but not least, but of considerable importance, a description is given of the types of expected outcomes and results from the introduction of the telemedicine services will be described.

Overall, more detail is available for the currently functioning services than for those which have been discontinued or for which the status is "don't know".

A comprehensive analysis of these cases is considered to be a long-term process inside the Momentum project. This work has generally been referred to by the consortium as the "cross-SIG analysis or matrix" (see Tables 2 and 3). The work will be further developed as the project develops.

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<sup>1</sup> In these two cases (Austria and Slovenia), the two services described are either no longer operational or never actually became operational. These two non-operational descriptions are contained in Annex 3 of this report.

<sup>2</sup> In ANNEX 2, the various operational services are listed according to the country to which they belong. In ANNEX 3, the different non-operational services are also listed according to the country to which they belong.

<sup>3</sup> The respondents' permission was given to the publication of their names, titles, and organisations.

<sup>4</sup> For discontinued services, some indication is given of the phases that are most typical of the stage or phase at which the decision was made to close or "fold" the service, and the types of overall reasons for this.

## 2.1 Types of services

The types of telemedicine services reported in the Momentum survey cover the following eleven categories. The definition of each service has been developed by the Momentum consortium members in discussion with each other, and with reference to the general literature. These definitions will be further reviewed, to ensure their validity and integrity.

**Table 1: Types of services and their definition**

Type of service	Definition of the service in the context of the Momentum project
Administrative meetings/ video-conference meetings	Meetings for administrative purposes held at a distance, using telephone or video conferences or some other ICT-based platform.
Diagnostics	Diagnosis at a distance of a patient by a healthcare provider, where the instrument required for collecting diagnostic data is located in the same place as the patient and the data are transmitted to the healthcare provider by ICT means.
Discharge planning	Consultation at a distance of a patient by a healthcare provider in view of making a discharge decision.
Education/training	Educational courses, seminars and training provided at distance, where the students are not in the same location as the teaching resources. This service also includes eLearning services, where the teaching resource is ICT-based.
Interpretation	Language interpretation offered at a distance, where the interpreter is not physically in the same place as the patient and/or the healthcare provider.
Mobile access to vital information (e.g. electronic health record)	Access of patient or personal health data at a distance and by any means (e.g., telephone or tablet device) other than a wired connection.
Monitoring	Collecting patient health-monitoring data at a distance, sorting all the alerts and forwarding them as appropriate to a healthcare provider.
Psychiatry	Consultation at a distance by a healthcare provider of a patient experiencing psychiatric difficulties.
Rehabilitation	Physical training at a distance of a patient using video conference as the means for the healthcare provider to monitor the patient when performing the requested physical exercises.
Research and development, and quality management	Using any ICT means to perform research and development activities or managing the quality procedures applied by an organisation to a workflow.
Therapy	Consultation at a distance of a patient by a healthcare provider in order to treat the patient therapeutically.

## 2.2 Cross-SIG analysis

The beginnings of a more comprehensive analysis of these cases was underway as of September 2013 (this work is provisionally called the “cross-SIG analysis or matrix”). Details of this cross-SIG analysis is given in the two tables that follow. On the one hand (Table 2), they describe the numbers of customers receiving the service, and various other attributes relating to the various service providers (“service parties”), the purpose of the service, and the initiator of the service at the project phase. On the other hand (Table 3), they describe a number of process-related attributes with regard to the interaction between organisations, and changes to workflow, as well as the

financing of two different phases of the project (the project phase and the lead into routine care). The work will be further developed as the assignments undertaken by each of the special interest groups (SIGs) on the overview of the submitted telemedicine services progresses.

In what follows, the emphasis is on the data provided by the functioning services rather than those which are not in routine operation, due to the orientation of the project towards a need for the understanding of telemedicine deployment scale-up.

Table 2: Attributes relating to numbers, service parties, purpose, and initiator

		Number	Service parties				Purpose of the service								Initiator of the project leading to a service in routine care				
		Number of customers (on a monthly basis)	Healthcare provider - Patient	Healthcare provider - Healthcare provider	Health/social service provider - Citizen	Delivery of healthcare	Prevention	Second opinion	Administration, Meetings	Education	Self care	Rehabilitation	Other	National or regional programme	Hospital initiative	GP initiative	Private initiative	Other	
1	Estonia - doc@HOME	100-1 000	1			1								1					
2	Israel - Chronic disease management	100-1 000	1			1						1					1		
3	United Kingdom - The telescot programme	100-1 000	1			1								1					
4	United Kingdom - Teledyalisis	10-20	1			1				1				1					
5	Norway - Electronic platform for integrated home care of long lasting and chronic ulcers, www.pleie.net	0-10	1	1		1						1			1				
6	Norway- Teledialysis	?	1	1		1			1						1				
7	Norway - decentralized psychiatrist on call service collaboration using videoconferencing	10-20	1	1		1		1							1				
8	Norway - COPD patients briefcase	20-50	1			1					1	1			1				
9	Denmark - Teleinterpreting: Improving interpreting services in health care thru the use of video conference equipment.		1	1		1								1					
10	Denmark - COPD briefcase	0-10	1			1									1				
11	Denmark - Health Optimum - Tele-consultations - Diabetes	10-20	1	1		1									1				
12	Greece - Telehealth Service of the Municipality of Trikala	50-100	1			1								1					
13	Greece - Telecardiology Service of CardioExpress SA	100-1000		1				1									1		
14	Spain - ECOPIH -Eina de comunicació entre Primària i Hospital- (Communication tool among Primary and Acute care)	100-1000		1				1		1					1				
15	Spain - Xarxa Telelctus	50-100		1		1		1						1					
16	Spain - ITHACA -Innovant en el Tractament de la Hipertensió Augmentant el Compliment i l'Adherència	100-1000	1			1				1	1				1				
17	Spain - ENDOBLOC (virtual community for clinical practice in endocrinology)	100-1000		1				1		1					1				
18	Spain - Guttman NeuroPersonalTrainer	50-100	1			1						1			1				
19	Netherlands - Remote intraoperative neuromonitoring	20-50	1			1											1		
20	Sweden - Electronic healthcare	100-1000	1			1								1					
21	Sweden - RxEye Remote Reading	100-1000	1			1											1		



**Service provision and volume of customers:** More services are provided to patients (17) than to other healthcare providers (9). Five services are provided to both patients and to healthcare providers (these are all services that continue to function). The most frequent range of customers served by the service is 100-1,000. Eight services serve this number of customers (most are services for patients, although a small number are services for healthcare providers). In fact, in terms of the potential volume of customers, this range is noticeably large range (the numbers of clients could vary from between just 101 upwards to a thousand). Some services served only small volumes of customers, such as 0 (zero) to ten, 10-20, 20-50, and 50-100. Interesting, many of these are the services which are said to serve both patients and healthcare providers. Perhaps understandably, only two of the six non-functioning services were able to indicate what numbers of customers they had had originally.

**Purpose of the service:** A range of purposes are served by the telemedicine applications seen. The four most frequent services are second opinion (5), education (4), rehabilitation (4), and self-care (2). There is at present only one case of an administrative/meetings application that has been submitted. Some other forms of service have not yet been seen: i.e., prevention or “other”.

**Initiator of the service leading to a service in routine care:** The most frequent initiator of the service that has led to routine care has been a hospital (10), with a national or regional programme as the second most popular category (7). In four still functioning cases, the initiator was a private entity. No examples of a general practitioners' initiative (0) or “other” (0) have been seen.

Table 3: Attributes relating to interaction between organisations, workflow, and financing of the different project phases

		Interaction between organisations					Interference to current workflow				Financing of the project phase				Financing of the service in routine care			
		Inside one healthcare organisation	Across institutional borders	Across national/regional borders	Between the secondary care organisation and patient	Between the primary care organisation and patient	Disruption of current workflows	Increasing efficiency/effectiveness of current workflows	Including excluded patients in current workflow	Other	Public	Private	Mix	Other	Insurance based (Social insurance)	Tax based	Mix	Other
1	Estonia - doc@HOME				1	1	1	1			1				1			
2	Israel - Chronic disease management		1		1	1	1	1			1				1			
3	United Kingdom - The telescot programme						1				1					1		
4	United Kingdom - Teledialysis			1				1			1					1		
5	Norway - Electronic platform for integrated home care of long lasting and chronic ulcers, www.pleie.net		1		1			1			1					1		
6	Norway- Teledialysis		1					1			1					1		
7	Norway - decentralized psychiatrist on call service collaboration using videoconferencing				1			1			1					1		
8	Norway - COPD patients briefcase				1			1	1		1					1		
9	Denmark - Teleinterpreting: Improving interpreting services in health care throu the use of video conference equipment.				1			1			1					1		
10	Denmark - COPD briefcase				1		1					1	1			1		
11	Denmark - Health Optimum - Tele-consultations - Diabetes		1		1			1			1					1		
12	Greece - Telehealth Service of the Municipality of Trikala				1		1				1				1			
13	Greece - Telecardiology Service of CardioExpress SA		1					1			1				1			
14	Spain - ECOPIH -Eina de comunicació entre Primària i Hospital- (Communication tool among Primary and Acute care)		1					1			1					1		
15	Spain - Xarxa Telelctus		1				1	1	1				1			1		
16	Spain - ITHACA -Innovant en el Tractament de la Hipertensió Augmentant el Compliment i l'Adherència				1	1	1	1									1	
17	Spain - ENDOBLOC (virtual community for clinical practice in endocrinology)		1					1					1			1		
18	Spain - Guttman NeuroPersonalTrainer		1				1	1					1			1	1	
19	Netherlands - Remote intraoperative neuromonitoring		1	1				1							1			
20	Sweden - Electronic healthcare		1					1								1		
21	Sweden - RxEye Remote Reading						1									1		

**Financing of the different project phases:** With regard to the functioning services, overwhelmingly, the financing of the project phase of these telemedicine initiatives has come from a public source (13). In four (4) cases, the source of the project phase financing was a mix of public and private sources. In only one case – that of the Danish COPD briefcase – was the financing also said to be private. In terms of the financing of the service in routine care, currently, the primary source of financing is said to be tax-based (15) rather than insurance-based (5), although in two (2) Spanish cases, the source is said to be mixed. These findings should be read in conjunction with the work of SIG 1 on strategy and management (see Del 4.1), which also covers financing.

**Relations between organisations:** In response to this question, respondents have been able to give multiple responses. The most popular responses have been that there is interaction across institutional borders (11) and between a secondary care institution and the patient (10). Less frequent indications have been given of between the primary care institution and the patient (3), and across national/regional borders (2). These findings seem to relate well with those relating to the service provision, the types of customers, and the initiators of the services. These findings should be read in conjunction with the work of SIG 2 on organisational implementation and change management (see Del 5.1), as should the findings (below) on workflow.

**Workflow:** The numbers of responses acknowledging the increased efficiency and effectiveness of the current workflow (17) is noteworthy. So too is the degree of disruption to the workflow (9 services). Only two (2) services remark on the involvement of previously excluded patients.

The definitions of the various attributes used in the above two tables (above) are listed below. Essentially, they relate to the following important elements of the types of services that have been under investigation by the Momentum consortium. They include:

- The service provider.
- The purpose of the service.
- The initiator of the project leading to a service in routine care.
- The interaction between organisers (involved in telemedicine).
- Any interference to current workflow.
- The financing of the project phase.
- The financing of the service in routine care.

Many of these characteristics have a primary importance for the work undertaken by the two Momentum SIGs on strategy and management (SIG 1), and on organisational implementation and change management (SIG 2). To date, much of the work of the consortium has focused on e.g., the initiation of the Momentum project, the financing of the project phase and the routine phase, and the degree of interruption to workflow.

**Table 4: Attributes and their definitions**

Category	Attribute	Definition (in the context of MOMENTUM)
Number	Number of customers (on a monthly basis)	Absolute figure as indicated in the questionnaire

Category	Attribute	Definition (in the context of MOMENTUM)
Service providers	Healthcare provider - Patient	Tele-service (i.e. communication at distance) - for healthcare purposes - between a healthcare provider (general practitioner, specialist, nurse ...) and a patient
	Healthcare provider - Healthcare provider	Tele-service (i.e. communication at distance) - for healthcare purposes - between two healthcare providers (GP, specialist, nurse ...)
	Health/social service provider - Citizen	Tele-service (i.e. communication at distance) - about issues not directly related to health - between a service provider - from the healthcare or social care sector - and a citizen or a consumer
Purpose of the service	Delivery of healthcare	The tele-service is aimed at contributing to healthcare delivery
	Prevention	The tele-service is aimed at contributing to a primary or secondary prevention programme initiated by the health care system
	Second opinion	The tele-service is aimed at enabling a healthcare provider to seek an opinion from another healthcare provider (e.g. a specialist) before determining a diagnosis or treatment; the diagnosis or treatment decision remains the responsibility of the primary healthcare provider that is seeking for the second opinion
	Administration, Meetings	The tele-service is aimed at contributing to the organisation of the health system or service (e.g. processing administrative data, organising appointments for healthcare)
	Education	The tele-service is aimed at training or informing healthcare providers or patients
	Self-care	The tele-service is aimed at helping citizens and patients to monitor themselves or their health status on their own initiative, using services made available on the market
	Rehabilitation	The tele-service is aimed at enabling rehabilitation at a distance
Initiator of the project leading to a service in routine care	Other	The tele-service has another purpose than the one listed in this category (e.g. social care)
	National or regional programme	The project which started the tele-service was initiated by the public authorities, as a part of a national or regional policy-support programme
	Hospital initiative	The project which started the tele-service was initiated by a secondary healthcare delivery organisation
	General Practitioner (GP) initiative	The project which started of the tele-service was initiated by a primary healthcare delivery organisation
	Private initiative	The project which started the tele-service was initiated by a commercial organisation
	Other	The project which started the tele-service was initiated by an organisation of another type than the one listed in this category

Category	Attribute	Definition (in the context of MOMENTUM)
<b>Interaction between organisations</b>	<b>Inside one healthcare organisation</b>	The tele-service is internal to the same organisation, i.e. it depends on a single decision-making authority
	<b>Across institutional borders</b>	The tele-service is established between two or more independent organisations, each of them with their own decision-making authority
	<b>Across national/regional borders</b>	The tele-service is established between two or more independent organisations, from two or more different countries or regions, each of them with their own policy-making authority
	<b>Between the secondary care organisation and patient</b>	The tele-service is established between a secondary healthcare delivery organisation and its patient, outside the organisation
	<b>Between the primary care organisation and patient</b>	The tele-service is established between a primary healthcare delivery organisation and its patient, outside the organisation
<b>Interference to current workflow</b>	<b>Disruption of current workflow(s)</b>	The tele-service creates a new workflow. It is considered that home monitoring is a new workflow, even if it replaces a patient's visits to the primary or secondary care organisation because this implies significant changes in a pre-existing workflow
	<b>Increasing efficiency/effectiveness of current workflow(s)</b>	The tele-service improves an existing workflow without changing it significantly by making it e.g., faster, cheaper, less resource-consuming, or less subject to errors.
	<b>Including excluded patients in current workflow(s)</b>	The tele-service improves the accessibility of a healthcare service (e.g. because it connects isolated areas better or reduces the shortage of healthcare providers in some specialities) or contributes to a better screening of patients at risk and their inclusion into prevention or disease management programmes
	<b>Other</b>	The tele-service interferes with the current workflow in another way than the one listed in this category
<b>Financing of the project phase</b>	<b>Public</b>	The project which started the tele-service was funded by the healthcare system or through a publicly-funded programme (either a regional, national European or international one)
	<b>Private</b>	The project which started the tele-service was funded by private commercial investors (e.g. an IT company or a pharmaceutical company)
	<b>Mix</b>	The project which started the tele-service was funded through a combination of publicly-funded programmes and resources from either the private or commercial sector
	<b>Other</b>	The project which started the tele-service was funded by another means than the one listed in this category

Category	Attribute	Definition (in the context of MOMENTUM)
Financing of the service in routine care	Insurance based (Social insurance)	The use of the tele-service in routine care is financed by an insurance-based social security system
	Tax-based	The use of the tele-service in routine care is financed by a tax- or residence-based social security system
	Mix	The use of the tele-service in routine care is financed by an insurance-based social security system in combination with resources from national or regional taxes
	Other	The use of the tele-service in routine care is financed by another means than the one listed in this category

### **3. ANNEX 1 - Country reports on country's telemedicine services**

This ANNEX provides a general overview of the overall national healthcare systems from which the Momentum questionnaire has received responses.

The ANNEX corresponds to the three questions that were classified in the Momentum questionnaire as A, B and C. Each of these questions has numerous sub-questions i.e., question A has three sub-questions, question B has two sub-questions, and question C has six sub-questions.

The ANNEX describes the organisations on whose part the response (or responses) is given; the EU-30+ countries in which the organisation is based (that is, the EU-27 plus Croatia, Norway, Turkey and any other near-European Union countries); and whether the organisation is a partner in the Momentum project or not.

It offers generic information about the health system and the social care system of the various countries, in particular a country's organisation in terms of payment structures and reimbursement (i.e., whether the system is insurance-based or publically funded).

Overall, this ANNEX identifies whether the specific health or care or telemedicine organisation possesses either a strategy or plan relating to telemedicine. Details will be included on whether the organisation has a strategy for telemedicine or a strategy on other health-related or IT domains that include telemedicine in some way, and whether this affects regional authorities. Information will also be available on whether the country itself has legislation that deals with telemedicine specifically, and whether liability is an issue that is included within its legislation..

These country reports for Denmark, Estonia, Greece, Israel, Norway, Spain (Catalonia), Sweden, and the United Kingdom (Scotland) date from July 2013. Revised versions of these reports, and the country's associated telemedicine deployment examples, are now located on the Momentum website <http://www.telemedicine-momentum.eu/europe/>. This follows vetting and quality control on the part of the Momentum national representatives and the Momentum consortium members.

#### **3.1 Denmark – country report**

##### **3.1.1 Denmark's health and care system organisation**

Denmark is divided into 98 municipalities (kommuner) and five regions (regioner), each covering several municipalities. The regions are responsible for hospitals and public health insurance. The municipalities are responsible for district nursing, preventive health and rehabilitation.

For practical purposes, the Danish health care service can be divided into two sectors: primary health care and the hospital sector.

The primary health care sector deals with general health problems and its services are available to all. This sector can be divided into two parts:

- One which chiefly deals with treatment and care: such as general practitioners, practicing specialists, practicing dentists, physiotherapists (the practice sector) and district nursing;
- Another which is predominantly preventive and deals with preventive health schemes, health care, and child dental care.

When a citizen develops an illness, he or she usually first comes into contact with the primary health care sector.

The hospital sector deals with medical conditions which require more specialised treatment,

equipment and intensive care.

In addition to the treatment of patients, both general practitioners and hospitals are involved in preventive treatment as well as in the training of health personnel and medical research.

In the health care service, general practitioners act as “gate-keepers” with regard to hospital treatment and treatment by specialists. This means that patients usually start by consulting their general practitioners, whose job it is to ensure that they are offered the treatment they need and that they are not be treated on a more specialised level than is necessary.

It is usually necessary to be referred by a general practitioner to a hospital for medical examination and treatment, unless it is a question of having had an accident or developing an acute illness. It is also normally necessary to be referred by a general practitioner for treatment by a specialist.

### **3.1.2 Denmark’s health and care system financing**

The Danish health care system is based on a principle of free and equal access for all citizens. Thus, the vast majority of health services in Denmark are free of charge for users.

Health care in the regions is financed by four kinds of subsidies: A block grant from the state, a state activity-related subsidy, a local basic contribution, and a local activity-related contribution.

The state block grant constitutes the most significant element of financing – around 75%. In order to give the regions equal opportunities to provide health care services, the subsidy is distributed by a number of objective criteria that reflect expenditure needs (e.g., the demography and social structure of each region).

Furthermore, part of the state financing of the regions is a state activity-related subsidy. The activity pool may constitute up to 5% of the health care expenditure of the regions. The purpose of the pool is to encourage the regions to increase the activity level at their hospitals.

Following local government reform, municipalities now contribute to financing health care. This reform was implemented from 2007 onwards, and was based on a cluster of 50 new laws passed in 2005. When considering the new local health care tasks (preventive treatment, care, and rehabilitation), the municipalities have acquired a more important role in the health care system. The purpose of these local contributions is to encourage the municipalities to initiate efficient preventive measures for their citizens with regard to health issues.

Local financing consists partly of a basic contribution and partly of an activity-related contribution. Together they constitute around 20% of total financing of health care in the regions.

Under the Health Care Reimbursement Scheme, services are provided by self- employed professionals such as general practitioners, specialists, and dentists who are licenced by the state. These services are provided in accordance with collective agreements between the regions and the relevant unions. Collective agreements include the prices of individual services which are covered by the scheme.

### **3.1.3 Denmark’s telemedicine strategy and legislation**

Denmark's national health authority has a strategy for telemedicine which was launched in 2012. The action plan supports and disseminates telemedicine initiatives that improve productivity and provides a direction for the on-going modernisation of the health services. The action plan (the “Better Framework for Telemedicine”) contains three initiatives to secure better framework for telemedicine. There are five concrete dissemination activities in the plan (they are called “Paths to Dissemination”):

Better Framework for Telemedicine

- Reference architectures and standards.



- Joint concepts for assessment.
- Overview of telemedicine technologies and solutions in use.

#### Paths to Dissemination

- Clinically integrated home monitoring.
- Home monitoring for COPD patients.
- Telepsychiatry.
- Internet psychiatry.
- National telemedical assessment of ulcers.

The regional authority's strategy for telemedicine was also launched in 2012 in common with the Regional eHealth Organisation (called RSI).

The national authority has a strategy in other health-related or IT domains that include telemedicine. Launched in 2008, it is called Health IT. A reviewed national eHealth strategy has been launched in 2013.

Denmark does not have legislation that deals with telemedicine specifically. The respondent did not know if there is legislation that in any way hinders or obstructs the implementation of telemedicine services.

## **3.2 Estonia – country report**

### **3.2.1 Estonia's health and care system organisation**

The main bodies responsible for planning, administration and regulation of healthcare in Estonia are the Ministry of Social Affairs, the Health Board, and the State Agency of Medicines.

Defined by the Health Services Organisation Act, healthcare providers are health care professionals or legal persons providing health services. Healthcare is divided into emergency medical care, general medical care, specialised medical care and nursing.

Family physicians are providers of general medical care. They may practice as sole proprietors or they may found companies that provide general medical care. Companies, sole proprietors or foundations which hold corresponding activity licences may provide specialised out-patient care. A company or foundation which holds a corresponding activity licence may own a hospital.

Nursing means out-patient or in-patient health services which are either provided by nurses and midwives together with family physicians, specialists or dentists, or independently.

The Government of the Republic establishes the procedure for co-operation in emergency medical care between the emergency medical staff, hospitals, rescue service agencies and police authorities. A company, sole proprietor, foundation or a state or local government rescue service agency which holds a corresponding activity licence may be the owner of an ambulance crew.

Through the Ministry of Social Affairs and its agencies, the state is responsible for development and implementation of overall health policy, including public health policy, and for supervision of health service quality and access. Its main function is regulation.

The Health Board's main functions include the licencing of health care providers and the registering of health professionals, controlling the quality of health care provision (mainly by processing patient complaints), and funding and organising ambulance services. It is also responsible for ensuring adequate standards of hygiene and health protection. It enforces health protection legislation and is also responsible for communicable disease surveillance, national and local epidemiological services and implementation of Estonia's national immunisation programme.

The State Agency of Medicines is responsible for the registration and quality control of drugs and for

regulation of pharmaceutical trade (including imports and marketing). This agency also ensures the safety of donated blood and tissue transplants. It has some responsibility for the registration of medical technology.

### **3.2.2 Estonia's health and care system financing**

Health insurance in Estonia is organised by the Estonian Health Insurance Fund and its four local departments. The Estonian Health Insurance Fund is the only organisation in Estonia dealing with compulsory health insurance.

All persons insured with the Estonian Health Insurance Fund have a family practitioner. A person not residing in Estonia may also visit a family practitioner. A person needs a referral from the family practitioner to visit a medical specialist. No referral is needed to visit a dentist, dermatovenerologist (for skin-related, sexually transmitted diseases), gynaecologist, infection specialist (for HIV/AIDS treatment), ophthalmologist, orthopaedist (for traumatology), psychiatrist, pulmonologist (for tuberculosis treatment), or surgeon.

In case emergency treatment is needed, a person may always go to the emergency reception or call an ambulance. The attending physician decides whether the patient needs in-patient treatment.

Only medicinal products included in the Estonian Health Insurance Fund's list of medicinal products and registered in Estonia are compensated. Medicinal products are compensated according to the reference prices and price agreements when these exist. In other cases, the refund is based on the product's retail price. Medicinal products are compensated on the basis of the diagnosis.

### **3.2.3 Estonia's telemedicine strategy and legislation**

Estonia's national health authority launched a strategy for telemedicine in 2005. The regional authority has a chronic care management strategy that was launched in 2008.

As of December 2008, a nationwide Estonian health information system has been available for citizens and healthcare professionals. The information system includes certain data that is supposed to reflect the population's health status, entered into the database either by the healthcare professional or by the patient him or herself. The content of the centrally stored information is governed by national legislation. This database is a part of the state information system. The Health Services Organisation Act and Associated Acts Amendment Act (accepted by the Parliament on 20 December, 2007) provide that, as of 1 September 2008, health care service providers are obliged to forward medical data to the Estonian National Health Information System.

To guarantee wide user acceptance of a central medical database, a foundation involving all main stakeholders in healthcare was created. The Estonian E-Health Foundation was established in October 2005 by the Ministry of Social Affairs and a range of other stakeholders. They include three main hospitals (Tartu University Hospital Foundation, North Estonia Medical Centre, and East Tallinn Central Hospital), the Estonian Hospital Association, the Estonian Family Doctors' Association, and the Union of Estonian Emergency Medical Services.

The national authority has two strategies in other health-related or IT domains including telemedicine, called Health IT and IT/Digitisation, both launched in 2005. Estonia does not have legislation that deals with telemedicine specifically nor does it have legislation that in any way hinders or obstructs the implementation of telemedicine services.

This organisation has a strategy for telemedicine, launched in 2007. The organisation also has strategies for Health IT and IT/digitisation. Both were launched in 2007.

### **3.3 Greece – country report**

#### **3.3.1 Greece's health and care system organisation**

Healthcare in Greece is provided by the state through a universal health care system that is funded mostly through a system of national health insurance, although private health care is also an option available to a large percentage of the population.

Healthcare in Greece is provided by the National Healthcare Service (or ESY). The Ministry of Health and Social Welfare is the main governmental agency for health policy, although there is some involvement of the Ministry of Labour and Social Insurance in the sector of welfare and social care.

Regional health authorities coordinate the health services on a regional level, with the administrator appointed by the Ministry and not by the local region's elected authorities (although this policy is expected to change in the coming years).

Emergency, ambulance and air ambulance services in Greece are provided by the National Centre for Direct Aid, known mostly by the acronym EKAB.

Primary health care does not receive as much public attention as secondary and tertiary hospitals. Structural European Union (EU) funds have contributed to the renovation of old hospitals and the construction of new ones during the past decade, and have assisted the introduction of hospital information systems.

Recent years have seen many changes in the health system of Greece against the backdrop of cuts in public funding, such as the implementation of e-Prescriptions.

#### **3.3.2 Greece's health and care system financing**

The Greek healthcare system combines public and private elements. Most hospitals and clinics are owned by the government. While some doctors are government employees, there are private hospitals and doctors who collect their fees from the government.

In Greece the major insurance organisation is a public body (known by the acronym, EOPPY) with a large network of almost 5,000 private doctors working on contract for it. EOPPY also covers part of the costs of the public and private hospitals.

Private health insurances (similar to those in the United States of America) have also entered the market.

#### **3.3.3 Greece's telemedicine strategy and legislation**

With regard to telemedicine, Greece's national health authority has a Chronic Care Management strategy and a Health IT strategy, both adopted in 2008.

Greece has only basic legislation that deals specifically with telemedicine. There is no legislation that is considered an obstacle to the implementation of telemedicine services. More legislation is required to promote the further implementation of telemedicine services in Greece.

The Ministry of Health and Social Solidarity in July 2013 launched an effort to establish the Greek e-health ecosystem and the new "national e-health strategy 2020", following the respective EU initiatives. For more information [click here](#).

### **3.4 Israel – country report**

#### **3.4.1 Israel's health and care system organisation**

The health and care system in Israel is predominantly a public system for health care, social care and social insurance in general (for example, pensions, welfare, child allowances, and old age

allowances). One area that remains predominantly private (in terms of both insurance and care provision) is long-term care – the public support for this area is income-related. In health care, there is a growing private sector and in the provision of both health care and social care there is a public-private mix.

The main authorities are the Ministry of Health, the Ministry of Finance, the Ministry of Labour and Welfare, the National Insurance Institute, and four not-for-profit Health Plans. Their roles in the health system are discussed below.

The Ministry of Health is responsible for executing the national health insurance law, overseeing and supervising the Health Plans, overseeing and supervising the hospitals including direct operating responsibility for hospitals owned by the Ministry of Health which are the majority of acute care and psychiatric hospitals in the country as well as some of the geriatric and chronic care hospitals. The Ministry of Health, together with the Ministry of Finance, sets hospital fees for all public hospitals, and recommends approval of co-payment levels to the Parliamentary Finance Committee (which is authorised by law to approve co-payment levels for the Health Plans). The Ministry is technically responsible for prevention, although in fact most of these activities are carried out by the Health Plans. The Ministry has been responsible for acute psychiatric care in the community and hospital, but this is in the process of being transferred to the Health Plans. The Ministry is responsible for participating in the financing of long-term institutional care for functionally dependent elderly people on a means-tested income basis according to the income of the elderly person's family.

The Ministry of Finance determines the overall allocation of the national budget for health care. This includes the health index that updates the funds allocated to the Health Plans, the Ministry of Health, and the Ministry of Health hospitals. The Ministry of Finance, as part of the bi-annual budget process, also determines the budget allocation for all social care programmes. As in most countries, the Ministry of Finance wields tremendous influence on both the health and care sectors by virtue of controlling the financing of these sectors.

The Ministry of Labour and Welfare is responsible for institutional care for the frail elderly, day care centres for the frail and dependent elderly, and numerous programmes for the low income population, including the low income elderly population.

The National Insurance Institute is the major social insurance body in Israel responsible for such areas as pensions, child allowances, and old age allowances. It is responsible for the operation of the Nursing Care Act that provides financing and oversight of personal care givers in the home of the dependent elderly living at home. The number of hours allotted to personal care in the home is based on the functional level of the elderly person as well as his/her income (although the income threshold is relatively high). This financing can be applied to the payment for an around-the-clock, live-in caregiver, although it does not cover the entire cost of this. The National Insurance Institute is also the body that collects social insurance taxes from the population (e.g. pension; the health tax). In the case of national health insurance, it pools the income from the health tax with the additional allocation from the national budget and distributes the funds among the Health Plans through a capitation formula.

There are four not-for-profit Health Plans that are responsible for the coverage and provision of the public basket of services legislated under the National Health Insurance system.

### **3.4.2 Israel's health and care system financing**

The Israeli health care system is a national compulsory statutory health insurance system based on the Bismarck model. It is financed via earmarked and general taxation. All citizens must be members of one of four Health Plans (i.e., sick funds or mutualities). Citizens pay a health tax that is 4.8 per cent of income to the National Insurance Institute. This is supplemented by funds from the national budget that are also transferred to the Institute. When pooled together, these funds must equal the "cost of the basket of services" as defined by the National Health Insurance Law. They are

distributed to the four Health Plans via a capitation formula based primarily on age, sex, and region.

The Health Plans are responsible not only for covering, but also providing, the public basket of services to their members by contracting with providers and/or operating their own services. Health Plans may contract with providers selectively, including doctors, health care professionals, hospitals, and nursing homes. They can negotiate fees with the providers.

These providers may be public or private providers. In this sense they are more similar to health maintenance organisations (HMOs) such as [Kaiser Permanente in the United States of America](#) than to European Sick Funds (which are predominantly insurers and not providers of care). The Health Plans may offer supplementary health insurance to their members to cover services not included in the public basket of services (for example, drugs, dental care for adults, and alternative medicine such as homeopathy). Because there is no public insurance for Long-Term Care, each of the Health Plans has entered into a contract with a private health insurance company for a collective policy to cover long-term care services (examples include the maintenance of nursing home care and personal caregiver services in the home). Medically-oriented nursing home care and medically-oriented home care are included in the public basket of services that the Health Plans are obliged to provide under the National Health Insurance Law.

Another aspect of the Israeli health care system that is relevant to telemedicine is the level of Health ICT and electronic medical record adoption. All of the four Health Plans are completely computerised – 100 per cent of the physicians, and most of the other health care professionals, use an electronic medical record which is either connected online to or is an integral part of the Health Plan's central medical record.

There is almost total clinical data exchange among all services in the community. These are supported by sophisticated decision support systems. This means that almost all aspects of the exchange are closed loop systems. This starts from the clinician's computerised referral until, and including, the transmission of results back to the clinician's computer/electronic medical record (including, for example, laboratory, imaging, and ECG records). For the prescription of medications, there is a decision support system that provides alerts to allergies and potential drug interactions and contraindications. All of the public hospitals and the large private hospitals are also computerised, including electronic medical records.

The electronic transmission of clinical data between the hospital and the Health Funds (the community healthcare system) is currently limited due to privacy legislation. However, the Ministry of Health is currently working on a national solution. In the meantime, each of the Health Funds has its own agreements with the hospitals.

All of the Health Funds have very sophisticated personal health records that give their members web access to their own medical information. This information includes doctor visits, purchased medications, laboratory results, imaging results, and other diagnostic test results. Much of this is currently accessible in at least two of the Health Plans via a smart phone as well as the Internet. In these plans, there are already proactive alerts and reminders for the funds' members based on their medical information and protocols developed by the Health Plans. In Maccabi, the second largest Health Plan, the doctor also has access to his or her electronic medical record via a smart phone.

### **3.4.3 Israel's telemedicine strategy and legislation**

Maccabi Healthcare Services is the second largest of the health plans and covers two million people (25 per cent) of the Israeli population. Maccabi launched its strategy for telemedicine in 2008.

The organisation also has a Chronic Care Management Strategy, a Health IT strategy, and an IT/Digitisation strategy. These three were launched in 2008, 1992, and 1988 respectively.

There is no regional authority, and so there is no relevant strategy that has health-related or IT domains that includes telemedicine.

At the national level in Israel, the national authority has neither a strategy in health-related or IT domains that includes telemedicine nor does it have legislation that deals with telemedicine specifically. Israel does not have legislation that in any way hinders or obstructs the implementation of telemedicine services.

#### **3.4.4 Israel's telemedicine strategy and legislation**

Maccabi Healthcare Services is the second largest of the health plans and covers two million people (25%) of the Israeli population. Maccabi has a strategy for telemedicine. It was launched in 2008.

The organisation has three other strategies in other health-related or IT domains that includes telemedicine in some other way. These are a Chronic Care Management Strategy, a Health IT strategy, and an IT/Digitisation strategy. These three were launched in 2008, 1992, and 1988 respectively.

There is no regional authority, and so there is no relevant strategy that has health-related or IT domains that includes telemedicine.

At the national level in Israel, the national authority has neither a strategy in health-related or IT domains that includes telemedicine nor does it have legislation that deals with telemedicine specifically. Israel does not have legislation that in any way hinders or obstructs the implementation of telemedicine services.

### **3.5 Norway – country report**

#### **3.5.1 Norway's health and care system organisation**

The health care system is mainly public with some private institutions, specialists and general practitioners. The system is organised at two levels: the municipal and regional level. General practices and social care are organised on the municipal level, and specialist health care on regional/state level, divided into four regional health authorities.

#### **3.5.2 Norway's health and care system financing**

The health and care system in Norway is publicly funded through tax, with a small patient fee. There are some private enterprises and institutions that provide health care, where the patients (or their employers) pay for the health services in full.

National guidelines are provided by the Ministry of Health. Institutions are organised by specialist health services and primary care.

#### **3.5.3 Norway's telemedicine strategy and legislation**

Norway's national health authority has launched several strategies for electronic cooperation in the health care sector since the late nineties. These plans have also included use of telemedicine and eHealth. A new plan for 2014-2016 is under preparation these days (Nov 2013).

Norway does not have legislation that deals specifically with telemedicine. However, there is legislation, the Personal Health Data Filing System Act (Act 2001-05-18-24), which relates to personal health data filing systems and the processing of personal health data. Article 13 of the Act is a barrier, among other things, to the implementation of electronic cooperation platforms for integrated care. The reason is that employees in different institutions or on different levels in the health care system are not allowed to access (log into) the same electronic health register.

### **3.6 Spain – country report**

The Spanish national health system is the agglomeration of public health services. Management of these services has been progressively transferred to the distinct autonomous communities of Spain. In this Momentum report, the information relates specifically to Catalonia, which has the status of



an autonomous region in its own right.

In Spain, public health competences are transferred to the autonomous regions. There is one National Health System (referred to as an SNS) composed of the different regional health services. Public funding for the SNS is fixed. Each regional health service has its own separate circumstances when it comes to the provision of services. In some regional health services, public provision operates as a monopoly while in other regions services are provided as a public-private mix.

In principle, telemedicine is financed through public resources in those cases where it replaces a traditional service. Given the demographic and socio-economic differences among the various regions in Spain, the regional authorities pursue different approaches to telemedicine deployment and acquisition.

In Catalonia, the main health authority is the Departament de Salut (the Ministry of Health), which is responsible for establishing service policies in accordance with the government health policies, determining the system of provisions, purchases and assessing results. Its policies and obligations to carry out a universal Health service is carried out by the public insurer, CatSalut.

The Catalan healthcare system is a mixed health care model that integrates in a single network all health resources, whether they are provided by public institutions or other organisations (such as health care funds, foundations, consortiums, and Church-run centres) that have traditionally engaged in health care.

The Health Department is responsible for planning and evaluating as well as developing the Health Care Decentralisation project, which has allowed the Catalan town councils to be incorporated in local health services. CatSalut, the public insurer, purchases and evaluates health care depending on the population's needs.

In addition there are two other relevant organisations: Agència de Qualitat i Avaluació Sanitàries (AIAQS), the evaluation agency, and TicSalut, the foundation for fostering ICT and innovation penetration in healthcare services.

More information is available at on the [Catalan government website](#).

### **3.6.1 Spain's health and care system organisation**

The system is publicly funded through taxes. In Catalonia, CatSalut contracts with organisations that provide health services to the people who are enrolled, in line with the government's guarantees and policies. The service providers are responsible for the quality of their services.

The health care budget includes the following:

- (a) the pay agreements of the XHUP (the hospital network);
- (b) salary harmonisation in the publicly-subsidised residential care sector and in mental health;
- (c) updating the collective agreement of the health care transport workers; and
- (d) support to tertiary care and innovation.

CatSalut signs yearly contracts with the individual hospitals and primary care centres buying their services on a per capita basis. The model is established according to the reference population (the number of inhabitants they must serve and the type of population: such as elderly people, chronically ill, tourists, etc.). Every year, provision is made for services to be contracted out and which must be justified by the end of the year. Prices per activity unit vary depending on the type of hospital e.g., whether it is a reference hospital, university hospital, municipal hospital, or other.

### **3.6.2 Spain's telemedicine strategy and legislation**

The situation in Spain varies according to regions. In terms of Catalonia, the regional health authority launched a strategy for telemedicine in 2012. It also has strategies in other health-related or IT domains that include telemedicine: chronic care management (launched in 2012); Health IT (2008); and IT Digitisation (2000).

Spain's national health authority in 2012 launched a health IT strategy that affects telemedicine.

Spain does not have legislation that deals specifically with telemedicine. Neither is there legislation that hinders or obstructs the implementation of telemedicine services.

## **3.7 Sweden – country report**

### **3.7.1 Sweden's health and care system organisation**

The Swedish government is responsible overall for health care policies and for quality control via the National Board of Health and Welfare. The country councils are responsible for organising the healthcare of all inhabitants. Municipalities are responsible for social care (elderly care, and care of persons with physical or mental disabilities). There are nine regional hospitals, 70 county council hospitals and around 1,000 general practitioners' offices.

Swedish citizens have at least two different types of guarantees from the healthcare providers and the government. One is that the patient can choose whichever primary care facility he or she prefers. Another is that the patient is guaranteed to have his/her need for specialised healthcare fulfilled by a chosen healthcare provider within a three-month time limit. If the provider does not have the resources to keep to that time limit, the patient will be reimbursed for choosing a healthcare provider who can perform the specialised care within the three months.

### **3.7.2 Sweden's health and care system financing**

All public-financed health care and social care is mainly tax-financed, which gives all inhabitants the right to health care. There are also privately-financed healthcare and social facilities and, according to recent figures, six per cent of the population has some kind of private health care insurance. In a political debate held in Almedalen in early July 2013, it was announced that more than 500,000 Swedish people have some kind of healthcare insurance.

Work is being done to reach political decisions for a financing model suitable for eHealth and telemedicine solutions, because today only actual patient contacts are supported financially.

### **3.7.3 Sweden's telemedicine strategy and legislation**

[Sweden's health IT strategy](#) (pdf, 2.5MB, in Swedish) was adopted by all relevant stakeholder launched in 2006 and further revised in 2010. The focus of the latest revision has moved from a focus on technology to patient benefits, participatory medicine, and usability for all end users.

Participatory medicine has been a focus of interest in Sweden. Patients are increasingly acting as "consumers" and are driving change. Many solutions are currently being piloted at the moment.

In 2013 a new national plan is expected based on the eHealth strategy.

The country has legislation that clarifies the issue of liability in telemedicine. However, there are privacy provisions that complicate the access of more than one care giver to a specific patient's medical history, which can be a problem for the design of eHealth services.

Every patient has the right to have access to their information online, and also to block unwanted healthcare providers from accessing their electronic health record (EHR).



On the potential difficulties in creating telemedicine services and sharing information between different actors apart from the patient: the problems with administering a patient's consent will be dramatically lessened if the patient is actually the active participant who manages the service in question. So, the solution is to put the tools in the hands of the patients. This is definitely the way in which Swedish national services are developing at the moment.

### **3.8 United Kingdom country report**

#### **3.8.1 The UK's health care systems**

The health care system of the United Kingdom consists in fact of four healthcare systems: the National Health Service (England), the Health and Social Care in Northern Ireland (HSCNI), the NHS Scotland and NHS Wales. They all share certain characteristics: they are principally funded through taxes and provide a comprehensive range of health services, of which most are free at the point of use (at least for citizens and residents of the United Kingdom).

Beyond the common characteristics, the four systems are quite independent, and operate under different management, rules, and political authority. The following discussion will focus on the **NHS Scotland**.

#### **3.8.2 Scotland's health and care system organisation**

The health and social care system in Scotland is a devolved responsibility which is overseen directly by the Scottish Government's Health and Social Care Directorate. The Directorate also allocates resources and sets the strategic direction for the National Health Service in Scotland (NHS Scotland) and is responsible for the development and implementation of health and social care policy. NHS Scotland is responsible for ensuring that everyone in Scotland receives the health services that they need, with well over 90 per cent of all healthcare provided by the public sector.

Scotland has an integrated healthcare system: all its hospital and community health services are delivered by 14 regional Health Boards. To bridge the gap between primary and secondary care, and between health and social care, regional health boards have established Community Health [and Care] Partnerships (called CH[C]Ps). The CH[C]Ps work in collaboration with 32 local authorities, that are represented at a national level by the Convention of Scottish Local Authorities (COSLA). These local authorities (also known as councils) are responsible for social care, support, housing, education, transport and environmental and community planning.

However, under legislation recently presented to Parliament (the Public Bodies (Joint Working) (Scotland) Bill), as from 2015 the regional Health Boards and Local Authorities will be required to set up a jointly-accountable Health and Social Care Partnership to deliver integrated Health and Social Care. Such a partnership will, as a minimum, cover a single local authority area, replace current CHP arrangements and have a single budget.

Primary care services are overseen by the CH[C]Ps and are provided by a range of health care professionals (such as general practitioners, nurses, midwives, and health visitors), and allied health professionals in a variety of non-hospital settings. These professionals are usually the first point of contact with the NHS, and have a 'gatekeeper' role in relation to secondary and tertiary services. Indeed, an estimated 90 per cent of patient contact is with primary care, and most patient journeys begin and end in primary care.

Secondary and tertiary care are provided mainly in hospital settings on an inpatient, day-case or outpatient basis (“day-case” procedures e surgical procedures performed in a single day, without admitting the patient for an overnight stay). This type of care is provided almost entirely by the NHS. Some care is provided through outreach services, for example in rural areas.

There are currently 30 district general hospitals in Scotland (ranging in size from hospitals with fewer than 30 beds to ones with over 600 beds), seven teaching hospitals providing tertiary care for more complex or rare conditions, five single speciality hospitals providing tertiary children’s, maternity or dental services, and one national centre for elective orthopaedic surgery and cardiothoracic services.

There is a very small independent health care sector, both private and non-profit-making. The private sector focuses largely on cosmetic surgery and healthcare for those with private medical insurance (around 8 per cent of the population), along with a number of mental health services. The non-profit making sector includes local hospices’ providing specialist palliative care.

The total number of people receiving home care from independent providers has grown every year over the past decade, from less than 10 per cent ten years ago to over 30 per cent of clients today. In 2012, for the first time, more hours of home care were delivered by the independent sector than by local authorities. A small number of these services are privately funded, with the vast majority contracted by local authorities; the same applies to care homes that provide nursing care (of which there are over 500) and, to a lesser extent, residential care homes (of which there are nearly 800).

The [Quality Strategy](#) is the approach and shared focus for all work to achieve the aims of delivering the highest quality healthcare to the people of Scotland and ensure that the NHS, local authorities and the third sector (which includes voluntary organisations, charities and community groups) work together, and with patients, carers and the public, towards a shared goal of world-leading healthcare, in support of the 2020 Vision.

At the core of the strategy are three Quality Ambitions:

- Safe – There will be no avoidable injury or harm to people from healthcare, and an appropriate, clean and safe environment will be provided for the delivery of healthcare services at all times.
- Person-Centred – Mutually beneficial partnerships between patients, their families and those delivering healthcare services which respect individual needs and values and which demonstrate compassion, continuity, clear communication and shared decision-making.
- Effective – The most appropriate treatments, interventions, support and services will be provided at the right time to everyone who will benefit, and wasteful or harmful variation will be eradicated.

This vision, with its focus on quality healthcare, provides the context for all strategic and operational decision-making across NHS Scotland.

### **3.8.3 Scotland's health and care system financing**

The health and care system in Scotland is publicly funded and is financed almost entirely out of general taxation. Per capita public spending on health in Scotland is just over £2,000 a year. It accounts for 10 per cent of gross domestic product, and more than one-third of the Scottish Government budget – well over £11 billion.

All health services and almost all social services are provided free at the point of delivery. Local authorities may charge a small fee, based on the individual's ability to pay, for non-residential and domiciliary care.

The Government of Scotland receives a funding allocation from the United Kingdom government. However, the responsibility for health and social care lies entirely with the Scottish government.

The provision of health and care services in Scotland is governed by a number of legal frameworks. It is guided by strategy and policy designed to ensure sustainable services which are safe, effective and person-centred (see the description above). The Health and Social Care Directorates Management Board aims to provide strategic leadership to NHS Scotland.

### **3.8.4 Scotland's telemedicine strategy and legislation**

While there is no specific legislation covering the use of technology in health and social care in Scotland, increasing attention has been paid to patient-related IT systems. The first [eHealth strategy](#) was published in 2008 and covered the period up unto 2011. It had two main strands: a number of national systems and collaborative working among groups of boards.

Central to these two strands, and a key patient safety measure in its own right, was the universal use of the unique patient identifier: The Community Health Index (CHI). Use of CHI on clinical communications is mandated across NHS Scotland with few exceptions. The CHI number is a fundamental building block to future Scottish Government health initiatives.

In support of future developments, a [national technical architecture](#) (pdf, 260KB) has been assembled and the Scottish Government has been working with boards to promote safe, effective and appropriate use of information through publication of an [information assurance strategy](#) and core guidance.

A second [eHealth strategy](#) was published in 2011 (and refreshed in 2012). It outlines how digital technology will enable patients to become more directly involved in the design and management of their individual care. Its aims, that are focused on the achievement of the three quality ambitions (see the description – above – of Scotland's health and social care organisation), are to use information and technology in a coordinated way, to assist people to communicate with the NHS and manage their own health, contribute to care integration, support people with long-term conditions, and improve the safety of people taking medicines as well as the effective use of these medicines. The strategy has also provided a framework within which NHS Boards across Scotland are agreeing outcome-based eHealth plans. It runs to 2017.

In the autumn of 2012, the Scottish Government published a report entitled [Scotland's Digital Future – Delivery of Public Services](#). This document sets out a vision for a Scotland in which digital technology provides a foundation for integrated public services that cross organisational boundaries, delivers services to those people who are most in need, and also enables services for businesses that promote growth.

A [National Telehealth and Telecare Delivery Plan for Scotland to 2015](#) was published in December 2012. It was developed in conjunction with partners across services as diverse as health, social care, housing, the third sector and the independent sector. It provides continued strategic direction for

the use of Telehealth and Telecare within Health, Social Care and Housing in Scotland. (NB Telemedicine in Scotland comes under the overall umbrella of Telehealth and Telecare.)

## 4. ANNEX 2 - Telemedicine services descriptions

This ANNEX offers some general information about the specific telemedicine services provided in the Momentum questionnaire. As per November 2012 and January 2014, this ANNEX is based on the responses to questions 1-8 of the Momentum questionnaire.

The ANNEX offers an overview of the number of respondents to the questionnaire, and the countries and/or regions in which their services are located. It describes generally who the questionnaire respondents were, their organisations, and the countries in which they are based.<sup>5</sup> It gives the titles of the services and a description of them including the service's main beneficiaries. It describes the current status of the telemedicine service.<sup>6</sup> It gives an overview of the targeted population and the clinical condition(s) that they are experiencing, the characteristics of the service, the numbers of people who receive the service in relation to the national level including those who receive it on a monthly basis. Some general characteristics, categorisations and descriptions of the services involved are given as well as the relationships between the key actors involved in the services. Descriptions of the types of conventional treatments that telemedicine services were seeking to replace are also outlined. Last but not least, an overview of the types of expected outcomes and results from the introduction of the telemedicine services is described.

This ANNEX draws on the general information given as a result of the 2 October 2012 version of the Momentum questionnaire which was first developed and piloted in early June 2012.

In this ANNEX are the 26 example cases submitted, as of November 2012, in response to the Momentum survey questionnaire.

As of January 2014, two observations could be made about the Momentum project:

First, an in-depth assessment process took place in the period between September-December 2013. It permitted the consortium to assess in detail a selection of four specific best practice service descriptions. These four service descriptions are Chronic Disease Management service of Maccabi (Israel); RXeyes (Sweden); Teledialysis (Norway); ITHACA (Spain [Catalonia]). These four service descriptions were chosen by the consortium to illustrate how telemedicine deployment services can be successfully scaled-up. This selection would not have been possible without both the in-depth analysis available in the first and second chapters of this deliverable, or the comprehensive service descriptions collated in this ANNEX (which is now also located on <http://www.telemedicine-momentum.eu/europe/>).

Second, a process of gathering further good practice telemedicine service descriptions is underway. It seeks to gather good practice service descriptions from a wider range of countries than these nine countries. The new countries whose good practice services are being sought out include, for example, Austria, France, Germany, Italy, the Netherlands, Portugal, Slovenia, and other home countries of the United Kingdom, particularly England.

This further data-gathering activity is taking place following a period of keen quality checking and quality assurance which has taken place during the autumn and winter of September-December 2013. Involved in the process have been the group of Momentum national representatives, the Momentum special interest group leaders and members, the Momentum community at large, and additional requested experts. In the majority of cases – with few exceptions – the service

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<sup>5</sup> Any questions with regard to roles/positions, and personal details of the respondent are not reported or analysed – they are used only to categorise the respondents in group and/or if some form of follow-up is needed with regard to the need for an enquiry of some sort.

<sup>6</sup> For discontinued services, ANNEX 3 identifies the stages most typical at which the decision was made to fold the service. and the types of overall reasons.

descriptions were found to be of sound quality and currency.<sup>7</sup>

The service descriptions contained in this ANNEX are now located on the Momentum website <http://www.telemedicine-momentum.eu/europe/> for purposes of public dissemination and awareness-raising.

**Table 5: Telemedicine service descriptions submitted for each country and the extent to which they are operational or non-operational**

Country	Telemedicine services submitted	Operational or non-operational
Austria	UEMS Pneumonology Section	Status unclear. Insufficient data currently provided. Not operational.
Denmark	COPD Briefcase	Operational.
Denmark	HEALTH OPTIMUM - Teleconsultation - Diabetes	Operational.
Denmark	Teleinterpreting	Operational.
Estonia	doc@Home.	Operational.
Estonia	Home monitoring of diabetic patients (insulin dependent diabetes mellitus).	Not operational.
Greece	Telecardiology Service of CardioExpress SA	Operational.
Greece	Telehealth Service of the Municipality of Trikala	Operational.
Greece	Sismanoglio General Hospital Group Telemedicine Centre (Coordinator of National Telemedicine Network)	Discontinued or don't know.
Israel	Chronic disease management.	Operational.
Netherlands	Remote intraoperative monitoring.	Operational.
Norway	COPD Patients Briefcase.	Operational.
Norway	Decentralised psychiatrist on-call service collaboration using videoconferencing.	Operational.
Norway	Integrated home care of ulcers.	Operational.
Norway	Teledialysis.	Operational.
Slovenia	Home care for chronic pulmonary patients.	Not operational.
Spain	ECOPIH - Eina de comunicació entre Primària i Hospital - (Communication tool between primary and acute care).	Operational.
Spain	ENDOBLOC (virtual community for clinical practice in endocrinology).	Operational.

<sup>7</sup> The alterations to the text that were required have been made directly to the good practice service descriptions that are uploaded on the Momentum website at <http://www.telemedicine-momentum.eu/europe/>. They have not been made to the text in this ANNEX specifically.

Country	Telemedicine services submitted	Operational or non-operational
Spain	Guttmann NeuroPersonalTrainer.	Operational.
Spain	ITHACA - Innovant en el Tractament de la Hipertensió Augmentant el Compliment i l'Adherència.	Operational.
Spain	Xarxa Telelctus.	Operational.
Spain	TELEPRESONS.	Not operational.
Sweden	Electronic healthcare.	Operational.
Sweden	RxEye Net.	Operational.
United Kingdom	Teldialysis.	Operational.
United Kingdom	Telescot Programme.	Operational.

#### 4.1 COPD Briefcase (DK)

##### Objectives, expected outcomes, main beneficiaries

The service's main aim is to reduce the rate of readmission of severity 3 and 4 chronic obstructive pulmonary disease (COPD) patients within the three-month period following hospital admission with some form of exacerbation. Other outcomes are intended to increase the number of days to the first readmission, to increase the FEV1, to improve the quality of life (SF36), and to improve the cost-effectiveness of COPD treatments.

Outcomes and results include:

- Reduced rate of readmissions and increased time between admissions to hospital.
- Cost savings (from a hospital perspective).
- Improved quality of life.

The main beneficiaries are COPD patients, healthcare provider organisations, and the national and regional health authorities.

##### Targeted population, number of patients

COPD patients are admitted to hospital when they experience a worsening of their disease. This group of people is severely ill, and the patients prefer to stay at home as opposed to spending time in hospital. Up to ten patients per month receive the COPD Briefcase service. Nationally, it is estimated that up to 10,000 patients could benefit from the service.

##### Type of telemedicine service

The COPD Briefcase can be categorised in the home-hospitalisation category of telemedicine services, and the relationship is with the patient/secondary care.

## Set-up that was being replaced

Usually, patients are not provided with follow-up after discharge from hospital. If they experience problems related to their disease, they can contact their general practitioner or call an ambulance for additional admission to hospital.

## Detailed description

Patients discharged from hospital after some form of COPD exacerbation are provided with a briefcase with a secure Internet connection. The briefcase is then used to call the hospital once a day for one week for consultations with COPD nurses in order to secure a stable state of disease on the part of the patient for the time being.

Four items of supplementary information on the service are available (all documentation in English):

- [Short history of COPD Briefcase \(originally an eTEN project, Better Breathing\)](#) (undated, PDF created 20 Mar 20122).
- [Medisat product brochure for The Patient Briefcase](#) (five pages; undated, PDF created 8 May 20123).
- [Med-e-tel presentation of COPD Briefcase trials in Norway](#) (undated; PDF created (from PowerPoint presentation) 23 June 2012)
- [Short report of Odense University Hospital conducting a study of the COPD Briefcase](#). Contains a clear, concise description of how it works (1.5 pages; undated, PDF created 15 Apr 2011)

## Operational status

The service is operational and part of the mainstream health service.

## Further information

This organisation has a strategy for telemedicine which was launched in 2013. The organisation also has a strategy – called Health IT – in other health or IT-related domains that includes telemedicine. It was launched in 2012.

### 4.2 HEALTH OPTIMUM (DK)

#### Objectives, expected outcomes, main beneficiaries

Health Optimum, which is short for “Delivery OPTIMisation through teleMedicine”, was a project approved by the European Commission in the eTEN programme. The objective of the project was to ensure the healthcare services through virtual medical assistance for a wide range of medical specialties: haematology, nephrology, dermatology, oncology, radiology, endocrinology, cardiology, endocrinology, orthopaedics, plastic surgery, neurosurgery, psychiatry, alcoholism recuperation, home monitoring for old people and general healthcare.

During its market validation phase, Health Optimum has market validated a comprehensive suite of telemedicine services able to improve the perceived quality of the healthcare services provided and,



at the same time, to enable a reduction in the costs related to their production and delivery. The project also evaluated the user acceptance of the services and validated a business model on which the Health Optimum Initial Market Deployment phase is based.

The expected outcome of the second phase of the project was an operational system which is up and running in all Danish regions and which is financially self-standing because it pays for itself through the savings that it releases in the routine delivery of healthcare. Thanks to Health Optimum, doctors are saving time, public healthcare systems are saving money and patients are receiving better coordinated and better quality care.

The main beneficiaries are patients, healthcare professionals, healthcare provider organisations, and regional and national health authorities.

### Targeted population, number of patients

The service targets people with chronic conditions such as those who receive long-term monitoring or coaching.

People living on a small island can receive specialist treatment through telemedicine. They are patients with diabetes type II, and they would otherwise have to spend hours travelling to receive treatment.

From ten to 20 patients receive the service monthly. The estimated size of the targeted population nationally is from 100,000 to 500,000.

### Type of telemedicine service

The service is described as “Consultations – Follow up”. The relationship between the key actors is patient/secondary care.

### Set-up that was being replaced

Conventional treatment involves travel by boat to go to the hospital and to see the specialist.

For diabetic patients, the Health Optimum service has meant an increased quality of life as they do not have to spend a day travelling to receive specialist treatment, and therefore they are much more likely to go to the very important three-month check-ups of their chronic condition. Previously, a number of patients did not want to travel and thus their chronic condition was not properly monitored.

### Outcomes and results expected after introduction

Approximately 5 percent of the Danish population suffer from diabetes (around 270,000 individuals). The annual increase in the number of diabetes cases is around 7 percent. One Dane dies every second hour, i.e. 12 deaths each day can be related to diabetes. In 15 years' time, the number of diabetes cases will more than double. While the number of patients is rising, at the same time specialist resources are becoming scarce; it is very important to test new methods for providing

diabetes treatment. Patients suffering from diabetes are exposed to some particularly crippling angiopathic complications, such as retinopathy causing blindness, diabetic ischemic foot ulcers leading to amputations, and nephropathy to the level of end-stage renal disease. These patients need to be seen regularly by an endocrinologist who monitors the course of their disease. This type of regular consultation can be particularly inconvenient for people living in remote areas far from the nearest specialist team. On the other hand, modern technology allows healthcare professionals to perform remotely the essential examinations which are required in these cases, and to transmit the information through a network (whether stills or animated images). Examinations for retinopathy will still be conducted in the tertiary hospital, as the equipment necessary for this examination cannot be moved.

In addition, video-conferencing can be applied advantageously to the routine monitoring of patients suffering from diabetes. Patients will have a blood test done at their general practitioner's and receive the answer through video-conferencing at their local hospital. Before this service was put in place, the patient had to travel to the tertiary hospital to consult a specialist. Even though the consultation itself usually takes less than an hour, the patient's commuting time back and forth to the hospital was often very significant.

Therefore, as a result of video-conferencing, both the specialist nurse at the local hospital and the patient experience benefits. The patient receives a fine-tuned therapy in a far more effective way than he/she currently does, even with frequent consultations with the specialist. This allows an immediate intervention when the glucose level reaches dangerous thresholds and the metabolic regulation gets out of control. By participating in the consultation, the specialist nurse or the general practitioner on his/her part learns more about the treatment of diabetes and improves over the time his/her problem-solving capability that can occur with poorly controlled diabetes.

The health professionals behind the set-up have collected data over the past six years. It shows that diabetic patients are better monitored than before and that they even might be among the best regulated diabetic patients in Denmark.

### Detailed description

In 2005, the Odense University Hospital (Svendborg) took its first baby steps to delivering health care at a distance. Today, every two weeks a specialist nurse travels by boat to the island of Aeroe. Here, she sees diabetes patients at the local hospital. If she needs an expert evaluation, she can contact a specialist doctor through video conferencing.

The feedback can be supplied both synchronously and a-synchronously: this is possible because of shared electronic patient records and shared laboratory results between hospitals and general practitioners. The service is conducted through video-conferencing.

The specialist nurse is present in the same room as the patient at the local hospital. Should the specialist nurse need assistance, she can call up the specialist doctor. The specialist doctor is able to see the patient as well as the shared clinical record. In addition, the specialist nurse is able to transmit live digital images to the specialist – these can be viewed simultaneously. The service requires an Internet connection between the two units as well as a shared clinical record. Should any information

be sent to other systems outside the hospital's clinical record, a standardised MedCom message will be used in order to ensure data security.

## Operational status

The service is operational and part of the mainstream health service.

### 4.3 Teleinterpreting (DK)

#### Objectives, expected outcomes, main beneficiaries

The telemedicine service's full title is: "Teleinterpreting – Improving interpreting services in health care through the use of videoconference equipment." Its immediate objective is to combine video conferencing and health professional interpretation services to provide more effective consultations between healthcare professionals and patients who do not speak Danish. In the longer term, the videoconference infrastructure will provide opportunities for a number of additional activities, including home monitoring and other telemedicine treatments as well as training of medical staff. It was expected that, by the end of 2012, tele-interpretation services will be more widely available, providing easier access to health services.

Many of the expected gains are qualitative. They include:

- Qualification of health professional interpretation services
- Professional distance to the interpreters
- Greater accessibility of interpretation services
- Easier coordination in case of delay or cancellation
- Increased real interpretation time in relation to less transportation time
- Less use of family members as interpreters
- Overcoming shyness.

The main beneficiaries are patients and healthcare professionals.

#### Targeted population, number of patients

The population targeted by this particular service are patients who do not speak Danish who need to communicate with a healthcare professional.

It is estimated that there are 200,000 interpreted consultations each year in Danish hospitals and general practices.

#### Type of telemedicine service

This telemedicine service is a language interpretation service to support effective communication between healthcare professionals and patients who do not speak Danish.

## Set-up that was being replaced

In Denmark, patients who do not speak Danish are entitled to the assistance of an interpreter. The interpreters are booked through private agencies on an ad hoc basis, and costs are covered by the health care services. There are an estimated 200,000 interpreted consultations every year in Danish hospitals and general practices. By far the most common type of interpreting is face-to-face, but users are often dissatisfied with the cost and accessibility of the existing service, as well as questioning its neutrality and quality.

## Outcomes and results expected after introduction

The overall aim, by the end of 2012, is that tele-interpretation services will be used in 90 percent of hospital departments with patient contact and in selected municipalities and general practices. The expectation is that the use of video conferencing will become a useful and efficient tool for health professionals, thus easing workload and improving quality in the clinic. Furthermore, the videoconference infrastructure will provide opportunities for a number of activities other than interpreting, including home monitoring, other telemedicine treatments, and training of medical staff.

## Operational status

This service is operational and part of the mainstream health service.

### 4.4 doc@Home (DK)

#### Objectives, expected outcomes, main beneficiaries

doc@HOME is an integrated telehealth solution for the remote management of patients with a range of long-term conditions (also known as chronic diseases). It collects and analyses essential patient-related data, permitting effective management through efficient interaction between clinicians and patients at home.

The doc@HOME service provides a systematic approach to the management of chronic disease in the home and other locations away from the clinician's office. Patient/clinician interaction takes place typically via the Docobo HealthHub. This is a fit-for-purpose, robust, handheld data collection unit which connects through a standard telephone line at the patient's home to a secure server. Healthcare professionals interact with the doc@HOME service via secure Web access using standard browsers, enabling patient management at a range of locations.

Changes in patient trends can be identified and notified to the authorised user. An authorised clinician can access the patient record on demand and send messages directly to the patient, ie to request to visit the surgery or to change the frequency and/or volume of medication.

doc@ HOME is cost-effective and offers a range of solutions that satisfy an operational need. The service is compliant with current standards. The infrastructure set-up cost is insignificant, obsolescence and depreciation is eliminated, and repair logistics considerations are not necessary. Pilot evaluation studies can be conducted on any scale.

doc@ HOME uses open database standards. As such, compatibility with emergent electronic patient record systems at local, national and European levels is assured. It offers the highest standard of interoperability, and is fully compliant European and International standards. It is also European Medical Device Directive-compliant EN13485 accredited. It interfaces to Electronic Patient Record Systems.

For the delivery of public healthcare, remote health management provides a cost-effective way to manage burdens on public services caused by an increasing proportion of chronically ill and elderly people who require healthcare.

### Targeted population, number of patients

The population targeted by this particular service is elderly citizens in general or people with chronic conditions (e.g. who receive long-term monitoring or coaching). Examples include patients with chronic conditions namely: chronic heart disease, hypertension, pulmonary diseases, and diabetes.

The number of patients who receive this service on a monthly basis is 100-1,000. The estimated size of the targeted population nationally is up to 10,000.

### Type of telemedicine service

This telemedicine service is a monitoring service. The general relationship involved is between patients and the secondary care level.

doc@HOME is essentially a telecare system. The patient has a hand-held medical device which collects regular health data. The data includes inputs given by the patient (such as well-being and sleep quality) and third-party measurements (such as weight, blood pressure, and blood glucose). The data is sent to a central server where it is made available for the patient, doctor and nurse (depending on the set-up). Automatic warnings can be sent to the patient, doctor, or to people who are worried well. The doctor will have this data at his or her disposal in the event of a regular visit, a change of treatment plan, or an emergency. The doctor is able to make changes in the monitoring programme and in the type of data that the system collects..

### Set-up that was being replaced

The telemedicine service replaced conventional treatment that included patient self-monitoring and regular visits to the treatment professional, and post-operative stays in the hospital.

### Operational status

The initiative has already seen results in cost-savings, increase in quality of life, and an increase in clinical effectiveness.

## 4.5 Telecardiology (GR)

### Objectives, expected outcomes, main beneficiaries

The full title of the service is Telecardiology Service of CardioExpress SA. Its purpose is to provide a telecardiology diagnostic services for emergency cardiology patients on a 24/7 basis.

The main beneficiaries of the service are patients, healthcare professionals, the healthcare provider organisation, health authority and society (public health, Ministry of Health or Social Affairs, Healthcare Board, etc.).

### Targeted population, number of patients

The target population consists of citizens in general, people with chronic conditions (e.g. who receive long-term monitoring or coaching), and acute/emergency intervention.

From 100 to 1,000 people receive the service each month..

### Type of telemedicine service

This service can be categorised as a diagnostics service. The relationship between key actors in the service is that between a patient with a potential cardiac emergency and a cardiologist.

### Set-up that was being replaced

Patients with cardiac problems require immediate medical intervention. The main delay between the onset of symptoms and hospital treatment often occurs at home before people decide to seek medical assistance. In many cases, additional delays in the hospital lead to a total delay in treatment of more than three hours.

Telemedicine combats the inherent hesitation that prevails when someone is faced with the prospect of medical intervention. The latest statistics show that Telecardiology subscribers have achieved receiving a diagnosis without leaving home within 15 minutes from the start of experiencing their symptoms.

### Outcomes and results expected after introduction

The prospect of receiving an immediate diagnosis (from your home, using special equipment which transmits by phone) helps lower the patient's hesitation to seek medical assistance.

The service has helped to reduce time between the onset of symptoms and diagnosis and treatment. It can reduce morbidity and mortality rates following cardiac incidents.

The services are provided to institutions and rural medical practices spread over various mountainous areas of regional Greece and the Greek islands.

## Detailed description

The Telecardiology control centre is equipped with the latest equipment and electronic devices as well as a team of trained cardiologists who answer phone calls of the subscribers. All evaluations and treatment options given by the Telecardiology cardiologists to the patients depend on a tele-electrocardiogram and the description of the clinical picture provided by patient.

If a cardiologist on duty confirms that patients do not have a heart problem, s/he assures the subscribers that their problem is not related to a heart condition and provides additional medical advice as appropriate.

In the case of a positive diagnosis of a heart attack or other cardiological problem, a cardiologist will recommend the appropriate medical treatment – including medication – or will organise the safe transportation of the patient to a hospital.

Telecardiology informs the local medical units through a simultaneous transmission of the ECG and provides the diagnosis. This prepares the hospital that will be treating the patient and reduces delays.

## Operational status

The service is operational, and is part of mainstream healthcare service.

### 4.6 GrTelehealth Trikala (GR)

#### Objectives, expected outcomes, main beneficiaries

The full title of the service is Telehealth Service of the Municipality of Trikala. Trikala, located in central Greece, has designed a long-term strategic plan for the transformation of the local society, based on the opportunities created by the information society era. To this end, several e-services are planned and are being implemented in the areas of e-government, e-health, and e-education, for example. Part of this strategic plan is the establishment of a telehealth and telecare centre offering advanced health and social care services to citizens with chronic diseases.

Telehomecare functions as an alternative and complementary social service that is able to provide value-added healthcare to patients with chronic diseases. The expected outcomes include the reduction of costs for the health and social care system, and improvement of the quality of life of the chronic patients. The main beneficiaries are patients and society.

#### Targeted population, number of patients

The target population is people with chronic conditions (e.g. who receive long-term monitoring or coaching).

From ten to 50 people receive the service each month.



## Type of telemedicine service

This is a monitoring service. The relationship between key actors in the service is patient to secondary care.

## Set-up that was being replaced

The Greek national health service care is not predominantly oriented towards the primary health care sector, but maintains a large network of secondary care hospitals which provide primary care through their outpatient departments. Therefore, there are often long waiting lists for patients in primary care. Patients from rural settings, such as from Trikala, often have to travel a long distance to visit their physicians in the secondary hospital so they can consult with a specialised doctor. Due to these difficulties, in the event of health deterioration, patients usually visit the hospitals' emergency departments.

The aim of this telemonitoring service is to replace some of the regular visits and face-to-face meetings of the patient with the specialist or primary care physician every time a medication modification is made or a medical examination is needed.

**Outcomes and results expected after introduction** During the first year of operation of the telehealth services, two scientific studies were conducted: one in cooperation with the Medical School of the Aristotle University of Thessaloniki, Greece, and with the Department of Business Administration, University of Macedonia, Thessaloniki, Greece; the other with the Department of Physical Education & Sport Science of the University of Thessaly in Trikala. Their purpose was to evaluate the efficiency of the telecare services compared with the traditional services.

The outcomes of the studies show that chronic disease management with telehomecare can lead to cost savings and improve quality of life and prognosis. At the same time, the citizens receive advanced, personalised health and community services. As a result, the establishment of a telehealth centre constitutes an efficient channel for the provision of patient-centric services. These two studies are reported below. More specifically:

**1. The e-Trikala Telecardiology project:** Cost utility and effects of home telemonitoring on hospitalisations, functional capacity and quality of life in elderly patients with chronic heart failure. A prospective, six-month, randomised trial was designed to compare the effectiveness of HTM versus usual care (UC) in elderly patients with CHF (NYHA class III and IV) and left ventricular ejection fraction (LVEF)<40%, receiving optimal treatment and counselling.

**Results:** The mean duration of the follow-up was similar for the two groups (146.29± 28.56 days,  $P>0.05$ ). There was a non-statistically significant reduction in hospital readmissions (-0.304 admissions; 95% CI, -0.773 to 0.164;  $P>0.05$ ) and in hospitalisation days (-1.130 days; 95% CI, -3.205 to 0.944;  $P>0.05$ ) for HTM group. However, there was a significant improvement in the Quality of Life, as measured with the disease-specific Minnesota CHF questionnaire (-6.24±4.05,  $P<0.001$ ) and the generic health-related EQ-5D questionnaire (10.00±7.24,  $P<0.001$ ). There was also a significant improvement in the exercise capacity as measured with the Specific Activity Questionnaire score (SAQ questionnaire: -0.62±1.10,  $P=0.001$ ) but not in the NYHA functional class. There was a trend for lower heart failure resource use in the intervention group.



HTM was associated with a significant improvement in the QoL and the exercise capacity, but a small incremental gain of  $0.13 \pm 0.24$  quality-adjusted-life-years (QALYs) over UC. The analysis showed that the average incremental cost of HTM was  $12,909 \pm 53,313$  Euros/QALY gained.

**Conclusions:** This project demonstrates that home telemonitoring in elderly chronic heart failure outpatients could improve Quality of Life and exercise capacity and reduce hospitalisations in the Greek health-care setting (Stafylas et al, 2008).

**2. Hypertension Management through the telecare service of the Municipality of Trikala:** A prospective, six-month, randomised trial was designed to compare the effectiveness of hypertension management through telecare versus usual care.

**Results:** The results of the study suggest that telecare management of hypertension is more effective than usual care (Tsounis et al, 2008).

## Detailed description

Telemonitoring services are provided to individual citizens with chronic heart failure, chronic asthma or chronic obstructive pulmonary disease (COPD), arrhythmias and hypertension. Individual citizens are equipped with light-weight handheld devices. They record their vital signs at home which are then transferred (via the telehealth centre) to the municipal hospital over the Internet or GPRS for review and feedback by the doctors. The service is implemented as a Card-Guard system which provides a web-based personal health record called PMP4 for both patient and clinician access. The medical devices used are designed to interface with the PMP4 system (this is the trade name of the electronic medical record and telemonitoring data management system of Card-Guard). Therefore, from an interoperability standpoint, this is a closed system provided by one vendor.

The service allows enhanced interaction between patients and primary care settings (i.e., General Practitioners) as well as secondary care settings (hospitals and/or specialists).

## Operational status

The service is operational, and is part of the mainstream healthcare service.

### 4.7 Chronic disease management (IL)

#### Objectives, expected outcomes, main beneficiaries

The multidisciplinary Center for Remote Chronic disease management is a recent expansion (1 July 2012) of an earlier programme that focused on home monitoring for patients with severe congestive heart failure (CHF).

The CHF home monitoring programme was implemented over four years ago. It was for patients suffering from severe congestive heart failure, and who therefore have some level of limitation in mobility. This programme initially began as a research programme. It had an experimental group, receiving telemedicine services, and a control group that continues to receive conventional care. There are 700 patients in each group – 1,400 patients altogether. The objective of the programme is to improve quality of life and patient satisfaction, improve patient security, improve quality of care, and

reduce emergency room visits and hospitalisation. It also makes more efficient use of nurse and physician resources.

The main beneficiary is the patient but it also clearly benefits the particular health plan by enabling it to make more efficient use of professional resources. It thus increases clinical benefits without a parallel increase in health manpower. As there is improved quality of patient care and improved efficiency in the delivery of care, it will also potentially benefit the healthcare system in general.

### Targeted population, number of patients

The population targeted by this particular service is people with chronic conditions (e.g., who receive long-term monitoring or coaching). The new multidisciplinary chronic disease home monitoring programme includes all of the patients who were a part of the (original) CHF programme. (Indeed, both the experimental and control group from the research phase have been completed.) Thus, the target population includes the following target populations:

CHF patients Grade 2-4, Chronic obstructive pulmonary (COPD) patients Grade 2-4, Home care patients (stabilised), Patients with new stoma, Diabetes patients, Patients with chronic wounds,  
• Heart rehabilitation patients.

The number of patients receiving this service on a monthly basis is between 100-1,000. The estimated size of the targeted population nationally is between 500,000-1,000,000.

### Type of telemedicine service

This telemedicine service is a proactive monitoring and case management service. With regard to the general relationship between the key actors involved in the service, the bulk of the interaction is between a call centre nurse and the patient. In parallel, it is also between the patient and his/her primary care physician, as well as between the nurse in the call centre and the primary care physician. There are also relationships for consultation purposes between the primary care and secondary care levels, as well as between the nurse and the secondary care physician.

The multidisciplinary home monitoring service is based on a call centre staffed predominantly by nurses who have been specially trained to manage the care of their target population (e.g. CHF nurses and COPD nurses). Each nurse receives a roster of patients that is his/her responsibility. He or she is expected to be proactive in his/her interactions with the patient and his/her primary caregiver.

In terms of the various technologies involved, each CHF patient has a digital blood pressure measurement device, a pulsometer and a digital scale. The patient takes his or her own blood pressure, pulse and weight each morning: COPD patients have peak flow monitors; diabetic patients have glucometers; and all patients have tablets for video-conferencing. The physiological information is electronically transmitted to the nurses' call centre and the patient's electronic medical record. The computerised system in the nurses' call centre is equipped with computerised protocols that will generate an alert if there is any significant deviation in the patient's data. In such a case, the nurse will initiate a phone conversation or video conference with the patient. Then, the nurse may (in accordance with the protocols and his/her experience) undertake such activities as change the

patient's care plan (such as medication dosage and diet), set up an appointment for the patient with his/her family practitioner or cardiologist or pulmonologist, contact the emergency room, or call an ambulance. Even if everything is alright, the nurse will proactively initiate communication at least once a week with the patient (the frequency of this contact is determined by the patient's condition), and the patient may call the nurse as often as he or she likes.

### Set-up that was being replaced

The conventional treatment would be more frequent visits to both the primary care and secondary care clinics as well as home visits. The telemedicine service is superior to the conventional treatment in the following three ways:

Visits to primary and secondary care clinics are predominantly patient initiated. Even in clinics that have chronic disease management nurses, the level of nurse-initiated interaction is low. The call centre is proactive as well as responsive.

- Visits to clinics and home visits take place during conventional work hours. The multidisciplinary call centre, on the other hand, operates 24/7. This means that, when the patient and/or his or her caregiver is in need – at any time of the day or night, they have somebody to contact who can help them.
- The telemedicine service is expected to improve patient compliance significantly. The nurses, using video conference, can actually watch patients taking their medication.

### Outcomes and results expected after introduction

The CHF programme has resulted in increased patient satisfaction, sense of security, safety, and quality of life. There has also been increased adherence to medication regimens. As the research part of this programme is nearing completion, it is hoped to have data with regards to emergency room and hospital use, as well as other measures, in the months following November 2012.

The new multidisciplinary call centre is currently caring for over 3,500 chronically ill patients. By mid-2013, it will be caring for 10,000 patients. Based on the CHF experience, first, the service is expected to increase patient satisfaction, sense of security, safety, and quality of life. Second, it is also expected to increase patient compliance to care regimens, reduce emergency room visits and hospitalisations, and enable more efficient and effective use of health carer personnel time and energy. Third, it is expected to enable the service to better empower the patient in managing his or her own care and to involve more actively the primary care giver.

### Operational status

This service is operational and is part of a mainstream service.

## 4.8 Remote intraoperative neuromonitoring (NL)

### Objectives, expected outcomes, main beneficiaries

The aim of the Remote intraoperative neuromonitoring service is to make intraoperative neuromonitoring available to as many (neuro) surgeons and patients as possible within the

Netherlands, but also across the country's borders (in Germany and Switzerland), to prevent neurological complications (such as hemiparesis, aphasia, and paralysis) when applying several surgical strategies. It is expected to be cost-saving, clinically effective and efficient, saving time for the specialist in charge (a clinical neurophysiologist). The beneficiaries are described as “all”.

### Targeted population, number of patients

The targeted population is patients undergoing specific treatment, i.e., patients undergoing surgery in which the central (or peripheral) nervous system is at risk of severe complications. These are, for example, patients undergoing brain surgery, vascular surgery and spine medullary surgery.

The number of patients who use the patients on a monthly basis is between 20-50. The estimated size of the targeted population is up to 10,000.

### Type of telemedicine service

The service category is monitoring. The relationship between key actors in the service is secondary care/secondary care.

### Set-up that was being replaced

The conventional treatment also consists of intraoperative neuromonitoring, in the same way as it is used now. The only difference is that the clinical neurophysiologist who is needed for the interpretation of the procedure does not have to be in the room, and not even in the same hospital or in the same country.

As the technique of neuromonitoring is very time-consuming, and many hospitals – and even countries – lack the specialised clinical neurophysiologists necessary, the technique is not used as often as needed.

By doing teleneuromonitoring intraoperatively from a remote location, the technique is used by a lot more surgeons, patients and hospitals. If the hospital has its own clinical neurophysiologist specialist, it can monitor the surgery – mostly also remotely – from within the hospital. If the hospital does not have its own specialist, by using live intraoperative teleneuromonitoring, the surgeon can benefit from using the knowledge of a specialist in another hospital or even in another country so as to ensure postoperatively the quality of life of his or her patient.

### Outcomes and results expected after introduction

The service was expected to be cost-saving, clinically effective, time-saving and to also improve the quality of the surgery and effect a decrease in postoperative neurological morbidity, thus leading to better quality of life for the patients.

### Detailed description

The service provides monitoring of central nervous system (CNS) function during surgery. In this way, it can prevent major complications during surgery. Since the monitoring is very time-consuming, and a lot of hospitals lack an experienced clinical neurophysiologist/neurologist who can perform this procedure, the remote delivery of the service makes monitoring possible for more hospitals, surgeons and, most important, patients.

The service is provided in the hospital from the operating room (OR) to the clinical neurophysiology (CN) department by means of virtual network computing (VNC) software or by means of Cisco Webex Meeting software – if mobility of the clinical neurophysiologist is necessary.

This tele-neuromonitoring is also provided to other hospitals across borders (these include Maastricht-Aachen, Germany; Maastricht-Bern, Switzerland; Maastricht-Hamburg, Germany and Maastricht-Regensburg, Germany), through Cisco Webex software that makes use of Internet connections. In the receiving hospital a local technologist, who has been trained in the hospital, starts and performs the monitoring procedure. Signals are interpreted by one of our clinical neurophysiologists in our own hospital remotely. Communication with the surgeon and the technologist in the receiving hospital is performed by various means: the use of the chat option in Cisco Webex, or by means of Skype (video and audio), or direct phone connection.

#### **4.9 COPD Patients Briefcase (NO)**

##### **Objectives, expected outcomes, main beneficiaries**

The COPD patients briefcase is a health service comprising both primary and specialist healthcare. It is intended as an integral part of future healthcare, delivering quality-assured, specialist consultation to patients in their home environment. It enables patients to have more quality days in their own home, shorter stays in hospital, and fewer readmissions. Patient empowerment is enhanced by providing expert multidisciplinary consultation, patient monitoring and education at home.

The main beneficiaries are patients and healthcare professionals.

##### **Targeted population, number of patients**

Broadly, the target population of the service can be categorised as elderly citizens with chronic obstructive pulmonary disease (COPD), and people with chronic conditions (e.g., who receive long-term monitoring or coaching).

From 20 to 50 people receive the service each month. An estimated 350,000 Norwegians have COPD, and this often involves frequent readmission to hospital. Home-dwelling patients with a FEV1 under 50% are the targeted population of the service.

##### **Type of telemedicine service**

The service category is home-hospitalisation. The relationship between key actors in the service is patient/secondary care.

##### **Set-up that was being replaced**

Traditional hospital treatment are made shorter and replaced by treatment via the COPD Patients Briefcase, introducing telemedicine-assisted discharge of COPD patients to their home environment.

### Outcomes and results expected after introduction

Danish surveys show a 46 per cent improvement in readmissions to hospital in the telemedicine group versus the control group, with 68 per cent improvement regarding total days stay in hospital in the telemedicine group. In a patient survey, 97 per cent of those receiving telemedicine consultations would recommend it to others, and 86 per cent report that it gives them the “necessary help” with their lung disease. In the Norwegian project, similar results are expected.

The Dalane District Medical Centre (DDMC) user survey (of 2,000 consultations) shows that nearly all participants managed the technology without assistance. In the survey, 80 per cent reported that the technology made them feel more secure on discharge from hospital, and 65 per cent reported that use of the COPD briefcase had an important effect on their coping strategies.

### Detailed description

Via the Briefcase (a two-way audio-visual “laptop” with spirometry and pulseoximetry capability), home-dwelling patients with an FEV1 of under 50 per cent are connected to the hospital for 14 days. They receive a pre-arranged, 30-minute video consultation with a specialist nurse each day of the week. At weekends they are offered telephone consultations. In addition, all patients can contact the hospital via an alarm telephone around the clock. This alarm telephone is connected to a manual call point in the briefcase.

The patient's FEV1, forced vital capacity (FVC), blood-oxygen saturation and subjective checklists are recorded. Medical, physiotherapy and occupational therapy consultations are undertaken as required. Data is encrypted, anonymised and recorded.

### Operational status

The service is operational and part of the mainstream health service.

## 4.10 Telepsychiatry (NO)

### Objectives, expected outcomes, main beneficiaries

**The full name of this service is “Decentralised psychiatrist on-call service collaboration using videoconferencing”.** It is a service through which specialists (psychiatrists) are available via video conference around the clock. The service allows patients and health personnel in the municipalities to communicate easily and directly with a psychiatrist. It includes patients treated by their local general practitioner and both in-patients and out-patients at the local centre for mental health (SPH), which is also called a district psychiatric centre (DPS).

Due to the use of video conferencing, specialists can be employed and located at different places in the region. In this case, the service can be offered as far away as 300 kilometres from where the patient is located.

The purpose of this service is to ensure that patients and health personnel have around the clock access to psychiatric specialist reviews as close to a patient's home as possible in order to assess the patient's condition when needed. Hence, health personnel can find out which initiatives should be taken especially in emergency situations or when the patient's state worsens.

The overall aims of the service are to:

- Run a new model for emergency assistance in the South Division area of Troms County. It takes place in cooperation between primary care and specialist care. The service includes an ambulatory team from the specialist health care. It involves primary care personnel, emergency beds in residential units in the local institution in combination with videoconferences with psychiatrist situated in other areas.
- Reduce unnecessary patient travel to Tromsø from remote areas.
- Avoid unnecessary hospitalisation in Tromsø when patients can be treated locally based on advice given by a psychiatrist via videoconference.
- Refine the service based on experience gathered.
- Disseminate this service (once refined) to other areas with the same characteristics.
- Evaluate the service systematically after some time.

The main beneficiaries of the service are the patients.

### Targeted population, number of patients

Broadly, the service falls into the category of acute/emergency intervention.

The service is aimed at people with mental disorders. The people involved include mentally ill patients in emergency situations, and patients who need a new evaluation of their condition. These patients are offered access to psychiatric specialist reviews and communication as close to their home as possible. In the videoconference, the patient can be seen by representatives from the acute ambulatory team, personnel from the local residential unit, their general practitioner and/or employees in the primary health care sector.

Between ten and twenty people receive the service each month.

### Type of telemedicine service

The telemedicine service category is psychiatry. Key actors in the service are the patient, his or her general practitioner, or other personnel from the primary health care, members of the ambulatory acute team, and a psychiatrist from the specialist health care service.

### Set-up that was being replaced

Maintaining a stable specialist psychiatry service in the District Psychiatric Centre(s) (DPS)/Centre for Mental Health (SPH), i.e., alternatively known as SPH/DPS or DPS/SPH has been a challenge. This challenge has existed not only in centres that are now organised within the Southern Department's area, but also for SPH/DPS in the whole service area of the University Hospital of North Norway



(UNN). It will take many years before it is possible for the DPS/SPH to establish a viable on-site around the clock service.

### Outcomes and results expected after introduction

There are large potential gains in the project, both in terms of raising the quality of services on offer and, economically, by ensuring a more efficient use of resources.

The service improves patient care and ensures safe emergency aid. The system can also support the establishment of acute beds at local in-patient units so that unfortunate and expensive transportation of patients to the hospital for evaluation/admission can be avoided.

An important ripple effect has resulted from the introduction of this duty scheme into regular routine: it is the gaining of experience with patient consultations via videoconference and the expansion of its range of use. This can make it easier to carry out regular checks via telematics and to obtain special expertise in different parts of the health system. Today, specialists are available on an ambulatory basis during the day in the regular in-patient units and out-patient clinics at the SPH/DPS. Part of this activity might to some extent in the future be easier to administer and make more efficient as a result of the use of information technology.

There is also a great potential for the transfer value of the project. Good solutions are easily transferable to other parts of UNN's geographical area. This applies for example to the northern area of Norway (the Finnmark county and the northern areas of Troms county), and to other SPH/DPSs all over the country. More district psychiatric centres/local centres for mental health can enter into secure cooperation with the specialist health care in the best interest of their patients.

### Detailed description

This service ensures that patients who are in emergency situations, or whose conditions worsen, have access to psychiatric specialist reviews as close to home as possible. Specialist reviews are made possible through the use of videoconferencing.

### Operational status

This service is operational and part of the mainstream health service.

#### 4.11 Integrated home care of ulcers (NO)

##### Objectives, expected outcomes, main beneficiaries

The full name of the service is the “Electronic platform for integrated home care of long lasting and chronic ulcers”.

The overall aim of the electronic ulcer treatment platform is to facilitate good and effective cooperation in treatment of ulcers between the patient, the out-patient clinic for ulcer treatment at the hospital, the patient's general practitioner, and home care personnel in the municipality where the patient lives. (The platform covers the treatment of leg ulcers, but also other ulcers.)



The service is expected to lead to better care, better quality of life for the patient, and more effective treatment. It is also expected that the number of hospital visits for these patients will be reduced, and result in cost-savings for the hospital. It also seems to lead to the upgrading of ulcer treatment skills among the home care personnel involved.

The main beneficiaries are: patient, healthcare provider organisation, and the regional and national health authority.

### Targeted population, number of patients

Broadly, the service covers two categories of patients: people with chronic conditions (e.g., who receive long-term monitoring or coaching), and patients undergoing specific treatment. More specifically, the targeted patient group is patients with long-lasting or chronic ulcers.

Up to ten people receive the service each month.

### Type of telemedicine service

This service can be called a rehabilitation service, but it can also be characterised as diagnostics, mobile access to vital information, monitoring, therapy and treatment.

The relationship between key actors in the service is primary care/secondary care, and both of these with the patient.

### Set-up that was being replaced

The patients using this service would be treated locally by health personnel with limited knowledge of the treatment of chronic ulcers. In many cases these ulcers do not heal without assistance from experts at a university hospital.

Some patients were referred to the University Hospital of North Norway (UNN) when local health personnel were not sure what would be the best treatment. But one visit to the university hospital was usually not sufficient. The patients would often need to visit the hospital several times for complete treatment. Considerable travel across large distances and limited capacity at the university hospital made this difficult.

### Outcomes and results expected after introduction

Better treatment, better quality of life for the patients, less travelling, lower expenses and upgrading of skills among local health personnel (and patients) were all expected.

### Detailed description

It is an electronic cooperation platform for patients, the hospital, the patient's general practitioner, and home care personnel involved in the treatment of the patient's ulcer(s). It is possible to register digital images of the ulcers in the service, compare images over time, ask for advice, and discuss what is the

most appropriate treatment to be given. The system is a web-based electronic health record for the treatment of ulcers. It is available via the Internet and can be used from both computers and mobile devices, such as mobile phones and tablets.

As a result of the introduction of this service, the local health personnel (or the patient himself or herself) can send images and questions electronically from a computer or mobile device to the hospital, receive answers and discuss different options. This reduces both the number of exhausting journeys for the patients and the work burden for the out-patient clinic at the UNN.

## Operational status

The service is operational and part of mainstream healthcare service.

## Further information

The service portal (in Norwegian) is at [www.pleie.net](http://www.pleie.net).

### 4.12 Teledialysis (NO)

#### Objectives, expected outcomes, main beneficiaries

The aim of the service is to deliver good quality service to patients with kidney failure living in areas without nephrologists (medical doctors who are specialists in kidney care). The University Hospital of Tromsø has video conference contact with all units in their area of responsibility which provide dialysis to patients but do not have a nephrologist onsite.

This service has been in routine use for more than ten years. The health personnel say that the service increases the security, the quality and the patients' safety. There is no updated information about cost-savings: this is simply the way that the service works.

The main beneficiaries are: patients, healthcare professionals, healthcare provider organisation, and the health authority.

#### Targeted population, number of patients

The category of patient targeted by the service is patients undergoing a specific treatment. The targeted population of the service is patients with kidney failure who need regularly haemodialysis.

The number of patients who receive the teledialysis service each month varies depending on the need at any given time. At the end of 2010, there were 1,218 dialysis patients in Norway.

#### Type of telemedicine service

Teledialysis falls mainly in the category of administrative meetings/video-conference meetings, but it also has other elements that lie in categories such as diagnostics, education/training, advice, and dialogue with patients.

The relationship between key actors in the service is primary care/secondary care and the patient.

### Set-up that was being replaced

The conventional treatment would be local treatment without telemedicine support.

### Outcomes and results expected after introduction

Telemedicine service improves the quality of the service and secure best practice. It also increases the competence of the local health personnel. At the University Hospital of North Norway (UNN), the staff feel more secure when they give advice via videoconference. This means of cooperation also links UNN and the remote sites more closely into one common workplace.

As mentioned before, the health personnel say that the service increases the security, the quality and the patients' safety and satisfaction. The service was evaluated as a part of the project ten years ago, but the routine service has not been subject to scientific evaluation and assessment since then.

### Detailed description

Patients receive haemodialysis in their local health institution supervised by a nurse and sometimes also by a nephrologist from the University Hospital of North Norway (UNN) via video conferencing (as part of the doctor's round). The nephrologist participates only in video conferencing to those units where they do not visit or when their expertise is needed due to the patient's condition. If necessary they solve patient problems by phone. UNN is the unit that is responsible for the treatment of dialysis patients in its area. Hence, UNN uses videoconferencing technology to communicate with remote hospitals, health centres and wards without nephrologists, but that still provide dialysis. At UNN both specialists and nurses participate in providing the service (sometimes, it is only nurses), and at the local hospital/health care centres there are both nurses and patients.

### Operational status

Teledialysis is operational and part of the mainstream health service.

#### 4.13 ECOPIH (ES)

### Objectives, expected outcomes, main beneficiaries

The full title of the service is: "ECOPIH" Eina de comunicació entre Primària i Hospital" (translation: "Communication tool between primary and acute care). ECOPIH is a term created and registered with the Creative Commons.

The overall aim and expectations of the service is to create a virtual community inside the web 2.0 platform e-Catalonia for professionals in both the primary and secondary/tertiary sectors. The objective of this consultancy environment is to offer a tool that makes online communication faster among primary care and hospitals, and tertiary care, and vice versa. It reduces waiting lists and contributes to mutual learning.

The service is available among five reference centres (hospitals) and nine primary care centres. There are subgroups for each clinical specialty that participates in the platform. The platform currently has 28 specialty consultancy groups (examples include tobacco addiction, pharmacology, rehabilitation, vaccinations, allergiology, and endocrinology).

The service's current use is limited to professionals in the primary care area of Sant Adrià – Badalona and the Hospital Germans Trias i Pujol. Access will be extended to further or larger territories linking reference hospitals with all primary care centres of its reference area in the territory.

The main beneficiaries are healthcare professionals and patients.

### Targeted population, number of patients

The target population is categorised as citizens in general and patients undergoing specific treatment. More specifically, they include the patients of professionals and general practitioners working daily in primary care and interacting with specialists at their reference hospital.

Between 100 and 1,000 people receive the service each month. The estimated size of the targeted population nationally exceeds one million.

### Type of telemedicine service

The service is categorised as an interpretation service. The relationship between key actors in the service is primary care to secondary care.

### Set-up that was being replaced

The service makes not only the set of professionals to whom a General Practitioner may make referrals accessible but also any available specialist in the country.

### Outcomes and results expected after introduction

This service allows any professional in the region to access or view all consultations available, and participate in discussions. It is an “auto learning” instrument that results from the individual's own consultations and the contributions made by other colleagues. In the discussions, materials include photos (for example, of skin lesions and wounds), or scanned documents, radiographies, protocols of service delivery, or innovative articles. All materials contribute to problem solving. It results, of course, in time-savings, reduced costs (the avoidance of conventional mail) and clinical effectiveness.

### Detailed description

This is an online tool that allows professionals in primary and secondary/tertiary sectors to build a relationship based on an online tool that works as a virtual community inside the e-Catalunya web 2.0 platform. The parties involved include any general practitioner that asks for a diagnostic assessment from a secondary care professional.

#### **4.14 ENDOBLOC (ES)**

##### **Objectives, expected outcomes, main beneficiaries**

The full title of the service is ENDOBLOC – virtual community for clinical practice in endocrinology.

The overall objective is to serve as a virtual community of professionals working with endocrine illnesses (including diabetes and others) at the University Hospital Arnau de Vilanova (Lleida). They will collaborate together with primary care physicians and nurses in the country who use the official governmental platform, called e-Catalunya.

The service includes a project director (called the Cap endocrinologia), a community manager and a community moderator (primary care doctor).

The main beneficiaries are healthcare professionals.

##### **Targeted population, number of patients**

The target population is categorised as people with chronic conditions (e.g., who receive long-term monitoring or coaching) and patients undergoing specific treatment.

The service is a collaborative tool for professionals in primary-secondary care to treat clinical cases of endocrinology including people with diabetes 1 or diabetes 2. This virtual consultation facilitates diverse sorts of participatory processes, such as conducting online surveys, and organising wikis and forums. They are always about endocrinology.

##### **Type of telemedicine service**

The service is categorised as an interpretation service. The relationship between key actors in the service is primary care- secondary care / secondary care-secondary care/ primary care-primary care.

##### **Set-up that was being replaced**

This project is based on the implementation of a virtual community of health care professionals belonging to a Primary Health Care Centre and the Department of Endocrinology and Nutrition of a university hospital. The main objective is to manage the medical knowledge of this medical speciality, in order to provide benefits to endocrinological patients and health care professionals involved.

##### **Outcomes and results expected after introduction**

Having 213 professionals integrated in exchanging relevant information can save unneeded referrals and time consuming visits by patients to the specialists.

##### **Detailed description**

The service platform is e-Catalunya. The e- Catalunya platform is a shared service platform. It is part of the corporate technological infrastructure of the Generalitat de Catalonia.

The platform was designed to facilitate building communities of practice without having to incur further developments, software licensing acquisition or changes in installations. Communities of practice benefit instantly from any new platform versions provided by the project, without having to devote any specific attention to platform developments or adaptations.

The basic infrastructure is supported by Linux OS. It runs on Apache web servers, Tomcat application servers, and uses MySQL as a database engine and OpenLDAP to secure authentication processes. The portals are supported by the exoPlatform software platform, supported by Java Open Single Sign-On (JOSSO), which is an open source J2EE and Spring-based SSO infrastructure aimed at providing a solution for centralised, platform-neutral, user authentication and authorisation.

## Operational status

The service is operational and is part of mainstream healthcare service.

### 4.15 Guttman NeuroPersonalTrainer (ES)

#### Objectives, expected outcomes, main beneficiaries

The service's objective is the continuous cognitive rehabilitation of a patient in their home through telerehabilitation systems. This rehabilitation reduces negative cognitive consequences, diminishes the level of patients' disability, and makes their social and work reintegration easier. It also enables the personalisation of therapeutic plans, which is one of the most delicate and limiting aspects of cognitive rehabilitation. This platform reduces provider burden while, at the same time, optimises the intervention. It also promotes the professional-user relationship: this encourages the user to perform at his/her maximum capabilities and provides a means for monitoring the results.

#### Targeted population, number of patients

The target population is categorised as patients undergoing specific treatment. The Guttman NeuroPersonalTrainer is a telemedicine platform that allows intensive cognitive rehabilitation. The conditions of the patients include cognitive impairment (Acquired Brain Injuries), dementia (through ageing), mental disorders, and intellectual disability.

Between 50 to 100 people receive the service each month. The estimated size of the targeted population nationally lies between 100,000 and 500,000.

#### Type of telemedicine service

The service is categorised as a rehabilitation service. The relationship between key actors in the service is patient to secondary care.

#### Set-up that was being replaced

The service replaces conventional paper-pencil tasks and face-to-face interventions for mental rehabilitation. There are no other alternatives to the telemedicine service described.

## Outcomes and results expected after introduction

The service is expected to reduce the cost of the treatment (personnel, dedicated time) without reducing efficacy. It actually does so. In 60% of the interventions done with the platform there was a satisfactory clinical response.

## Detailed description

There are currently 21 operating platforms: in hospitals, *sociosanitari*, integrated care centres, and sheltered/nursing homes.

The platform is based on open source web technologies. The main architecture of the platform is based on a client-server communication using HTTP and XML-RPC.

A Model-View-Controller pattern has been followed, so that the view and the logic to access and process data are separated. The web application requires Java (JDK 1.6, JRE 6.x) and it runs over Apache Tomcat 6.X, as it is based on Servlet/JSP. The database used is MySQL Server 5.X and MySQL Java Connector 5.X (JDBC). However thanks to this division between the data process and the view, the platform could be easily adapted to new other database models or new languages for the graphic user interface. Relating to the programming languages, all the environment is Java 2 Platform (J2EE, Enterprise Edition), using JavaScript and AJAX (SACK library) to dynamically change the data showed on the HTML pages, thus avoiding reloading the page every time a user wants to show or edit contents.

## Operational status

### **4.16 The service is operational, and is part of mainstream healthcare service. ITHACA (ES)**

#### Objectives, expected outcomes, main beneficiaries

The full name of the service is ITHACA -Innovant en el Tractament de la Hipertensió Augmentant el Compliment i l'Adherència.

ITHACA is an innovative integrated service that optimises the care of patients with chronic diseases. The telemedicine tool facilitates the monitoring of chronic patients through motivation and co-responsibility. The service offers a system of self-measurement of blood pressure at the patient's home. This is done through a GPRS gateway that sends the blood pressure readings directly to the platform. The service integrates three levels of care: primary care, tertiary care (hospital), and social care.

Since the model is based on a population stratification model (according to chronic disease) risks are labelled in three types: low, moderate and high. Patients with hypertension – who represent about 35% of the population – will require far fewer visits to tertiary care and fewer admissions to the social care units (for the treatment of sub-acute patients).

This leads to a significant decrease in costs and improves quality of daily life.

The main beneficiary is the patient.

## Targeted population, number of patients

The service is categorised as a monitoring service. The relationship between key actors in the service is between the patient and primary care.

## Set-up that was being replaced

The service substitutes the conventional procedure where patients go regularly to a general practitioner to control their hypertension; sometimes it also replaces the follow-up protocol after hospital discharge of patients. In fact, this is a change in the organisational model of procedures, but the clinical treatment remains the same.

## Outcomes and results expected after introduction

The respondent reports both the main actual outcomes and the expected outcome(s).

The main outcome of ITHACA is that patients assume a greater role in their treatment and take it more seriously.

Since the telemedicine service has been in place, therapeutic outcomes have improved significantly. Patients have improved control of their blood pressure, and have used fewer clinical resources, which has decreased cost.

Using telemonitoring has decreased the costs per patient by 65€/year. There are 120,000 inhabitants with a potential for hypertension in the area where the service is in place. Bearing in mind that hypertension is present in 35% of the adult population, this means a significant cost reduction. The pharmaceutical costs are the same.

The expected outcome of the service is to reduce seriously the hypertension events.

## Detailed description

With this service, there is a well-defined interaction protocol for the telemonitoring with a dashboard of the measurements, alerts, documental material sharing and document exchange.

The platform to be accessed by the professionals is a web service integrated on their workstations.

The technology used is for the platform development. Architecture: Java – J2EE – Spring and Web development technology: RichFaces Java Server Faces (JSF) Operating platform; Web Server: Apache; Application Server: Tomcat

Concerning the device integration the Measuring Devices: Sending Data: GPRS Gateway Communications and the Data Integration is SOAP using XML Web Services.

## Operational status



The service is operational, and is part of mainstream healthcare service.

#### **4.17 SpainXarxa Telelctus (ES)**

##### **Objectives, expected outcomes, main beneficiaries**

Xarxa Telelctus, or “Tele-Ictus Network” (“ictus” is Catalan for “stroke”), is a telemedicine service that facilitates specialised/tertiary attention to stroke patients within the first hours of the incident. It covers the Catalonia region according to the criteria and requirements of the Directors’ Plan for Circulatory System Illnesses/Cerebral Vascular Illnesses of the Catalan Health Department.

Stroke is the second cause of death worldwide and the main cause of disability in industrialised countries. For a stroke patient’s survival, one of the most critical factors is response time.

By deploying the Tele-Ictus Network the goal is to reduce response time in stroke diagnoses in Catalonia, and therefore also the consequences of stroke.

The goal of the service is to enable expert neurologists specialised in strokes, who are on duty and located in a reference hospital, to diagnose stroke right from the moment the patient arrives at the emergency service of a regional hospital and to support emergency service professionals via videoconference.

AIAQS measured the improvement of quality of care in cardiovascular disease and stroke treatment through telemedicine.

##### **Targeted population, number of patients**

The target population includes patients undergoing specific treatment/acute/emergency intervention. More specifically, the global population is patients with stroke symptoms that have being diagnosed at a regional local hospital.

Between 50 to 100 people receive the service each month (there were approximately 600 consultations during 2010).

##### **Type of telemedicine service**

The service is categorised as a diagnostics service. The relationship between key actors in the service is primary care to secondary care.

##### **Set-up that was being replaced**

The telemedicine teleconsultation replaces physical transports where patients with stroke symptoms are sent by ambulance from the local area hospital to a reference hospital where the appropriate expert/s are located. The journey takes usually longer than 145 minutes, and causes delays in diagnosis and treatment.

##### **Outcomes and results expected after introduction**

The main expected outcomes relate to the quality of care, cost-effectiveness, and general results.

**Quality of care:** The main evidence of quality of care improvement is the fact that a patient has a diagnosis, and is treated with thrombolytics by a stroke expert before the critical time-period of 180 minutes is exhausted.

**Cost-effectiveness:** No long-distance transportation is needed. Costs for emergency admissions and professionals' fees in regional hospitals are reduced or avoided.

**Results:** Fifty-five per cent of the strokes treated in Vall d'Hebron reference hospital, and others, come via Tele-Ictus. This has amounted to approximately 600 consultations being undertaken during 2010.

## Detailed description

The treatment follows a specific established protocol, namely the stroke protocol for adequate treatment.

The service platform is proprietary: it is called "Medting". Medting is a web application for publishing, sharing and checking all kinds of clinical applications. First the image captured at any of the local centres is uploaded with MIO LT into the Medting platform. With MIO LT, it is possible to share and access any medical image in a totally centralised way, even from outside a radiological environment. This is done by intense use of medical standards (such as CDA, HL7, and DICOM).

Subsystems include:

- Videoconferencing – Allows the neurologist to have a detailed analysis of the external symptoms of the patient.
- Image transmission – Allows DICOM images that come from a cerebral computerised tomography (CT) scan directly to be sent to an online repository that the reference hospital neurologist can consult.

The hospital requirements include:

- Unique speaker identification
- Stroke registry
- Ambulance service SEM nominated, available and with medical units
- >100 strokes/year
- Being approximately 40 km from the reference centre/reference hospital
- Having 24-hour CT cranial availability
- Emergency lab available 24 hours
- Rehabilitation unit continuously available
- Hospital stroke protocols available with treatment capacity
- Intensive monitoring unit at the regional hospital.

Specific IT requirements include:

- Public Internet Protocol (IP), firewalls, and more than 1 Mbps.
- Connectivity: This is a physical LAN from an emergency box.

- Sending the CT images in DICOM format to the repository.
- It is necessary to add an intermediate computer which receives DICOM and encapsulates in HTTP.
- There is an etiologic diagnosis and agreement among stakeholders.

The parties involved are the teams in the reference hospital, a local (regional) hospital, and a patient.

## Operational status

The service is operational and part of mainstream healthcare service.

### 4.18 Electronic healthcare (SE)

#### Objectives, expected outcomes, main beneficiaries

The service consists of a medical record, a phone, telecommunications, and video meetings. It is part of child rehabilitation and a healthcare service given to children up to 18 years old who experience e.g., diabetes, heart disease, child nephrology, cystic fibrosis, neuropsychological syndromes, and other syndromes.

The main beneficiaries of the service are patients and healthcare professionals.

#### Targeted population, number of patients

The population targeted by the service include people with chronic conditions (e.g., who receive long-term monitoring or coaching); patients undergoing specific treatment; and patients undergoing acute/emergency intervention.

Between 100 –1,000 patients receive this service on a monthly basis.

#### Type of telemedicine service

The main beneficiaries are the patient and the primary care sector.

#### Set-up that was being replaced

The difference between the previous set-up and the current set-up is as follows:

- For meetings where people had otherwise in the past to travel a long distance, they can now participate by video from their home city.
- Ultrasound examinations online with a national specialist, when there are no relevant specialists in the area, improve the quality of the examination and diagnostics. This also applies for x-ray interpretations and second opinions.
- Physiotherapists can use video for rehabilitation in the patients' home, when needed, which results in a quicker and better rehabilitation for the patient.
- Follow-up after surgery in other hospitals by video.

#### Outcomes and results expected after introduction

The four aims of the service are:

- Cost savings.
- Quality and safety for the patients: e.g., less travel for the patients and staff which minimises the risk in traffic. The district covers a radius of about 250 kilometres. Furthermore, all actors involved in the patient's case can be involved more easily with the patient's treatment regardless of where they live.
- Reaching other specialists in other regions, nationally and internationally easily. Patients and staff do not need to travel, but can easily be reached by video.
- Treating more patients by reducing travel time. Telemedicine allows staff to treat four patients a day, instead of one or two when travel is added. Therefore, telemedicine is more clinically effective.

## Operational status

This electronic healthcare is operational and forms part of the mainstream health service.

### 4.19 RxEye Remote Reading (ES)

#### Objectives, expected outcomes, main beneficiaries

RxEye Remote Reading offers companies a way to deal with the lack of radiologists/pathologists and the associated resource problem. It offers a simple and secure solution for engaging remote reviewers and providing transparent costs and flexible, but secure, contracts. Parallel contracts of variable duration can be concluded without external information technology (IT) installations in order to facilitate and guarantee continuous availability of reviewers.

With RxEye Remote Reading, teleradiologists/pathologists can offer their review services to other companies on an automatically generated invoicing basis, thus achieving transparent profit with minimal administration. In this way, radiologists and pathologists can handle greater volumes or more complicated examinations in the case of either reduced work load or to enhance personal skills. It costs nothing to get started and start reviewing.

Remote Reading fully supports clinical flow processes so as to minimise the need for administration for both clients and reviewers.

#### Targeted population, number of patients

The targeted population includes patients undergoing specific treatment(s), particularly patients who need diagnoses based on medical imaging.

The service can increase the efficiency of radiology departments, increase the number of treatments, and increase the accessibility of expertise for all types of patient groups that are in need of examination using medical imaging.

On a monthly basis, between 100–1,000 patients receive the service.

#### Type of telemedicine service

The RXEye Remote Reading service can be classified as diagnostics. The key actors involvement are secondary care to secondary care.

### Set-up that was being replaced

RxEye facilitates using external radiologists or medical imaging experts for care given for internal purposes. This can lead to faster access to a diagnosis. Medical imaging experts can also be coordinated or consulted to determine the diagnosis of difficult or rare cases. This can lead to a higher quality of diagnosis.

### Outcomes and results expected after introduction

No clinical trials or health economic evaluations have been undertaken to evaluate the outcome, but the faster and easier access to external medical imaging experts that RxEye provides could lead to a higher quality of diagnosis, with shorter delay times.

### Detailed description

The service is a web platform that allows fast procurement processes and communication to work in a network where expertise, images and patient data can be exchanged.

Regarding RxEye's technology, only one IT installation is required for all future suppliers, which reduces the cost and increases the flexibility of the company providing the service. For companies that only need to upload individual cases manually, getting assistance as soon as possible does not require an IT installation. The only thing that suppliers need is a client installation, which lowers the barrier and makes it possible to start delivering services quickly.

Parties that can be involved include buyers and suppliers of diagnostic services. Private and public companies can procure imaging diagnostics directly, simply and securely. RxEye's procurement complies with the provisions of the Swedish Public Procurement Act. Organisation of experts, such as self-employed teleradiologists, recruitment companies or teleradiology companies, can be given different assignments by county councils and private care institutions through RxEye.

### Operational status

This RXEye Remote Reading service is operational and forms part of the mainstream health service.

## 4.20 Teldialysis (UK)

### Objectives, expected outcomes, main beneficiaries

Teldialysis's aims is to monitor the haemodialysis outpatients at remote dialysis units by video conference. This frees up clinic time to see outpatients and save them travelling to Inverness (a 300 kilometre round trip), and allows staff to meet up weekly to troubleshoot and to facilitate shared teaching with remote sites.

### Targeted population, number of patients

The targeted population is people with chronic conditions (e.g. who receive long-term monitoring or coaching), that is, patients undergoing specific treatment. The target is to video conference the haemodialysis patients in the satellite dialysis unit who attend for dialysis three times a week.

Between ten to 20 patients receive the service monthly. The estimated size of the targeted population nationally is 40,000.

### Type of telemedicine service

The service is a monitoring service, and the relationship is between patients and secondary care.

### Set-up that was being replaced

Previously, the service involved reviewing the patients face-to-face.

### Outcomes and results expected after introduction

No real change in consultation quality was expected, but the intention was to free up time to see other patients in clinics.

### Detailed description

The videoconferencing uses Tandberg Edge and an Internet Protocol (IP) network between hospitals, set up by the videoconferencing team at the health board.

### Operational status

The Teldialysis service is operational and forms part of the mainstream health service.

## 4.21 Telescot Programme (UK)

### Objectives, expected outcomes, main beneficiaries

The Telescot Programme set out to evaluate the impact of telehealth on admissions to hospital and quality of life on COPD, control of high blood pressure, diabetes and managing blood pressure in people with strokes. The main beneficiaries are the patients.

### Targeted population, number of patients

The targeted population was people with chronic conditions (e.g. who receive long-term monitoring or coaching), specifically people whose long term condition is considered to be poorly controlled. The key actors involved in the relationship were patients and primary care.

### Type of telemedicine service

The service can be classified as a monitoring service. Between 100-1,000 people benefit from the service each month. The estimated targeted population nationally is up to 10,000.

### Set-up that was being replaced

The former service was normal general practitioner care for these conditions.

### Outcomes and results expected after introduction

Expectations were of reduced hospital admissions, increased quality of life, and reduced blood pressure and haemoglobin A1c (HBA1c).

### Detailed description

There are a variety of interventions in the service: some relying on fixed broadband Internet, others on mobile phone technology. The patient measures parameters and records symptoms which can be viewed by a health professional. An algorithm alerts the professional to potential problems.

### Operational status

The Telescot service is operational and forms part of the mainstream health service.

## 5. ANNEX 3 - Non-operational telemedicine services in five countries

The telemedicine services described in this Annex are five of the 26 cases which were submitted to the Momentum survey questionnaire as of November 2012. No version of these reports has been uploaded onto the Momentum website.

### 5.1 Austria - UEMS Pneumology Section

The service can be categorised as providing mobile access to vital information (e.g., electronic health records). Beneficiaries are perceived as “all”.

Pneumology combines clinical experience, clinical skill, laboratory value, imaging and lung function analysis. It is seldom done in one place and one time. Further insight is gathered by analysing the data over a given time period. In imaging, obtaining a full covered computed tomography (CT) study means accessing a lot of data. In addition, in both the lung function analysis and the “work-out study”, there is a lot more data stored than is documented in final reports. Giving a physician the whole data set(s) makes diagnosis faster, and thus cheaper, thereby assuring benefit for the patient.

### 5.2 Estonia - "Home monitoring of diabetic patient provided by the municipal hospital"

This description contains details on an Estonian telemedicine service called “Home monitoring of diabetic patient provided by the municipal hospital”. It covers the service’s aim and main beneficiaries, the targeted population, its current operational status, the category of telemedicine

into which it falls, the set-up that was being replaced, and its expected outcomes and results following introduction.

Details on the specific telemedicine service were provided by an executive member of the hospital board who is also head of IT and medical engineering. His title is Director of research and development. Both the organisation and he have a high level of experience with telemedicine. The service is a Momentum partner.

#### **5.2.1 Telemedicine service title, aim of service and expected outcomes or results, and main beneficiaries of the (new) telemedicine service**

The title of the telemedicine service is “Home monitoring of diabetic patient provided by the municipal hospital” The expected outcomes/results of the service were better treatment compliance, less ambulatory and hospital visits, and higher patient satisfaction with the hospital. The main beneficiaries are the patient/society (for example, public health, the Ministry of Health or Social Affairs, and the Healthcare Board).

#### **5.2.2 Targeted population of the service and the number of patients using it**

The population targeted by this particular service is people with chronic conditions (e.g. who receive long-term monitoring or coaching) and/or patients undergoing specific treatment.

The number of patients who received this service on a monthly basis was 20-50. The estimated size of the targeted population nationally lies between zero (0) and 10,000.

#### **5.2.3 Category of telemedicine service and the relationship between the key actors in the service**

This telemedicine service was a monitoring service. The general relationship between the key actors involved in the service was between the patient and the secondary care level.

Patients were provided with a glucometer for blood sugar measurements. In the event of complications, ECG, and a blood pressure meter and/or scale were also provided, depending on the patient’s condition. Measurements were collected regularly (for example, daily or weekly) and sent to the hospital where nurse specialists were responsible for collecting and analysing the data. In case of abnormalities, the nurse contacted either the physician or patient.

#### **5.2.4 Set-up that was being replaced**

The telemedicine service was intended to replace ambulatory visits and Emergency and Accident visits. There are no alternatives to that service except active home visits by the nurse.

#### **5.2.5 Outcomes and results expected after introduction**

The aim of the initiative was to achieve better blood glucose balance and, consequently, reduce complications. This should all have led to the more effective treatment of diabetic patients and, as a result, release some hospital resources for other services. An additional aim was to create a special telemedicine department for the provision of different telemedicine services.

#### **5.2.6 Current operational status of the service**

This service is **not operational**. The initiative was discontinued before the service was implemented. The decision to discontinue the service was made during the development and pilot project phase of the project.

The main reason for discontinuation was the lack of reimbursement scheme. The service was too expensive for out-of-pocket payment, and the reimbursement by Health Insurance Fund was not in place.



### **5.3 Greece - Sismanoglio General Hospital Group Telemedicine Centre (Coordinator of National Telemedicine Network)**

#### **5.3.1 Telemedicine service title, aim of service and expected outcomes or results, and main beneficiaries of the (new) telemedicine service**

The full title of the service is the Sismanoglio General Hospital Group Telemedicine Centre (Coordinator of National Telemedicine Network). The purpose of the operation of Telemedicine Network of the National Health Service is to provide specialised diagnostic and therapeutic information at peripheral health units and support for programmes of preventive medicine, education and health promotion. It also provides systematic training of medical and nursing services-related health units to improve the quality of service of primary health care.

The objectives of the network telemedicine can be expressed in relation to the patient, to the healthy population, and to health service professionals. Specifically:

**For the patient**, the service is to provide reliable and timely diagnostic and therapeutic assistance; to avoid unnecessary travel to the big cities to find a specialist or, when movement is warranted, to do so in a safer way.

**For a healthy population**, the service is to reduce the sense of isolation and to increase the confidence of the community in local services medical care. The education of the healthy population through education programmes and health promotion.

**For the health service professionals (such as doctors and nurses)**, the service is to increase the knowledge and skills of health care professionals through specialised programmes for continuing education with the upgrading of the health services.

The expected outcomes include the following dozen expectations:

- Optimise the delivery of therapeutic care of patients with chronic problems.
- Minimise movement of the chronically ill to the secondary and tertiary hospitals of big cities.
- Reduce social discontent and increase confidence in local health services.
- Make rational use of laboratory tests and medication.
- Establish patient education for modification of attitude and behaviour in favour of regulating diseases.
- Establish the role of the treatment team to improve the treatment of diseases (by various specialties, such as doctors, nurses, psychologists, and dieticians).
- Train medical and nursing personnel to acquire the ability to affect the patient.
- Reduce morbidity and mortality indicators.
- Reduce hospital days.
- Reduce waiting time.
- Provide continuing education of physicians through the tele-education procedures.
- Develop familiarity with new ways to communicate and use of new technologies by the medical and nursing staff, to the benefit of patients.

The main beneficiaries are the entire population.

### **5.3.2 Targeted population of the service and the number of patients using it**

There are two categories of target population: people with chronic conditions (e.g., who receive long-term monitoring or coaching), and acute/emergency intervention.

More specifically, the target population can be characterised as:

- Those requiring acute/emergency telemedicine (pathology, cardiology, paediatrics, pulmonology, or orthopaedics) – primary health care centres and isolated peripheral medical offices.
- Chronic condition patients (pathology, cardiology, hepatology, urology, pulmonology, orthopaedics, paediatrics, dermatology, endocrinology, dietology, psychiatry) – primary health care centres and isolated peripheral medical offices.
- Education/training (health care professionals, primary and secondary education students and teachers on health prevention and health promotion issues).

No patients currently receive the service monthly as it has been discontinued. The estimated size of the targeted population exceeds one million, i.e., the entire relevant population of the country of Greece.

### **5.3.3 Category of telemedicine service and the relationship between the key actors in the service**

This service can be categorised both as a rehabilitation service, and as diagnostics, mobile access to vital information, monitoring, therapy and treatment. It also involves diagnostics, monitoring, discharge, planning, interpretation, education/training, psychiatry, therapy, and administrative meetings/video-conference meetings.

The relationship between key actors in the service is of primary care to secondary care.

### **5.3.4 Set-up that was being replaced**

Three set-ups were being replaced:

1. Provision of remote specialisation in emergency and chronically ill cases without patient's movement.
2. Acute/emergency telemedicine: i) Limitation of patient's movement (e.g., diabetes cases); ii) Documentation and medical instructions of the acute incident management (e.g., acute cardiology incident).
3. Education/training : provision of continuing education and training of health care professionals in remote areas; use of tele-education and e-learning methods by primary and secondary level schools in health prevention issues and health education in remote and isolated areas population.

### **5.3.5 Outcome and results expected after implementation**

Three main outcomes were specified: cost-savings, clinical effectiveness, and quality of life.

1. Cost-savings due to reduction of patients' movement and hospital admission.
  - Clear reduction of repeated biomedical tests and medication cost (polypharmacy).
  - Optimisation of therapeutic manipulation and skills of General Practitioners with the help of the telemedicine centre.
2. Clinical effectiveness: timely access to proper treatment from remote specialist.

- Improvement of laboratory and other parameters because the population training (body weight, diet, glucose, lipids, smoking, alcohol, life style, etc.).
- Physicians updated on modern therapeutic developments.

3. Quality of life: gratitude of patients and acceptance of service with the help and support of the telemedicine system.

- Increase the reliability of medical services in the remote and isolated regions.
- Significantly increased confidence of population in primary health care services and locally-provided medical services due to knowledge and support provided by telemedicine network. Increase in confidence between remote primary health care professionals.

### 5.3.6 Telemedicine service in more detail

The **telemedicine service** involved:

- Acute/emergency telemedicine: type real-time
- Chronic-ill telemedicine (monitoring): type real-time
- Interpretation: type store and forward

**Technology:** The technology is telecommunications. Use of a Virtual Private Network (VPN), a direct dedicated Integrated Services Digital Network (ISDN) line between telemedicine centre and primary health care units for voice and health data communication, telephone network.

**Service platform:** call management (call-fax and messages management); incident management; teleclinics scheduling; teleclinics management; video-conference services; education/training programmes management (call on telemedicine centre via telephone network), fax and messaging system, logging to the telemedicine system, use of application of electronic health record, transmission of images, storage, diagnostics, interpretation, referrals, and education/training procedures).

Parties involved:

- Primary health care units : physicians
- Telemedicine centre : specialists, coordinator.

## 5.4 Slovenia - Home care for chronic pulmonary patients

This description contains details on a Slovenian telemedicine service called home care for chronic pulmonary patients. It covers the service's aim and main beneficiaries, the targeted population, its current operational status, the category of telemedicine into which it falls, the set-up that was being replaced, and its expected outcomes and results following introduction.

### 5.4.1 Telemedicine service title, aim of service and expected outcomes or results, and main beneficiaries of the (new) telemedicine service

The title of the service was home care for chronic pulmonary patients. The overall aim of the service was both clinical effectiveness and improvement in quality of life. The main beneficiaries of the service include patients; healthcare professionals; the healthcare provider organisation; the authority; and society at large (such as public health, Ministry of Health or Social Affairs, Healthcare Board).

#### **5.4.2 Category of telemedicine service and the relationship between the key actors in the service**

The service could be described as a monitoring service. The relationship was between the patient and secondary care.

#### **5.4.3 Targeted population of the service and the number of patients using it**

The targeted population was people with chronic conditions (e.g. who receive long-term monitoring or coaching), particularly chronic obstructive pulmonary disease patients.

#### **5.4.4 Set-up that was being replaced**

The set-up that was being replaced related to the early diagnosis of disease worsening, and was intended to achieve fewer outpatient visits on regular pre-set dates.

#### **5.4.5 Outcome and results expected after implementation**

Expected outcomes and results involved clinical effectiveness; a reduction in hospitalisations; better quality of life for the patients due to patient-health care from the patient's home; and better rehabilitation results.

#### **5.4.6 Telemedicine service in more detail**

The details of the service involved a: service platform in which the patient enters his or her health vital data and a nurse in secondary care contacted him/her, triggered an action and alerted doctors including specialists and general practitioners.

#### **5.4.7 Operational status of the service**

The service is **not operational** and is not part of the mainstream health service.

The service – which was a national project founded by the Ministry of Health – was discontinued after the service began to implemented. The decision to discontinue the service was made at implementation.

After the end of a project, a platform was tested on chronic patients and proved operational. Since the project ended, no funds were available to implement it in regular care.

### **5.5 Spain - TELEPRESONS**

This description contains details on a Spanish telemedicine service in Catalonia called TELEPRESONS. It covers the service's aim and main beneficiaries, the targeted population, its current operational status, the category of telemedicine into which it falls, the set-up that was being replaced, and its expected outcomes and results following introduction.

#### **5.5.1 Telemedicine service title, aim of service and expected outcomes or results, and main beneficiaries of the (new) telemedicine service**

The title of this telemedicine service is TELEPRESONS. TELEPRESONS is a teleconsultation service between the healthcare service in penitentiary centres and the corresponding reference hospital or tertiary centre. This service, provided via teleconference, has allowed :

- Interconsulting among professionals with or without the patient;
- Integrated sessions among any health professional working with prisons;
- Remote access to digital images;
- Access to the electronic health record of the patient, and therefore follow-up the patient's

progress;

- Continuous education for the professionals in the penitentiary centre.

In terms of expected aims/results, considerable cost-savings have been achieved since the prisoners transport from jail to hospital or to a specialist needs significant security measures and procedural administrative paths. For each case, the telemedicine service saves thousands of euros (around € 32,000 for 118 cases). There are savings in police staff and on the “waiting patient list”. The health professionals feel much supported, and the quality of life of the prisoners is much better since this alternative speeds up contact with a [medical] specialist.

The main beneficiaries are said to be the patient; healthcare professionals; and society at large (such as public health, Ministry of Health or Social Affairs, and the Healthcare Board).

### **5.5.2 Targeted population of the service and the number of patients using it**

The population targeted by this particular service was “other”: persons in prison. It was intended for persons in jail with no freedom for movement, and with any health problem demanding preventive treatment or even subacute treatment for unexpected disease events.

The number of patients who received this service on a monthly basis was ten to 20. The estimated size of the targeted population nationally lies between zero (0) and 10,000.

### **5.5.3 Category of telemedicine service and the relationship between the key actors in the service**

This telemedicine service is categorised as a therapy service. The general relationship involved is between primary care and secondary care.

### **5.5.4 Set-up that was being replaced**

A face-to-face visit was modified to a remote visit, making the secure transport of prisoners unnecessary. The old healthcare service provision was immensely more time-consuming because of the bureaucracy needed and because of the high security measures to be present. Additionally, many times when the prisoner arrived at the specialised centre, not all the necessary tests had been previously done.

The service was superior in two aspects:

- in response time (for planned visits)
- in the quality of diagnosis, offered by the reference centre (which is mostly a hospital) to the health professional in the penitentiary centre.

### **5.5.5 Outcomes and results expected after introduction**

The main expectations were of the cost savings (mentioned earlier).

### **5.5.6 Telemedicine service in more detail**

Two penitentiary centres were connected to a single hospital as reference centres. For clinical sessions, all three stakeholders could be connected.

The main technology used was Polycom Video Conference. The hardware was connected with a multipoint control unit (MCU). The central infrastructure belongs to the Central Unit of the government for ICT infrastructures (CTTI).

### **5.5.7 Current operational status of the service**

This service is **not operational** and is not part of a mainstream service.

The service was discontinued after the service began to be implemented. It was discontinued at the phase of mainstream service delivery (“daily production”). The overall reason was governmental change, and a breakdown in the collaboration among Ministries: the Ministry of Health, Ministry of Justice, and of Ministry of Governance (Administration).

## 6. References

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