# Output 4.1: Situation analysis, process description, and state-of-art of tele-consultation solutions in the 7 pilot sites and in the BSR

Output No. 4.1

Produced by WP4 members

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# Situation analysis, process description, and state-of-art of tele-consultation solutions in the 7 pilot sites and in the BSR

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# 1. Content





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Programme 2007-2013

## 2. List of Figures



## 3. List of Tables



## 4. List of Abbreviations

| | |
|---|---|
| BelMAPO | Belarusian Medical Academy of Post-Graduate Education |
| BSR | Baltic Sea Region |
| DST | Distance-spanning technology |
| EUR | Euro |
| GP | General practitioner |
| HC | Health Systems |
| NHC | National Health Systems |
| PHC | Primary health care |
| TC | Tele-consultation |
| TM | Tele-medicine |



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# 5. Abstract

The Baltic Sea Region (BSR) is confronted with an ageing population, which leads to a rising demand for primary health care (PHC) services. Moreover an increasing lack of health workers and medical doctors challenges the maintenance of PHC within the BSR. Above all the brain drain of health professionals is affecting particularly remote areas in the whole BSR. There is evidence that professional isolation is a leading cause for this brain drain.

The overall aim of PrimCareIT is to raise the attractiveness of remote primary health care for medical professionals by the means of tele-consultation and tele-mentoring. Thereby the project counteracts brain drain and professional isolation in sparsely populated areas for more equal access to primary health care in the BSR.

A better deployment of tele-consultation and tele-mentoring including social media has strong potential to reduce professional isolation and to provide opportunities for professional networking, continuing medical education and career development for younger and experienced doctors and health workers in remote areas.

This report contains the results from the Task 4.1: “Situation analysis, process description, and state-of-art of tele-consultation solutions in the 7 pilot sites and in the BSR” concerning “Counteracting brain drain and professional isolation of health professionals in remote primary health care through tele-consultation and tele-mentoring to strengthen social conditions in remote BSR“.

The report contains state of the art material on tele-consultation and related topics of interest for the task of PrimCareIT and especially WP4 and 5 for piloting. The analysis shows that technologies exist, cases exist and a need and context exist, but that implementation issues exist due to the fact that understanding of current, and future, healthcare situations is much up to what is desired, and not what can be done and supported. This is to some extent a political dialogue of countries to decide upon, and also a question on to what level interoperability of systems is desired.

The report also contains legal aspects and first draft of technology needs for piloting, together with draft plans for pilots. The review in WP3 and WP5 showed that the state of the art in the countries is still on different levels. There has been deployment of tele-consultation solutions for years in participating countries, and access to specialist competence have been a main driver in these cases.



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# 6. Introduction

## 6.1. PrimCareIT

The increasing lack of medical professionals, such as health workers and medical doctors, challenges the maintenance of primary health care (PHC) in all Baltic Sea regions. Demographic change and ageing population lead to a rising demand for PHC services with a higher morbidity and more chronic diseases.

In addition the brain drain of health professionals is affecting particularly remote areas in the BSR challenging the maintenance of rural primary care. There is evidence that professional isolation is a leading cause for brain drain among other factors such as remuneration and living conditions (UN, WHO). Such brain drain of health professionals is currently affecting remote primary care in the whole BSR.

A better deployment of tele-consultation and tele-mentoring between health professionals within the primary care and with relevant hospital specialist can reduce professional isolation, provide opportunities for professional networking and continuing education thereby attracting more medical professionals to remote areas (UN).

PrimCareIT is part of the flagship project ImPrim and ICT for Health. While ImPrim mainly focuses on financial incentives to attract health professionals to the PHC, PrimCareIT complements this approach by elaborating on opportunities of tele-consultation and tele-mentoring.

The overall aim of PrimCareIT is to raise the attractiveness of remote primary health care for medical professionals by the means of tele-consultation and tele-mentoring. Thereby the project counteracts brain drain and professional isolation in sparsely populated areas for more equal access to primary health care in the Baltic Sea Region.

The PrimCareIT objectives are

- To assess the regional needs and strategic opportunities of tele-consultation and tele-mentoring to avoid professional isolation of health professionals in remote primary care
- To assess current barriers for large scale deployment of tele-consultations and tele-mentoring in the BSR such as technology acceptance, investment decisions, work flows, legal uncertainties
- To implement and validate transnationally developed tele-consultation solutions in remote primary care in pilot sites
- To implement tele-mentoring as innovative solution for career development of younger health professionals in remote primary care
- To prepare the durability and large scale implementation of the piloted solutions in the partner regions

The objectives of the project form the structure of the Work Package (WP) framework and are



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represented by the diagram below:

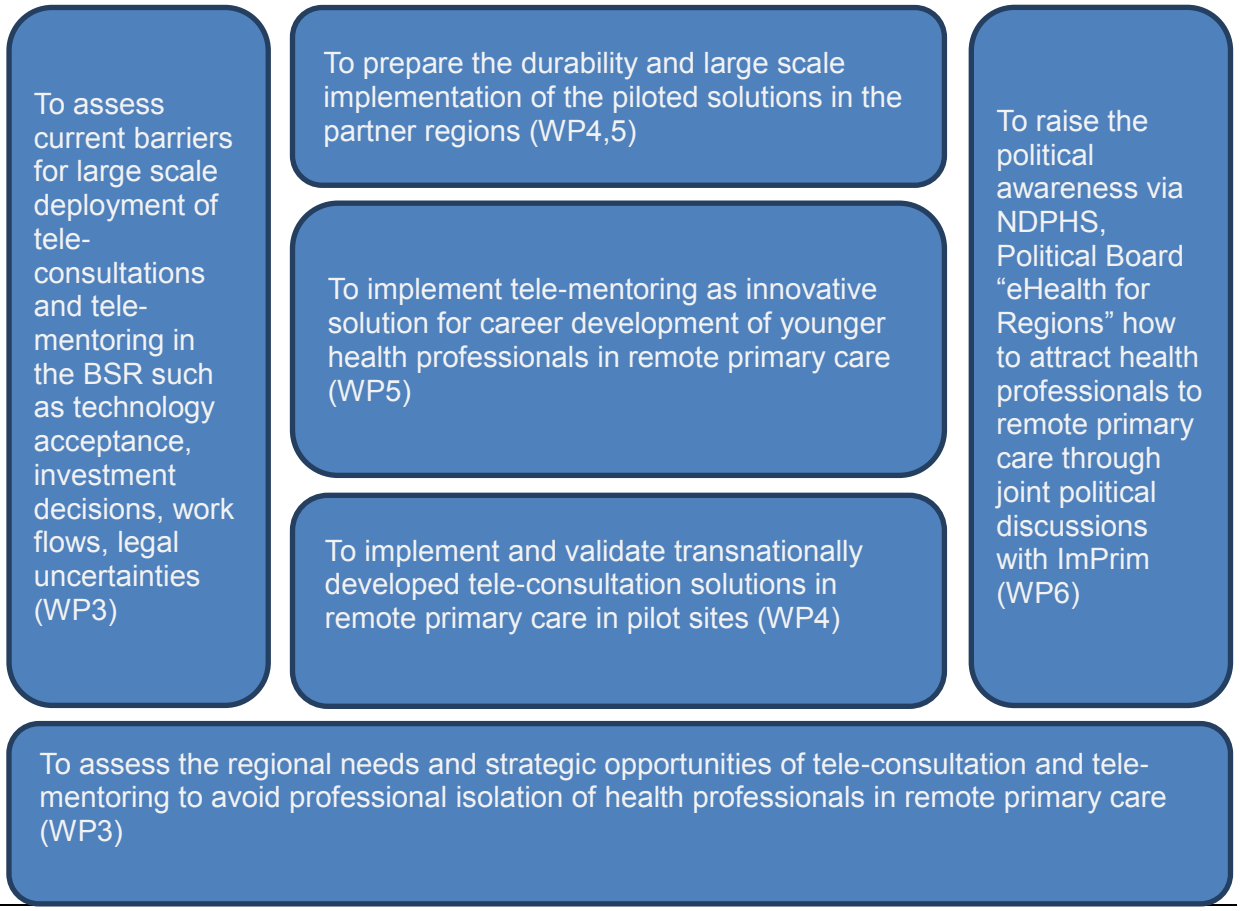


*Figure 1: Work package structure of PrimCareIT (Source: WP3 Literature Review)*

The project base and the background layer for all other activities are the assessment of the regional needs and strategic opportunities of tele-consultation and tele-mentoring to avoid professional isolation and health professionals in remote primary care. To asses these needs the



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background of the current situation in countries, participating in the project should be identified. The findings will lead to the generalization of overall situation regarding deployment of tele-consultations and tele-mentoring in the partner regions and also will lead to the definition of specific ways of the counteraction of professional isolation and brain drain in regional remote primary care.

## 6.2. WP4 context and background

In WP4 the aim is:

- To implement successfully methods and tools for tele-consultation in 7 pilot sites in remote areas of 5 different countries within the Baltic Sea Region
- To validate the transnationally developed tele-consultation solutions in remote primary care in pilot sites
- To prepare the durability and large scale implementation of the piloted solutions in the partner regions

Sub-objectives are:

- To enhance the connection of health professionals within primary health care and the cooperation with the secondary health care sector.
- To enhance the use of ICT for collaboration of health professionals within primary health care and the cooperation with the secondary health care sector
- To improve the professional cooperation and quality in remote primary care.
- To counteract professional isolation through tele-consultation.

This WP will explore how to overcome professional isolation in the primary health care (PHC) sector in remote areas. This will be achieved by elaborating, implementing and testing methods and tools that support tele-consultation.

### 6.2.1. Introduction to WP4 tele-consultation baseline

Tele-consultation accounts for a substantial part of tele-medicine. It can be generally defined as a (audio-) visual communication link between health professionals. Tele-consultation enables the virtual communication between doctors of different disciplines or with specialists in other health care institutions like hospitals.

As more and more other health professionals in PHC (for example specialized nurses and physiotherapists) have their own consultations and the request for inter-professional collaboration, there is a need for technical and methodological support for communication and consultations between all health professionals in PHC

Tele-consultation is carried out in different ways. There are two broad categories: live tele-consultations via video- and audio recordings and data tele-consultations. Video- and audio recordings can be uni- or bi-directional, in real-time or not. The information can be transmitted via e-mails, the World Wide Web and through other internet applications. Data tele-consultations



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involve the information regarding the patient's medical condition, for example laboratory findings, which is forwarded to a consulting physician for second opinion.
The use of social media has increased rapidly in healthcare during the last decade.

Physicians, patients, and healthcare organisations are all starting to employ a new generation of online and mobile technologies, which are fundamentally changing the way healthcare works. Social media, for example, can be used by healthcare providers to give general advice, provide information, and to facilitate interaction between patients and physicians or nurses. Social media also represent an untapped means for social networking among medical professionals. For example, social networks can be used to reduce the isolation of remote primary care physicians or to improve the means for addressing support to tele-consultation is also considered in the demonstration pilots as a possible solution component.

Especially in remote areas tele-consultation can take place between health workers and general practitioners (GPs) as well as between GPs and medical specialists at hospitals. During a home visit by a health care worker, for example, the patient information on vital signs, pictures of ulcers or recordings of the patient's behaviour after suffering a stroke can be send via mobile phone directly to the GP, who can give further instructions to the health care worker. Thus, the patient does not have to travel to the GP. According to this example, tele-consultations will also facilitate the shift of medical tasks from hospitals to GPs and from GPs to health workers. Consequently, specialists are taken to the primary health care sector by tele-consulting. Therefore, tele-consultations ensure continuous care. Moreover, hospital visits will be reduced.

Technologies for tele-consultation are available off-the-shelf. However, there are several obstacles and problems that prevent the implementation and routine use of tele-consultation. A survey of the project participating Baltic Sea countries on challenges for implementation of tele-consultation in remote primary care showed that a reserved attitude of health workers and GPs towards eHealth and tele-consultation inhibit its use. Until now, tele-consultations are not part of daily working routines of GPs and health workers. There are no processes implemented, on which level a tele-consultation should take place. Furthermore, a missing reimbursement scheme of tele-consultation between institutions of primary and secondary health care makes an implementation and use of tele-consultation difficult.

For tele-consultation the national frameworks concerning the health care system, existing connections between health care provides as well as data protection and legal security have to be taken into account. Legal uncertainties regarding tele-consultations and documentation of health data should be clarified. The applications should be feasible and manageable.
Still, tele-consultation is proven to be one instrument to counteract professional isolation of GPs. It allows them to directly communicate with a colleague to discuss clinical pictures, diagnosis and treatment of their patients. Therefore, tele-consultation is also a tool for continuing education.

Furthermore, tele-consultation leads to better cost-effectiveness, cost savings, access to specialised medical knowledge and to more attractive jobs for medical professionals in remote



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PrimCareIT addresses the aforementioned problems and will solve them in consideration of the national and regional distinctions. Seven pilot sites in five different countries within the Baltic Sea Region – Finland, Sweden, Lithuania, Estonia, and Republic of Belarus – will elaborate, implement and test tele-consultation within this project.

In most of the participating pilot regions (Sweden, Finland, Estonia), a secure environment for eHealth applications in primary health care is already established. In Estonia, for example, tele-consultation should be made through secure environment of the electronic health record (EHR) system. But even though the infrastructure is at hand, eHealth for consultation has not yet been introduced in remote primary care. All implementing project partners are facing resistance in the use of eHealth applications such as tele-consultations. These obstacles and barriers should be overcome by PrimCareIT.

The use of tele-consultation in remote areas is a new promising field of improving primary health care. The tele-consultations should take place both within regions and across borders to meet the transnational aspect. Regarding WP4 of the flagship project ImPrim, which develops measures to enhance and harmonize professional development in primary health care, this work package should establish tele-consultation as the aforementioned tool for collaboration and support in remote primary care and improve the cooperation between health professionals within the primary health care sector, for example between nurse and GP, as well as with the secondary health care sector.

A transnational workshop after the pilot project is completed will evaluate its results. The findings will be taken into account in WP 6. A handbook with good practices and guidelines for the successful implementation and usage of tele-consultation will be published.

## 6.3. WP4 task descriptions

### 6.3.1. Task 4.1: Transnational assignment to prepare and plan the pilot project at 7 pilot sites

The implementing partners will prepare the pilot in their regions.

**Situation analysis:** analysis of the country specific working models within remote primary health, e.g. communication and division of work between GP and nurse

- Literature study on best practices in tele-consultation
- Needs assessment in the pilot regions, e.g. what kind of technology and methods, for example webcam, is still needed
- Process assessment on how to implement tele-consultation in the daily work routine
- Assessment of legal aspects of tele-consultation



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### 6.3.2. Task 4.2: Pilot projects on implementing tele-consultation

Based on task 4.1 the pilot on tele-consultation in the 7 pilot sites starts.

- Set-up of the pilot
- Equip at least ten doctor's offices in remote primary health for tele-consultation. According to regional/national health policy, nurses will also be equipped if performing home visits.
- Equip the corresponding medical specialists
- Carry out tele-consultations between GP-nurse, GP-resident medical specialist, GP-medical specialist in hospital

**Output 4.2:** Implementation plan of tele-consultation pilots

### 6.3.3. Task 4.3: Mid-term evaluation of the pilot projects

After the pilot has been running for six months, a mid-term evaluation will be carried out. If necessary, adjustments in the implementation will be made.
The pilot will continue throughout the mid-term evaluation period.

**Output 4.3:** Mid-term evaluation report in tele-consultation implementation including necessary adjustments

### 6.3.4. Task 4.4: Complete pilot project on tele-consultation

After 15 months the pilot on tele-consultation will be completed.
At the end of the pilot phase sustainable networks between primary and secondary health care providers in the pilot regions will be established.

**Output 4.4:** Report on fully implemented tele-consultation infrastructure und running processes in the pilot sites

### 6.3.5. Task 4.5: Transnational workshop on the lessons learned from piloting tele-consultation

Based on the results of Task 4.4 there will be a transnational workshop on the lessons learned from piloting tele-consultation in remote primary health.
The findings of this work package as well as the conclusions of the transnational workshop will be published in a handbook with good practices and guidelines.

**Output 4.5:** Publication of handbook with good practices and guidelines for tele-consultation.



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# 7. Methods

This analysis and state-of-art of tele-consultation has been written from the viewpoint of understanding where the frontiers are and then for the next step coordinate within PrimCareIT in order to further plan and deploy pilots within WP4 (and WP5).

Literature searches have been performed with different contexts using academic search engines and methods.

The participants of WP4 have been asked to use templates for state-of-art/practice[1] (PrimCareIT-WP4-Template-StateOfArtPractice.docx), and for situation analysis and purchase needs[2] in order to collect data for further analysis.

[1] WP4 State of practice template on PrimCareIT project portal.
[2] WP4 Sitation analysis template on PrimCareIT project portal.



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# 8. Literature study on state-of-art of tele-consultation solutions

Literature searches have been performed on 4 aspects, where search 1 is the “obvious” search for tele-consultation, and aspects 2-4 have been listed with their search-words also out of clarity reasons since these searches are a little bit more complex (Aspect 2: Attitudes towards learning and knowledge sharing. Aspect 3: Professional identity of rural doctors and their isolation. Aspect 4: Current use of web 2.0 tools and knowledge management tools).

## 8.1. Context

Before going deeper into the tele-consultation area as such it is important to note that with technology also comes change. It is not only to introduce technology to existing practice; it is also to understand how a practice can change with new technology and processes. This also means that, maybe, also the view on the definition of the GP might change (Olesen et al. 2000 [1]) where some main pointers on the new definition of general practice are:

- It is time to create a new definition of general practice based on the ideal content of the specialty
- Any new definition should describe the core content and function of general practice and should supplement the description of the medical discipline
- It should also be universal, not country specific
- It should provide a framework for teaching and training and describe where to find evidence to support science based work
- A new proposed definition fulfills these criteria, emphasizing the need for general practitioners to be able to take a biomedical, psychological, and social approach to patients and their problems

The proposal for a new definition of general practice is:

> *“The general practitioner is a specialist trained to work in the front line of a healthcare system and to take the initial steps to provide care for any health problem(s) that patients may have. The general practitioner takes care of individuals in a society, irrespective of the patient's type of disease or other personal and social characteristics, and organises the resources available in the healthcare system to the best advantage of the patients. The general practitioner engages with autonomous individuals across the fields of prevention, diagnosis, cure, care, and palliation, using and integrating the sciences of biomedicine, medical psychology, and medical sociology.”*

National Health Systems (NHS) are facing the challenge of providing better quality health care (HC) and, at the same time, keeping costs at a minimum. Primary care has a relevant role in the current health services. General Practitioners (GPs) are responsible for the primary evaluation of patients' health status; in particular for the initial steps needed to provide care for any health



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problem [1] and to supply access to preventive tests and secondary care [2].

The importance of primary care is mainly due to three reasons:

1. GPs contribute to the appropriateness of care, defined as the outcome of a decision-making process that should maximise individual health benefits in view of the available resources [3], with special reference to the growing burden of the elderly and chronically-ill patients [4].
2. Primary care is crucial in the frame of containing costs [5], providing more efficacious actions thus preventing unnecessary hospital accesses, improving timeliness of care and reducing waiting lists [6].
3. GPs have to ensure the best possible access for those patients needing care [1] also providing appropriate care for those who live in remote rural areas and who might have logistic barriers to access secondary care [7], such as distances, transportation costs and a consequent lack of timeliness of care [8]. In fact, accessibility to health care systems (HCS) is a major problem in rural areas [9], with consequent higher disease and mortality rate, which, in turn, can also cause rural to urban migration [10].

## 8.2. Aspect 1 – Tele-consultation

Nowadays, new organizational strategies should be identified to improve primary care and its link with secondary care in terms of efficacy and timeliness of interventions [11]. Telemedicine (TM), defined as the use of electronic information communication technologies (ICT) to support HC at distance [12], represents an outstanding solution for improving access in remote areas, currently well accepted by both health professionals [13] and citizens [14]. The most helpful application of TM in primary care is the possibility to provide specialist consultation, usually known as tele-consultation, to the GPs [15,16]. Tele-consultation for GPs has been demonstrated to be feasible [17,18,19] and effective [20,21,22,23], to potentially reduce costs [24,25,26], to provide organisational benefits [27,28] and to improve patients' satisfaction [29]. However, there are few data about the comprehensive assessment of tele-consultation services that might include different aspects [30] and provide complete information about their impact.

Already from the middle ‘90s the growth of telemedicine and tele-consultation was seen as a potential way to provide cost-effectively and value adding Health Care services [31]. After 17 years, it can be concluded that the prevision has revealed correct. However, already by that time literature was highlighting challenges that the sector is facing nowadays on the issue. Research into safety, cost-effectiveness, efficacy, and satisfaction was claimed to be required, something that is still relevant.

A systematic review of telemedicine assessments by Hailey et al. 2002 [32] based on searches of electronic databases between identified 66 scientifically credible studies that included comparison with a non-telemedicine alternative and that reported administrative changes, patient outcomes, or results of economic assessment. Thirty-seven of the studies (56%) suggested that telemedicine had advantages over the alternative approach, 24 (36%) also drew attention to some negative aspects or were unclear whether telemedicine had advantages and five (8%) found that the



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alternative approach had advantages over telemedicine. The most convincing evidence on the efficacy and effectiveness of telemedicine was given by some of the studies on teleradiology (especially neurosurgical applications), telemental health, transmission of echocardiographic images, teledermatology, home telecare and on some medical tele-consultations. However, even in these applications, most of the available literature referred only to pilot projects and to short-term outcomes. Few papers considered the long-term or routine use of telemedicine. Similar study was also performed by Roine et al. 2001 [33].

Zhang et al. [34] developed (2000) a cost-effective tele-consultation system in a clinical DICOM PACS environment for collaborative healthcare application. This system provides data authoring and synchronizes image display and manipulation on both the general physician/radiologist and the expert site during consultation through remote cursors. The system relies both on standardized technologies, such as DICOM and TCP/IP network protocols, and on innovative techniques such as advanced message routing concept for re- mote control functionality.

Looking at the problem of Home telehealth, Koch [35] provides a detailed state of the art of the field, concluding that trends are moving towards not only providing tools and services not only for professional but also for citizens and patients as well. However, their impact on the patient—provider relationship and their design for special user groups, such as elderly and/or disabled needs to be further explored. In general, evaluation studies are rare and further research is critical to determine the impacts and benefits, and limitations, of potential solutions and to overcome a number of hinders and restrictions.

Roine et al. [36] surveyed more than 1000 articles with the aim to understand the effectiveness of Telemedicine. The main result was that at the time (the reference is dated 2001) the cost-efficiency of Telemedicine was found yet to be proved. So, the authors claimed for more business cases in order to provide an understanding of the area for decision makers in the public and private sector.

The progressive acceptance and efficiency of a tele-consultation service demands to solve many challenges. Looking at the problem of interoperability, Chronaky et al. [37] that the service should be robust end resilient. Terminology and communication standards, together with web technologies and XML, provide an elegant solution to interoperability problems and facilitate continuity of care.

Medicial diagnosis where results are shared (images, analysis) in coordination with tele-consultation sessions is frequent, and the TeleDICOM case (Gckowski et al. 2011 [38] and Cala et al. 2008 [39]) is such a scenario where stakeholders are joining in a TC session,



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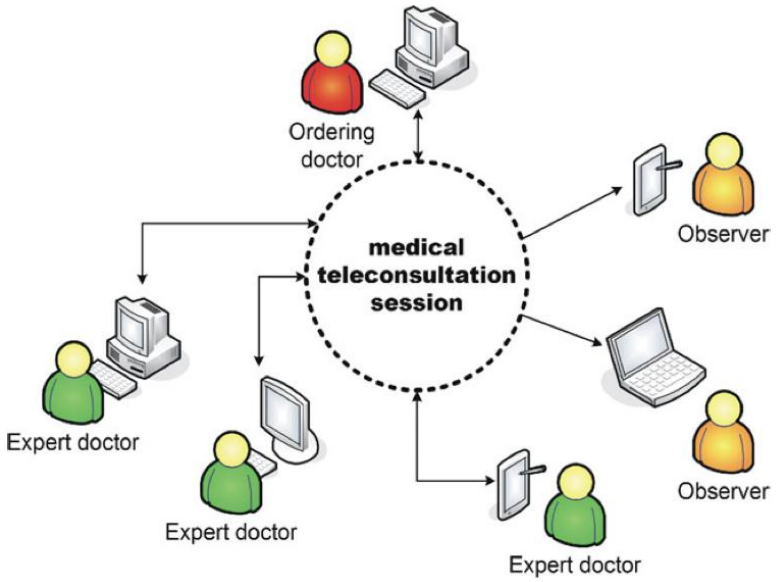


*Figure 2. Logical TC view of TeleDICOM [38]*

Looking at the costs of a Tele-consultation system, Lamminen et al. [40] analyze a case study in Finland to prove that Tele-communication can be cost-efficient in a relatively small health center, and that the main benefits and saving consist of reduce transportation cost and reduced paperwork, as well as time saving by the patient. The reference provide a good cost model where cost of equipment, maintenance costs, cost of specialist, cost of GP, telecom cost, and cost of paperwork is bundled into a total cost model, see Figure 3.

$$F_1 = I + M + (S + G + C + P_v)\, n$$

*Figure 3. Total cost model for TC [40].*

Sachpazidis et al. [41] provide a good case of tele-consultations in rural areas of Brazil and Colombia. First experiences showed the satisfaction of the medical users with the provided services but also the difficulties to establish sustainable telehealth centres that provide services on a regular base with a reimbursement of costs. The authors however highlight the need to consider the cost-effectiveness of such tele-consultation network, comparing it with all the costs of patient transference for central hospitals and the improvement and of healthcare in the target regions. The “South America case” is further described in [42][43].

In [9] 80 pathology cases were sent independently to each of two telepathology servers. Cases were submitted from the Department of Pathology at the University of Kerman in Iran (40 cases) and from the Institute of Pathology in Berlin, Germany (40 cases). The telepathology servers were located in Berlin (the UICC server) and Basel in Switzerland (the iPATH server). A scoring system was developed to quantify the differences between the diagnoses of the referring pathologist and the remote expert. Preparation of the cases, as well as the submission of images, took



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considerably longer from Kerman than from Berlin; this was independent of the server system. The Kerman delay was mainly associated with a slower transmission rate and longer image preparation. The diagnostic gap between referrers' and experts' diagnoses was greater with the iPATH system, but not significantly so. The experts' response time was considerably shorter for the iPATH system. The results showed that telepathology is feasible for requesting pathologists working in a developing country or in an industrialized country. The key factor in the quality of the service is the work of the experts: they should be selected according to their diagnostic expertise, and their commitment to the provision of telepathology services is critical.

In the TELEMACO[3] project a larger study on tele-consultation services for GPs took part where the aim is at supporting small rural communities in mountain valleys and preventing the current rural to urban migration as a result of socioeconomic and infrastructural problems. Another aim of the project is to overcome the difficulties in accessing secondary care in rural areas. In Italy, admissions to Emergency Departments (EDs) and in-hospital visits are often unnecessary and could be avoided. This would result in waiting lists reduction. Particular attention has been also paid to the promotion networks involving governments, local HC providers, specialized hospitals, small and rural hospitals and GPs in a multidisciplinary and cooperative context. The project has been structured in four different programmes:

1. Tele-consultation for GPs;
2. Tele-monitoring for patients with chronic heart failure (CHF) or chronic obstructive pulmonary disease (COPD) after hospital discharge;
3. Tele-consultation on digital images between rural hospitals and specialized hospitals for traumatic brain injury and stroke;
4. Cardiology emergency involving the use of TM in ambulances.

Further data on setup, objectives, methods etc. to be found in Zanaboni et al. 2009 [44]. Some 957 tele-consultations where carried out, according to Table 1.

*Table 1. Characteristics of the tele-consultations [44]*

| Specialty | Number of TC | Duration of TC |
|---|---|---|
| Cardiac | 927 | 5.4 ± 3.7 minutes |
| Dermatological | 18 | 9.5 ± 3.7 minutes |
| Diabetic | 12 | 9.2 ± 4.4 minutes |
| **Total TC** | **957** | **5.4 ± 3.7 minutes** |

In the TELEMACO project 48 GPs, practicing in small mountain communities eventually participated with an average rate of 20 tele-consultations per user. As published in a previous paper [19], tendency to form associations and attitude to utilise ICT were reported by GPs who

[3] http://www.telemaco.regione.lombardia.it/



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used the service. Conversely, no statistically significant difference between users and non-users GPs was evidenced in terms of number of patients, post-graduate study and areas. In addition, 24 out of the 48 GPs who used tele-consulation had already acquired knowledge on the system by participating to previous projects: this experience probably led to a better and larger use of tele-medicine solutions. Some 812 patients participated. Geographically, tele-consultations took place in 30 small rural communities, with an average population of 3,723 inhabitants. The average distance between the communities and the nearest HC provider, either a local outpatient clinic or a hospital, where patients could receive visits and examinations, was 7.5 ± 6.2 km, corresponding to 12.2 ± 8.2 min of one-way travel. Additionally, the average distance between the communities and the nearest hospital with an ED was 12.5 ± 9.3 km, corresponding to 17.6 ± 10.2 min of one-way travel. Since this optimistic scenario is based on the hypothesis of access to the nearest clinics and does not take into account common unexpected events (e.g. traffic), real distances and travel times are underestimated.

Regarding acceptance (Table 2) the analysis was that TCs did well for the aspects studied.
*Table 2. Acceptance of the Tele-consultations by GPs in TELEMACO project [44].*

| *Questions (scores)* | *1* | *2* | *3* | *4* | *5* | *Total* |
|---|---|---|---|---|---|---|
| Contact with SC | 0.0% | 0.0% | 0.0% | 17.1% | 82.9% | 4.8 |
| Clinical Website | 4.8% | 28.6% | 19.0% | 38.1% | 9.5% | 3.2 |
| Equipment for Data Transmission | 0.0% | 0.0% | 4.9% | 65.8% | 29.3% | 3.7 |
| Quality of Consultations | 0.0% | 5.0% | 27.5% | 60.0% | 7.5% | 4.7 |
| Clarity of Suggestions | 0.0% | 2.4% | 0.0% | 22.0% | 76.6% | 4.2 |
| Duration of TC | 0.0% | 0.0% | 80.5% | 12.2% | 7.3% | 3.3 |
| Adherence to Suggestions | 0.0% | 0.0% | 9.8% | 39.0% | 51.2% | 4.4 |
| Impact on Solving Problems | 0.0% | 2.4% | 12.2% | 63.4% | 22.0% | 4.0 |
| Training Utility | 0.0% | 2.5% | 15.0% | 65.0% | 17.5% | 4.0 |
| **Overall Quality** | **0.0%** | **0.0%** | **4.9%** | **56.1%** | **39.0%** | **4.3** |

Score: 1 = low; 5 = high; SC indicates Service Centre; TC, Teleconsultations

This study also looked at organisational impacts and by asking GPs of preferences for continuing to use TC and this is concluded in Table 3.



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*Table 3. Perceived Utility of the tele-consultation, TC.*

| | Perceived Utility | | |
|---|---|---|---|
| **Specialty** | **Usefulness** | **Reasons for Usefulness** | **Reasons for Uselessness** |
| **Cardiology** | 95% | reduction of waiting lists, ease use, timeliness of TC, management of emergencies and unnecessary actions, specialists' skills and expertise | problems for acute events that require immediate hospitalisation |
| **Dermatology** | 64% | transportation, waiting lists, avoid unnecessary visits, functional and accurate consultations even though more complex than cardiac TC | too much time for technical-operative problems, difficult clinical evaluation, face-to-face visits often preferred |
| **Diabetology** | 71% | handiness and timeliness of care especially for infrequent emergencies and complicated situations, optimisation of therapy | low tendency of requesting diabetic consultations, face-to-face visits often preferred |

Finally, looking at economics, this study showed that tele-consultations avoided 600 physical visits and 122 admissions to emergency departments. This led to savings equalling up to the investments in technology and changed practices. On the patient side, considerable costs where saved in time and travel. Once systems and rationalisation routines are in place savings are foreseen, even if quality in service is main objective.

There is an aspect of growing concern in the tele-consultation field; many case stories and prototypes, while less operational environments. This “pilot phenomena” (despite the large number of telemedicine projects to date [45] and the positive outcomes of evaluation studies [46]) applications often still fail to survive beyond the pilot phase) is often credited barriers to telemedicine diffusion and include among others reimbursement, liability and organizational issues. It is recognized that user acceptance of telemedicine technologies is essential as well [47,48]. This is also illustrated by the growing number of studies of this topic [49]. The lack of acceptance may be intensified by the technology-driven approach to many telemedicine projects, as described in Esser et al. 2009 [50].

### 8.2.1. Discussion on aspect 1/4 – Tele-consultation

Tele-consultation has proved to be effective in different domains, with an increase in the appropriateness of primary care and integration with secondary care, in line with previous studies. Timeliness of care appears to be a key ingredient. The economic analysis, which often include direct costs and savings related to in-clinic visits, diagnostic examinations and tele-consultations (including investments and training) show economic balance, something that is likely to shift to even more benefits due to cheaper and more available “off-the-shelf” technology. Real economic benefits can hence be considered to be higher.

Most studies deploy tele-consultation as complementary service where access to specialist competence in rural areas is a key ingredient. Benefits deriving from geographical access could be higher in countries characterized by a greater physical distance between primary and secondary care.

Some barriers also exists from the actual organization of the general practice. For future use of the



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service in routine clinical practice in regional and NHS care settings, issues concerning trust in the specialist, duration and workload of tele-consultations [27] have to be taken into account. Tele-consultation also poses social and politic implications. These services are meant as TM-based networks that involve governments, HC providers, GPs and also private SCs in a multidisciplinary and cooperative context, hence coordination efforts are needed.

## 8.3. Aspect 2 - Attitudes towards learning and knowledge sharing

A literature review was performed using google scholar, ISI web of knowledge and scopus using the search terms listed below. After the initial search snowballing was performed – who the articles cited and who cited them – to find more relevant sources.



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| Database | Search query | No of results |
|---|---|---|
| google scholar | allintitle: "social learning" "health care" | 9 |
| google scholar | allintitle: "social learning" "health workers" | 0 |
| google scholar | allintitle: "social learning" "nurses" | 3 |
| google scholar | allintitle: "social learning" "doctors" | 2 |
| scopus | TITLE-ABS-KEY("social learning" "primary health care") | 11 |
| ISI | Topic=("social learning") AND Topic=("primary health care") | 2 |
| ISI | Topic=("social learning") AND Topic=(health care) AND Topic=(barriers) | 5 |
| scopus | TITLE-ABS-KEY("social learning" AND barriers AND health care) | 16 |
| google scholar | allintitle: "learning attitude" "health care" | 0 |
| google scholar | allintitle: "attitude of learning" "health care" | 0 |
| google scholar | allintitle: learning attitude "health care" | 1 |
| google scholar | allintitle: "knowledge sharing" attitude "health care" | 0 |
| google scholar | allintitle: "knowledge sharing" attitude doctors | 0 |
| google scholar | allintitle: "knowledge sharing" attitude | 16 |
| scopus | TITLE-ABS-KEY("learning attitude" "primary health care") | 1 |
| scopus | TITLE-ABS-KEY("knowledge sharing attitude" "primary health care") | 0 |
| scopus | TITLE-ABS-KEY("attitude towards learning" AND "primary health care") | 1 |
| scopus | TITLE-ABS-KEY("attitude towards learning" AND "health care") | 6 |
| scopus | TITLE-ABS-KEY("attitude towards knowledge sharing" AND "health care") | 0 |
| scopus | TITLE-ABS-KEY("attitude towards knowledge sharing" AND "primary health care") | 0 |
| scopus | TITLE-ABS-KEY("attitudes towards learning" AND doctors) | 7 |
| scopus | TITLE-ABS-KEY("attitudes towards knowledge sharing" AND doctors) | 0 |
| scopus | TITLE-ABS-KEY("knowledge sharing attitude" AND doctors) | 0 |
| scopus | TITLE-ABS-KEY("learning attitude" AND doctors) | 4 |
| ISI | "attitudes towards learnging OR "learning attitudes" OR "attitudes towards knowledge sharing" OR "knowledge sharing attitudes" AND doctors | 0 |
| ISI | "attitudes towards learnging OR "learning attitudes" OR "attitudes towards knowledge sharing" OR "knowledge sharing attitudes" AND health care | 0 |



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| | | |
|---|---|---|
| google scholar | allintitle: culture barrier learning "health care" | 0 |
| google scholar | allintitle: "organizational learning" "health care" | 22 |
| google scholar | allintitle:barriers "organizational learning" "health care" | 0 |
| google scholar | allintitle: "organizational learning" "primary health care" | 2 |
| google scholar | allintitle: "organizational learning" "doctors" | 0 |
| scopus | TITLE-ABS-KEY("organizationl learning" AND "primary health care") | 0 |
| scopus | TITLE-ABS-KEY("organisationl learning" AND "primary health care") | 0 |
| google scholar | allintitle: "organisational learning" "health care" | 3 |
| ISI | Topic=("organisational learning") AND Topic=(health care) AND Topic=(barriers) | 2 |
| scopus | TITLE-ABS-KEY("organizational learning" AND barriers AND "health care") | 11 |
| ISI | Topic=("communities of practice") AND Topic=("health care") | 47 |
| ISI | Topic=("communities of practice") AND Topic=("primary health care") | 1 |
| google scholar | allintitle: "communities of practice" "health care" | 13 |
| scopus | TITLE-ABS-KEY("communitites of practice" "primary health care") | 0 |
| scopus | TITLE-ABS-KEY("communitites of practice" "health care") | 0 |
| ISI | Topic=("communities of practice") AND Topic=(health care) AND Topic=(barriers) | 11 |
| scopus | TITLE-ABS-KEY("communities of practice" AND barriers AND health care) | 21 |
| scopus | TITLE-ABS-KEY("communities of practice" AND rural AND health) | 18 |

*Figure 4. Search queries for Google Scholar, Scopus and ISI for Aspect 2.*

At a first glance, it is already noticeable that there were surprisingly few results for the (in other disciplines) rather popular field of organization learning, social learning and communities of practice. Communities of practice (although in health care in general, not specifically primary health care) and organization learning produced the most results, while attitudes towards learning/knowledge sharing produced very few. The ones that it did produce in the learning/knowledge sharing category were mostly not applicable to the context of this project.

The search term social learning almost exclusively returned results that related to social learning amongst patients in relation to health care (e.g. Leonard 2005, [51]) or amongst medical students (e.g Pollard 2008 [52]), but not among staff within the health care unit or across health care units to professional groups such as doctors.

The organizational learning results focused mostly on learning within one organizational unit as a form of knowledge management, most prominently on learning from incidents and in relation to patient safety. For example, a scan of articles that cited Caroll and Edmonson (2002) [53] on google scholar shows that a vast majority of articles relates to incidents, undesired events, near-misses or patient safety[4]. While some focus on the general need for learning and development in health care (Bohmer and Edmondson 2001 [54], Franco and Almeida 2011 [55]), it seems to be

[4] http://scholar.google.com/scholar?cites=6548834091869909748&as_sdt=2005&sciodt=0,5&hl=en



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because of the pressure for quality improvement that organizational learning has gotten more traction (Nembhard 2008 [56], Nikula 1999 [57]).

Most articles discuss barriers to organizational learning in health care and how to address these. The barriers seem to be:

1. Lack of openness to learning from mistakes due to focus on perfection and expertise (Carroll and Edmonson 2002 [53], Bohmer and Edmondson 2001 [54], Aase and Lie 2008 [58], the hierarchy that develops based on expertise (Rushmer et al 2003 [59], Timpka and Hallberg 1996 [60], Kislov et al 2011 [61]) and legal structure (Carroll and Edmonson 2002 [53], Bohmer and Edmondson 2001 [54]). Overcoming this require psychological safety (Bohmer and Edmondson 2001 [54], Tucker et al 2006 [62])
2. A tradition of individual learning based on application of knowledge derived from science (Aase and Lie 2008 [58], Sheaff and Pilgrim 2006 [63], Carroll and Edmonson 2002 [53], Bohmer and Edmondson 2001 [54], Rushmer et al 2003 [59])
3. Formal learning mechanism often is time-consuming and there is a low degree of feedback. Standardization can actually inhibit organizational learning (Carroll and Edmondson 2001 [53])
4. Work pressure, efficiency demands, and scarce resources constrain learning in many hospitals (Aase and Lie 2008 [58]. Sheaff and Pilgrim 2006 [63])
5. Institutational leadership, encouragement, and supporting structure are needed to foster organizational learning (Asse and Lie 2008 [58], Franco and Almeida 2011 [55], Edge and Laiken 2002 [64], Bohmer and Edmondson 2001 [54])
6. Most learning currently occurs as informal one-on-one learning, based on spontaneity and necessity (Aase and Lie 2008 [58]). Often this is sharing of tacit knowledge rather than evidence-based research knowledge (Soubhi et al 2010 [65]).
7. Often the learning is not about a specific content, but about how to imbed the knowledge in the organization (Tucker, Nembhard and Edmonson 2006, Bohmer and Edmondson 2001 [54]). For example, evidence based best practices are often known, the question is how to imbed them in the day-to-day working

A larger body of literature discusses the communities of practice approach as an approach to learning in health care. Communities of practice are defined as groups of people held together by a common interest in a body of knowledge and driven by a desire and need to share problems, experiences, insights, hunches, and best practices. Such informal networks have a tremendous impact on worker cognition and behaviour (Wenger 1998 [66]). They are put forward as beneficial because they are designed to capture tacit knowledge and rely on informal knowledge sharing (Wenger 1998 [66], in health care Boateng 2011 [67], Bates and Robert 2002 [68]) and are therefore gaining popularity in health care as passive dissemination of information does not work by itself (Kendall et al 2010 [69])

The literature review revealed two systematic reviews - on the use of CoPs in the health care sector by Li et al (2009) [70] and one by Kothari et al (2011) [71] focusing on lessons the health



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care sector could learn from the business sector as regards to Knowledge Management and CoPs.

Li et al examined 13 studies from the health care sector based on literature from 1999-2005 and discovered that:

- The concept started to surface in the mid 1990s (in the health care sector), the actual terms began to surface in medical literature around 2002 (mostly in the UK and US)
- There has been a broad range of interpretations, but the term CoP was mostly used as a term for a group of health professionals who are working together
- CoP research in the health sector focused mainly on the exploration of how people shared information, created knowledge, and built a professional identity in a social setting.
- Despite it´s inception as an idea to improve knowledge sharing and therefore quality, there was no substantive empirical research that examined if CoP groups indeed improved the uptake of best practices in the health sector (i.e. causal description).

They also identified 4 fundamental characteristics of CoPs; namely active social interaction among members, knowledge sharing, knowledge creation, and identity building within the group, as for example evidenced by developing common languages. The importance and focus on identity building is also emphasized by Kislov et al (2011) [72].

The second systematic review by Kothari et al (2011) [71] found that:

- Current knowledge management practices in health care focus on ICT, but that these technologies do not support knowledge development and sharing. For the latter, CoPs, ICT based or not, have been used.
- Interests in KM has increased in the health care sector, catalyzed by an interest in organizational improvement the dominant evidence-based culture might be a deterrent for KM as it stresses research information, and as a consequence, devotes less attention to tacit knowledge (KM and CoPs both focus on this)
- To transfer to more KM-related practices it would be beneficial to identify non-hierarchical groups, such as a professional discipline, who might readily share best practices with each other.
- Experience from the business sector suggests that “one size fits all” or externally imposed programs do not work and do not lead to long-term sustainability.

Two studies in the literature focused on virtual or electronic CoPs.[2] Kendall et al (2010) [69] discuss electronic CoPs for incorporating health research into the practice of individual health practitioners. They discuss three benefits of eCoPs – dynamic and continuous learning environments with immediate access, access to current and archived discussions with peers and mentors and a common platform which supports unified and coordinated communication (with patients). Hanlis et al (2009) [73] add the ability of a diverse group to communicate and collaborate quickly across institutions and geographical locations.



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| | |
|---|---|
| Kendall et al (2010) propose 6 guidelines to enable a successful eCoP:<br><br>1. Voluntary involvement and self-organization<br>2. Problem focused<br>3. Distributed leadership, transparency, and public accountability.<br>4. Accessibility (accessible and user-friendly tools and technology)<br>5. Shared identity. The membership of a successful eCoP identifies not only with a particular problem, but also a general approach of working with each other to solve that problem. Also the absence of spatial and temporal boundaries makes building trust and shared identity in the eCoP a challenge, but a communication and collaborative strategy that engenders trust through building the community's accountability structures evolves as members work with each other and build incremental successes over time.<br>6. Sustainability. An eCoP, like any community, seeks sustainability. | Hanlis et al (2009) discuss the necessity of the following elements for a successful virtual community for health professionals:<br><br>1. A Community Coordinator or Moderator<br>2. Active Participants and Lurkers (people who watch from the sidelines)<br>3. Trust is especially important in vCoP – providing Opportunities for Socialization early on helps with this<br>4. Community Activity and Events, that "anchoring" the community<br>5. Inclusion of Face-to-Face Interaction<br>6. Clear Purpose or Goal of the Community<br>7. Credibility, e-g site needs to remain unbiased and transparent, potentially expert oversight<br>8. Ownership of Site (participants should at least own elements of the site)<br>9. Relevant educational Content<br>10. Truly supportive technology, which is easily usable and naturally supports the behaviors of the individuals, potentially a combination of tools<br>11. Leadership – formal leadership structures work better than letting them emerge<br>12. Institutional Commitment and Recognition and allowing time for members to participate |

*Figure 5. Successful deployment of eCoP's.*

Hanlis et al (2009) [73] also remind us that tacit knowledge can also be shared in online communities via metaphors, analogies, and stories of practice. Connor (2005) [74] shares insights from the early use of CoPs and emphasizes that really understanding the domain of practice (tapping into what people are truly passionate about) – not just in general, but specifically - is essential. Further, Bates and Robert (2002) [68 ]stress that learning communities and networks cannot be directed, only enabled, facilitated or supported, something that was already emphasized in the guidelines above. Finally Boateng (2011) [67] reminds us that though online communities can be costly to begin with, they may serve the interest of [some groups] better than physical communities of practice (Boateng 2011) [67].

### 8.3.1. Discussion on aspect 2/4

In respect to the project, these findings are interesting in many ways. They seem to imply that a network of primary-care physicians that are in the same situation and share the same identity might be a better solution than specific tele-consultation. The CoP is also appealing because it works with professional identity. Since professional isolation as described in the project as the main problem is potentially not just a function of lack of access to knowledge but a wider lack of network to form an identity and support with. CoPs have shown to address this issue. The CoP arrangement could also lead to more long-term sustainability of the arrangement because it creates relationship of mutual trust and acknowledgement, rather than a dependency relationship that a urban to rural tele-consulting arrangement might result in. A preliminary literature review into needs of rural physicians in relation to IT adoption, notes high cost and lack of time as a barrier



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(Davidson and Heslinga 2006 [75]) for this idea, which will have to be kept in mind in designing solutions.

## 8.4. Aspect 3 – Questions around professional identity of rural doctors and their isolation

The research has been conducted mainly using Google Scholar, and the research strings were mainly around the concepts of “professional identity”, “professional training of rural doctor”, “postgraduate rural medical education”. After the preliminary search, also the concept of “rural doctor retention” has shown relevancy.

Wilkinson et al. 2003 [76] focused on the impact of undergraduate and postgraduate rural training among some 2000 Australian doctors. The findings were that the more doctors are exposed to rural health problem the more is the likelihood to work in rural areas.

Azer et al. 2001 [77] studied the willingness of medical students in Australia to become rural doctor after finishing the studies or to take internships in a rural hospital. The main objective of the study was to identify correlations between the willingness and factors such as rural background (if the student came from a rural area, in Australia or overseas), gender and Citizenship. The study had also the objective to identify what were factors that influence the not-willingness to become a rural doctor. The study found a great correlation between rural background and willingness to work in a rural hospital, where instead gender and Citizenship did not show any great correlation. In other words, student with a rural background were more willing to be trained or to work as doctors in rural areas. The main barrier identified to instead the not–willingness was the greater adverse influence that the media had upon students.

Hays et al.2003 [78] re-interview rural doctor previously interviewed for another research 10 years before asking them what are the factors that made them willing to stay in their position for a long period, and what were the stressors of working in a rural area. The reasons for staying were: strong attachment to the community; and practice arrangements that allow for adequate time off-call and for holidays. The main stressors were: overwork and having to send children to boarding school.

Tolhurst 2008 [79] focuses on medical students and female practitioners in rural Australia and provides a model (“Landscape of fulfillment”) for understanding the complex interaction between the factors that affect a doctor’s location choice. The author also provided a good literature study of positive and negative aspects of being a rural doctor, see Table 4.



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*Table 4. Literature study from the reference Tolhurst 2008 [79]. Numbers in table reference the articles number system*

| | Positive aspects of rural practice | Negative aspects of rural practice |
|---|---|---|
| Professional issues | Variety of work[142, 191-193] | Excessive work load and on call work[85, 192, 193] |
| | Relationships with patients[85, 191] | Difficulty accessing locums[17, 192, 193] |
| | Professional autonomy[17] | Remuneration[159, 194] |
| | Financial issues[17] | Professional isolation[192, 193, 195] |
| | | Community expectations relating to availability as a doctor[193] |
| | | Lack of easily accessible CPD[17, 192, 193] |
| Personal issues | Rural lifestyle[142, 159, 191, 195] | Limited career opportunities for spouses/partners[142, 159] |
| | Rural community relationships[191, 195] | Limited educational opportunities for children[193, 195] |
| | Opportunities for family[142, 195] | Lack of anonymity[195] |
| | | Social isolation[193] |

The author concludes that place, professional and gender identity are key factors for female rural doctors. The author also suggests new recruitment and retention strategies in order to deal with the changing needs of rural doctors.

An interesting work about a doctor's professional identity, is made by Clandinin and Cave 2008 [80], which highlight the importance for a doctor of telling and retelling continuously the stories of who he or she is, his or her stories to live by; in order to develop a doctor identity.

In this direction, the development of the Internet Era has made easier this process of sharing success-stories by doctors living in rural area. One of these is RuralDoctoring[5], a blog created by Theresa Chan, a family physician graduated at Stanford and UCSF, working in rural Northern California.

John Launer 1996 [81] explores the advantages and advantages of social constructionism to

[5] http://www.ruraldoctoring.com



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correct some of the faults for which doctors are most criticized, i.e the inability for some doctors to listen alternative stories about illness and health. For the author, the doctor has to balance objective knowledge with dialectical approach, depending on the circumstances.

An important study made in one of the countries involved in the project, reveals that job satisfaction in the primary health care sector is relatively low (Buciuniene et al. 2005 [82]), and most Primary Health Doctors would not recommend their children to follow their profession. The authors concluded also that autonomy at work, social status and workload are the most important factor that influence the job satisfaction. Also in the specific case the rather low compensation has a big impact on the current dissatisfaction.

A national study in Japan focuses on understanding to what extend rural doctors are satisfied with their job and what factors might contribute for them to continue with the rural career (Matsumoto et al. 2004 [83]). The study proved strong concerns about their municipalities and manifest dissatisfaction with their relationship with their municipalities. The author suggests that priority has to be given to doctor-municipality relationship in order to assure satisfying workforce in rural areas.

Surveys conducted among doctors in South Africa (Kotzee and Couper 2006 [84]) reveal that improving their salary is the most important factor to retain doctors in rural areas. However, many doctors in the surveys stated that improving the salary would not retain doctors, and other factor, such as job satisfaction and working conditions are equally important. These factors are shown and ranked in Table 5.

*Table 5. Most important interventions to retain rural doctors according to the study [84] .*

| Theme | Interview | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Financial (salary and allowances) | B | | C | A | A | B | | A | A+ C | B |
| Accommodation | C | | | B | C | | C | C | B | C |
| Hospital environment / working conditions | C | | | | | | | B | | A |
| Career pathing | | A | | | | A | A | | | |
| Continuing medical education | | | | | B | | A | | | |
| Good hospital management | | | B | | | | C | | | |
| Recognition / appreciation / treated as an individual | | C | A | | | | | | | |
| Staff relationships | A | | | | | | | | | |
| Clinical support from seniors | | | | | | | B | | | |
| Family supported | | B | | | | | | | | |
| Leave | | C | | | | | | | | |
| Recreational facilities | | | | C | | | | | | |
| Quality of life | | | | | | C | | | | |

A, Most important; B, second most important; C third most important.

The same results are driven also by surveys conducted in India (Saini et al. 2012 [85] that investigate what impedes to work in rural areas.

A survey among rural doctors in the South Wales area reveals that current strategies and services to retain the workforce should address the following key-points (Alexander 1998 [86]):



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- As rural GPs value procedural work, any closure of local hospital beds, let alone local hospitals, would severely undermine any other positive efforts to retain local GPs.
- The strategies need to be coordinated effectively and offered as a package, rather than implemented in a piece- meal fashion.
- Such a coordinated delivery of services and programs must be the result of local discussions involving the affected key parties.
- Any such services and programs must be flexible and tailored to local need.

Studies conducted in the United States focuses on the problem of retention looking place integration (Cutchin 1997 [87]).

Some interesting findings from the Internet (even though without too much of a scientific evidence) about benefits of a doctor working in a rural area can be found in eHow[6]. One of the main benefits of such a doctor from a professional career is the possibility to work on a broader range of treatments, so having the possibility to learn more and having a larger experience.
Another study conducted in Japan on a large scale (Matsumoto et al. 2005 [88]) strengthen the thesis that rural background has strong relationship among medical students to work as a rural doctor after the studies. Other positive factors have been founded out in undergraduate exposure to rural practice, multidisciplinary postgraduate training, and membership of a medical school department.

And interesting attempt to provide rural postgraduate training in Canada is proposed by Rourke 1996 [89]. The interesting part of the program is that rural doctors provide the teaching, with some affiliation with medical schools or training programs. However, the authors highlight that it is difficult to provide a single educational program that suits all the consumers' needs. Probably will be preferable to run local educational programs and targeted to meet needs. Also many rural doctors have shown the problem of obtaining locums and the cost of obtaining such a cover.

A study in Canada, United States and Australia focuses on postgraduate education formal consumer's perspective Kelly and Murray 1994 [90]. The results are presented in Table 6.

*Table 6. Results from the study by Kelly and Murray 1994 [90].*

| Method | % of 1523 respondents expressing preference | | | | | % of non-respondents |
|---|---|---|---|---|---|---|
| | Least preferred | Not preferred | Equivocal | Preferred | Most preferred | |
| Lecture only | 7.4 | 13.5 | 27.4 | 25.1 | 21.6 | 4.9 |
| Small group work only | 7.7 | 13.1 | 26.0 | 31.3 | 15.7 | 6.2 |
| Practical work only | 6.6 | 12.9 | 31.5 | 28.5 | 10.4 | 10.1 |
| Lecture and/or small group work and/or practical work | 5.2 | 6.4 | 18.7 | 22.8 | 35.7 | 11.2 |
| Distance learning | 46.9 | 20.0 | 10.6 | 7.7 | 4.7 | 9.9 |
| Practice based learning | 24.4 | 23.6 | 23.6 | 13.5 | 4.5 | 10.4 |

[a]Respondents asked to indicate preferred method of learning by grading each item.

Surprisingly, the doctors were more familiar with the formal medical education rather than distance

[6] http://www.ehow.com/facts_4882076_benefits-rural-health-care.html



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learning or practice based learning. The authors also discuss the timing preferences for the meeting, with a preference for evening meetings and a fall for lunchtime meetings. Wednesday and Thursdays have been found better for educational meetings, since they were considered quieter days of the working week.

### 8.4.1. Discussions on Aspect 3/4

A first reflection that can be made is that literature provides a good overview of the reasons that contributes to the retention of rural doctors, but very little work has been done on how a doctor-doctor relationship can contribute to increase (or decrease) the willingness for a doctor to continue working in a rural area.

Looking at some of the references taken into consideration it does not seem that the problem lies on the willingness by the medical students from rural areas to “escape” towards the cities once the studies are completed. Yet, the problem lies to retain these doctors that are willing to work in rural areas.

The literature review supported our belief to have a look at the problem from a more holistic perspective. In fact, the professional identity of rural doctors is highly associated to factors out of the profession (i.e education for the children). So, probably a learning system between doctors should focus on other aspects around the professional’s sphere, going also outside of it.

The literature review around postgraduate training for rural practice has shown that such a system has to be tailored around the users’ (in this case, the rural doctors) needs. Rather than “imposing” a system, the education has to be provided according to the interests, time and preferences of the doctor. For instance, having a rural doctor as a teacher might be preferable rather than having an urban one. Also, time of the meetings and the possibility or not to obtain a locum has to be considered. Promote the affiliation of rural doctors to medical departments might increase the status of the doctor (i.e. the PhD degree has shown great value as status among medical doctors) and so the willingness to take part of learning programs and subsequently provide education as teacher.

By the literature has emerged also the interesting concept of a “local” education. In other words, the education might be provided according geographical location or according to the different subjects the different doctors might be interested in.

We believe that next steps in our project might be to have some interview with doctors working in rural areas in order to understand what these users’ needs might be, and in order to provide a possible scenario for postgraduate medical education for rural areas.

## 8.5. Aspect 4 – Current use of web 2.0 tools and knowledge management tools

According to Lavis et al. 2003 [91] five questions provide an organizing framework for a



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knowledge-transfer strategy:

- What should be transferred to decision makers (the message)?
- To whom should research knowledge be transferred (the target audience)?
- By whom should research knowledge be transferred (the messenger)?
- How should research knowledge be transferred (the knowledge-transfer processes and supporting communications infrastructure)?
- With what effect should research knowledge be transferred (evaluation)?

The details of these five aspects are different based on which is the target audience of the knowledge transfer. Lavis et al. [91], distinguish between four different kind of audience: general public/service recipients (e.g., citizens, patients, and clients), service providers (e.g., clinicians), managerial decision makers (e.g., managers in hospitals, community organizations, and private businesses), and policy decision makers. This literature review focuses on the knowledge transfer systems and tools currently used or experimented at a system provider level, i.e. analyzing how the knowledge is transferred between doctors, or, more generically, clinicians.

The literature suggests that passive processes are ineffective and that interactive engagement may be most effective, regardless of the audience [91]. Gabbay 2004 [92], stated that clinicians rarely access and use explicit evidence from research or other sources directly. They rely on "mindlines", defined as collectively reinforced, internalised, tacit guidelines. Those are built up by brief reading but mainly by their own and their colleagues' experience, their interactions with each other and with opinion leaders, patients, and pharmaceutical representatives, and other sources of largely tacit knowledge.

Mitton et al. 2007 [93] provides a wide literature review about knowledge transfer and exchange systems in health care, categorizing the main barriers and the main strategies currently adopted. They conclude that "*although knowledge transfer and exchange is not a new concept, it seems to be growing more important. Nonetheless, knowledge transfer and exchange as a field of research is still in its infancy. It is not hard to find opinion pieces and anecdotal reports about how to use KTE, but the limited reporting of KTE implementation and the even more limited formal evaluation of it leave those wanting to develop their own KTE efforts at a loss for evidence-based strategies*." [93].

Eight main strategies for knowledge transfer and exchange are identified [93]:

- Face-to-face exchange (consultation, regular meetings) between decision makers and researchers
- Education sessions for decision makers
- Networks and communities of practice
- Facilitated meetings between decision makers and researchers
- Interactive, multidisciplinary workshops
- Capacity building within health services and health delivery organizations



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- Web-based information, electronic communications
- Steering committees (to integrate views of local experts into design, conduct, and interpretation of research)

Each strategy owns pro and cons and several issues can arise in different contexts when dealing with knowledge transfer and exchange. Especially in public heath care sector the organizational structure is often hierarchical since it has evolved from traditional organizations, and while it provides for rigid control and coordination (Beveren 2003 [94]) on one side, it may generate several barriers to the implementation of new system and innovation on the other. From a study on an Australian regional health care organization Beveren [94] identifies a number of issues that appear in the health care organization subject of the study. Some of them can be generalized as follows:

- Health care organizations have often a complex hierarchical structure with many levels of management; in which most information flows upward, with processing and filtering occurring at each level.
- There could be a strong resistance to change at the individual and management levels of the organization that inhibits the adaptation or reaction to the environment.
- The divisional structures in the organizations are often based on professional groups and are not oriented around work areas. Individual professionals (surgeons, nurses, pharmacists etc.) are employed to perform their step in the process. There is minimal group problem solving and few informal networks – a rigid departmentalized organizational structure creates minimal formal and informal contact between professional groups.
- Rigid strategies and formal procedures are developed to streamline processes. “Clinical pathways” for patient management are provided uniform patient care at the lowest cost.

Government policy has a direct impact on the direction and focus for outcomes. The change in government policy causes confusion and disruption that often leads to a lag in the implementation of strategy to meet the new directions.

Before the birth of the web 2.0, the Internet has seen different application concerning knowledge management and transfer in the health care industry. Internet based tools such as CATmaker, aimed to help clinicians to produce short summaries of articles on clinically relevant topic (Jadad et al. 2000 [95]). The Internet has been used by governments and professional organizations to facilitate dissemination of and access to specialized evidence-based guidelines; for instance, the National Guideline Clearinghouse (www.guideline.com), is a database still in use, that gives access to evidence-based clinical practice guidelines and allows comparisons of recommendations produced by different organizations in North America. Literature evidence of the usefulness of web tools and application for health care was given by Lavis et al. [91] that suggested that “supporting infrastructure like Web sites and newsletters can augment interactive efforts, though not replace them, particularly if the material provides targeted information to clearly identified audiences and/or more general information in a searchable form when an intervention or event generates a demand for this information”.



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With the diffusion of the WEB 2.0 the opportunities of application of new tools for knowledge transfer in health science is radically increased. A big field of research has been opened to study the opportunities and the effect that of web 2.0 could bring to the field. Lupiáñez-Villanueva et al. 2009 [96], has identified three major trends of application of web 2.0 in health care related to:

- The opportunity of social interactions and the social scalability of the initiatives; Social Network Services illustrates different initiatives defined just for physicians[7], nurses[8] or patients[9]; other initiatives are based on a mix of profiles[10]. Furthermore the case of patient assessment of health care services [9] and patients posting sickness information onto a map[11] revealed the importance of the amount of users that could reach the expected benefits.
- The possibility of developing contents in multiple ways; for instance a number of application have been seen in education, where the use of the YouTube video for patient health education (BuilthSurgery's Videos) or the use of wikis[12] and blogs[13] for continuous medical education have had positive feedbacks.
- The new possibilities of access, control and assessment of the information. In this field Initiatives like 'Google Health', 'Microsoft HealthVault' and 'HealthSpace' revealed the interest of private companies and the Government to develop personal health records and health search engines.

Although much interest in generated in using web 2.0 technologies, the major applications focuses on the communication between doctors and patients, leaving the potentiality of enhancing doctor to doctor knowledge transfer unexploited. The research presented by Lupiáñez-Villanueva et al. [96] shows how clinicians use internet technologies on their daily work; the data (Figure 5) shows how only a limited percentage of the use is dedicated to promote the debate on the medical specialty.

[7] http://www.sermo.com
[8] http://www.nurseconnect.com
[9] http://www.patientopinion.org.uk
[10] http://www.medhelp.org
[11] http://www.whoissick.org
[12] http://www.radiologywiki.org
[13] http://clinicalcases.org



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| What are the main reasons to be on the Internet? | Physicians (%) | Nurses (%) | Pharmacists (%) |
|---|---|---|---|
| Share information with citizens | 15.4 | 10.7 | 46.7 |
| Share information with my friends and relatives | 12.5 | 21.4 | 38.0 |
| Spread my own scientific papers to the scientific community | 11.1 | 9.3 | 9.2 |
| Promote debate on my own medical speciality | 6.8 | 7.6 | 7.4 |
| Share information with my patients | 5.5 | 2.9 | 18.8 |

*Figure 6. Reason selected by health care professional to be on Internet. (from Lupianez-Villanueva et al 2009 [96])*

Meanwhile doctors are seeking new methods of information discovery because of the limitations of search engines Guistini 2006 [97]. Blogs have been one of the first social software tools used for this scope. Blogs are dynamic and permit bloggers to write articles and engage in "one to many" conversations with readers [97]. Blogs such a Clinical Case and Images [13] (clinicalcase.org contains a rich collection of "presurfed" material for busy clinicians and features interactivity and timely discussion). Blogs may make available on a daily basis the headlines of the major newspapers filtered by relevance, moreover a free photo sharing tool is oftern linked to grant access to relevant images and pictures.

Busy but organized doctors need a variety of evidence sent to them in a single organized interface [97], this can be grant by the use of RSS feeds, providing a synthesis of continuous updates on the status of selected topic discussed, in different blogs or websites. Additionally in order to build an "health care encyclopedia" Ganfyd[14] promotes the concept of a "Medical Wikipedia" edited by doctors but available also to external users, thus using a bottom up and co-creative approach for building medical knowledge.

### 8.5.1. Discussion on Aspect 4/4

The literature study reveals that, given the novelty of web 2.0 applications, relatively few attention has been paid on its application to enhance knowledge sharing and transfer between doctors. Although this field seems to generate increasing interest, given the fact that a lot of doctor decisions are driven by the so called "mindlines", tacit guidelines that the doctor develop through the interaction with colleagues, patients, and medical representatives. These interactions need to be granted also to those doctors that are operating in remote area and with low connections and links with other specialists. Therefore web 2.0 technology can play a relevant role in reducing the gap given by the physical distance, allowing an easier knowledge transfer between doctors located in big metropolitan areas and doctor located in remote villages. However to structure an effective communication system, the needs and the requirements from different groups of doctors need to be studied in detail, so to provide an architecture that synergically generates value for all the participants, being at the same time easy to use and learn by those doctors not familiar with internet 2.0 technologies.

[14] http://www.ganfyd.com



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# 9. Tele-consultation, regional views

This has been a redundant task between WP3 (overall context) and WP5 (tele-mentoring), hence we refer to these reports to avoid replicating material that is not unique, i.e. contextual material from partners.

# 10. Legal aspects

From the very start of modern telemedicine legal aspects have been a major issue and concern. This is still the case. Telemedical services have developed and are being used within an increasing number of medical fields. The use of telemedicine have brought organizational changes and new ways of communicating both between health care personnel and between patients and health care providers. The patients themselves are taking a new role towards the health care system, acting more as consumers than passive health care receivers. And on the technological field, the growth of the Internet and its use for health care advice and treatment, is giving new legislative challenges.

As with conventional healthcare, confidentiality, consent and non-maleficence are basic principles in telemedicine. Brahams 1995 [98] warned that unforeseen medical and legal issues could arise from increased but inefficient or ineffective use of telemedicine.

Brahams outlined three core issues:

- Responsibilities and potential liabilities of healthcare professionals;
- Duty to maintain confidentiality and privacy of patients' records;
- Jurisdictional problems associated with cross-border consultations.

Randell et al 1998 [99] discussed the ethical principle of beneficence to justify using technologies to increase access to care and reduce costs. They argued that an efficient service meant a better service in terms of quality of care, mainly by increasing accessibility by minimizing traditional barriers created by time and location. However, only people with the resources to gain access benefit. Control of data remains in the health organisation's jurisdiction. This is an advantage when coordinating a multiprofessional team as data can be readily dispersed. There are potential ambiguities in practitioners' responsibilities, in terms of loyalty to patients or the employer. For example, if staffs do not have physical/live contact with patients so are not aware of their holistic needs; this could cause them to focus on investigating the health problem rather than establishing a rapport. Staff could therefore become more committed to their employer than to patients.

Confidentiality may be problematic in telemedicine. Since patients trust practitioners with personal information, it is reasonable for the onus to fall on professionals to protect the confidentiality of that data. Layman 2003 [100], Bates et al 2001 [101] and Briggs 2001 [102] used the concept of non-



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maleficence to emphasize professional responsibility, since the legal aspect of confidentiality focuses on the relationships between individuals involved in delivering care rather than on systems used.
While security of technology is vital in safeguarding patients and care standards, individual practitioners should bear ultimate responsibility for protecting patients from emotional, spiritual, social or material harm.

The British Medical Association 2005 [103] provided three principles to guide practice:

- Patients' right to privacy regarding medical details and records;
- Patients' privacy should be maintained unless waived in a meaningful way;
- Disclosure of information should be related to the prevailing medical condition to fulfil the immediate and specific purpose of treatment.

Telemedicine relies on transmitting data. This means secure networks and data transmissions are critical to confidentiality and privacy.

These considerations led to a debate between the NHS Information Management Group and the BMA on access to the NHS network (NHSnet). The approach adopted is a code of connection, which sets out minimum conditions that organizations must meet if they wish to gain access to NHSnet (Asadi and Akhlaghi, 2002 [104]). The most obvious way of reducing the risk of unauthorized access to computer data across the internet is to control traffic across the interface between the NHS local area network and the external internet. Technology offers some safeguards in firewalls and encryption protocols. However, firewalls require regular and frequent updating and are effective only against traffic that goes through them. In addition, neither firewalls nor encryption can stop people who misappropriate medical records for malicious reasons and/or economic gain. The legal issue is not whether electronic systems can provide airtight security, but whether they can protect privacy as well as or better than paper systems. Warner 1998 [105] said that agencies delivering care would need to ensure rigorous ways of protecting patients' electronic records.

Patient privacy during telehealth consultations should be maintained as much as possible, although it is understandable that privacy might be limited when such technology is used (Mair and Whitten, 2000 [106]). Healthcare professionals should ask patients if they have any questions that might require more privacy than provided. It is important to explain to patients that privacy and confidentiality cannot be guaranteed in telemedicine, as medical records can be shared with other practitioners involved in their care. The nature of the professional-patient relationship changes dramatically, as telemedicine challenges traditional concepts of privacy and confidentiality (Telemedicine Association of Oregon, 2004 [107]).

Also the cross-border aspects are taken into account besides the direct PHC legal issues, by Callens et al. 2008 [108].



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# 11. Process assessment, pilots and needs

This section contains descriptions of the drafts of the piloting activities including scenarios, processes and equipment lists from partners.

## 11.1. Planning

To collect initial data for drafts of pilots, a template was created to collect this in the form of scenario descriptions, context and needs of technology[15] based on the idea of Scenario Based Design (Rosson et al.2002 [109]), as seen in example in Table 7. This material is then used for iteration into Task 4.2 (see section 6.3.2) of the project.

*Table 7. Example descriptions for pilots*

| | |
|---|---|
| Name | Name of the pilot |
| Scenario | Scenario context of the pilot, scenario example below<br>Yiannis (85) is a retired farmer suffering from mild cognitive impairment. He lives in a remote village of Trikala prefecture in Greece. His sense of orientation has recently deteriorated in such a level that he moves only in the perimeter of his own garden. He lives together with his 77 years old wife Maria who is his devoted carer. Their children, Dimitra and Spyros, live in Athens and Cologne with their families. Since they are very worried about their parents they have recently convinced them to seek assistance from the municipality's telecare centre, a non for profit organisation offering specialised services to all inhabitants of the area.<br>Maria is a housewife who spent her entire life in the village and whose health is very good. She found herself in the unpleasant situation where her spouse is totally dependent on her while his behaviour can be really difficult to cope with. She usually feels tired and disillusioned and quite close to desperation as she feels left out and completely isolated.<br>Maria woke at 6:30am today and, as every working day, she prepares breakfast for her and her husband Yiannis. She is doing the household and waits until Yiannis wakes up. Yiannis didn't sleep well last night, he had nightmares and Maria tried to calm him down.<br>At around 8:00am, Yiannis wakes up and seems very well. He eats his breakfast and then he watches his favourite TV show. Maria goes into the garden to do some work. When she returns into the house she is not able to find her husband. Although she is searching for him in the entire house she cannot find him. She's getting very worried about him and starts searching also outside the house. Two hours later, Yiannis |

[15] WP4 Situation analysis template from PrimCareIt project portal.



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| | |
|---|---|
| | returns home saying that he was at work. Maria reminds him that he is retired but Yiannis doesn't agree with her.<br>Maria is really worried about Yiannis and so she decides to call Kostas, the service operator at the municipality telecare centre, in order to ask for a transfer of Yiannis to a nursing home. She really feels that she can no longer ensure Yiannis safety and wellbeing. Kostas tries to calm Maria down and records the appropriate information to the integrated electronic health record. Eleni, the psychologist working at the telecare centre, looks on her computer and sees the alert message from Kostas. She enters the medical folder and has immediate access to specific fields. She checks on the data already entered and calls Maria to check the situation. Eleni persuades Maria to go into video counselling three times per week for a period of one month before she makes a final decision about her husband. Maria agrees.<br>Dimos, the technical personnel of the telecare centre, receives an alert in his personal computer that informs him to go to Yannis and Maria's house to install all appropriate equipment for the video counselling. Dimos visits the house in order to make the adequate equipment installations. George, the physician, accompanies Dimos in order to check the general health status of Yiannis and Maria. After the visit Dimos and George fill in the corresponding fields in the EHR and an automated alert is sent to the psychologist.<br>The following Thursday Eleni starts a video call with Maria. The two have a very good and encouraging conversation and Eleni boosts Maria's psychological situation by saying that she can manage the situation and that Eleni is going to help her. When the call is finished Eleni enters the integrated EHR and fills in the corresponding fields with the adequate information. After a few sessions Maria is much more confident about the way that she will cope with the caring for her husband. It soon becomes evident that there are qualitative changes in the everyday life of the couple. |
| Solution idea | Describe ideas on solution, try avoid brands but sticking to conceptual functional solution. Smart tablet, video conferencing, web based documentation |
| Partners | Whom to participate. BTH – Ronneby PHC |
| Responsible | Contact person of pilot. Ewy Olander, BTH |
| Timing | When in time. M8-M12 |



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## 11.2. Pilot 1 – Tele-consultation Blekinge Wound Care Center

Tele-consultation between Blekinge Wound Center and primary care actors (Municipality and County Councils)

### 11.2.1. Purpose

The purpose with the pilot is to explore /find out/test best arrangements, structures, equipment, etc for Wound centers tele-support and consultations that also could support collaborative learning, improvement of professionally and counteract professional isolation and brain drain.

The aim with the new tele-support is that health personnel with responsibility for patients with wound have knowledge, understanding and skills for high quality of professional and secure investigation, treatment and caring.

### 11.2.2. Scenario

*Table 8. Scenario description pilot Wound Center*

| | |
|---|---|
| Scenario | Consultation between Wound-center (a specialist-driven primary health unit) and health personnel at Primary health care centers and home health care |
| Solution idea | • Video conferencing with web camera for consultation with and without patient<br>• Other forms for collaborative learning based on ICT and web 2.0 applications for professionals with discussion forum for synchrone and asynchrone communication<br>• Web based documentation<br>• Other forms of collaborative learning based on ICT and web 2.0 applications. |
| Evaluation | • Formative<br>• Process of video consultations, use of forums and collaborative learning, results, impact, outcomes: knowledge, skills, considerations, decisions, usability, quality, benefits |
| Partners | • Blekinge county council wound center, PHC–centers in Blekinge county council, Home care, Elderly care in municipality |
| Responsible | Katarina Sulasalmi (Ewy Olander Ruth Öien) |
| Timing | September 2012 - december 2012 |



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### 11.2.3. Situation analysis

- The county council of Blekinge Wound center
- In PHC and Home care not so many patients with wounds in each PHC-area and municipality that health personnel can get insight and experiences, and to continuous get updated to have a high quality in wound investigation, assessment and treatment.
- Need for specialized support and guiding from experienced and professional personal.
- Tele-consultation and collaborative learning and documentation of questions and discussions could increase possibility to increase conditions for wound assessment, treatment and health promoting and preventive patient care with high quality and safety and to counteract brain drain and professional isolation.

### 11.2.4. Context situation

- Today's Wound Center activities: The Woundcenter is placed at Lyckeby Health Center in Kalrskrona and Brunngården Health Center in Karlshamn and is for patiens in the whole County. We in the Wound Center are specialists to treat slow-healing wounds.
- The Wound Group: The wound group has been established since the middle 80's as a forum for experience- and knowledge exchange between personal and treated patients with slow-healing wounds in the County. In the wound group doctors and nurses are involved with special interests for active slow healing. The members cover both primary care,
- Wound treatment is provided within the respective Health Centers and Home Care with the support of the Wound Center. The patient goes to the Wound Center to assess the treatment etcetera and is directed thereafter to the respective Health Centers or Home Care.
- Documentation of questions, problems, news is not collected or documented in one single place.
- There is no local forum for Care of patients with wounds to have access to
- Rikssår is a national web-database for info about WoundCare[16]

### 11.2.5. Relevance

- Increase health personnel's knowledge, understanding and skills in rural areas and for personnel with responsibility for patients with wound.
- Increase treatment quality, safety, professional medical investigation and treatment, caring and patient education
- Health economic gains from a a national health care perspective as well s well a local county council aspect, and from an individual patient perspective.

[16] http://www.rikssar.se/node/26



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## 11.2.6. Technical needs

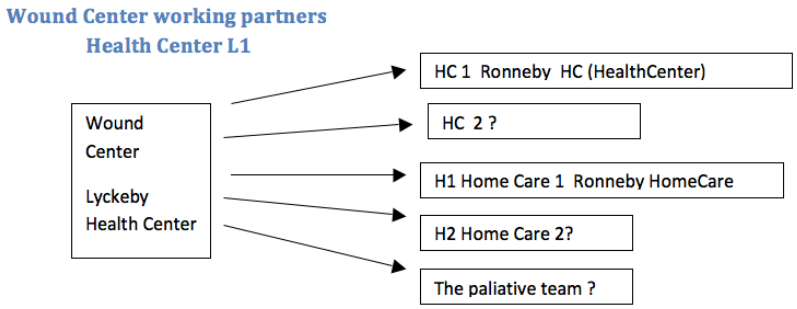


*Figure 7. Implementation pilot Wound Center.*

Given the implementation scheme there is a need for smartphones, and tablets with network (3/4G, and/or WiFi) together with videoconferencing software. Also video cameras for research recordings.



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## 11.3. Pilot 2 – BelMAPO - Professional support of GPs from remote

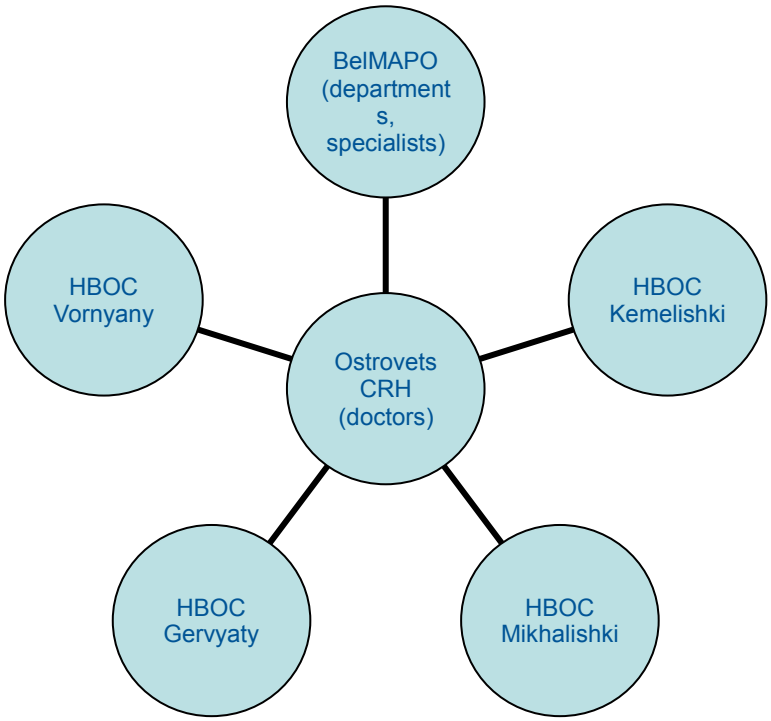
Professional support of doctors (general practitioners) from remote areas using tele-consultations.

### 11.3.1. Purpose

Supporting GPs from remote areas via tele-consultations.

### 11.3.2. Scenario

*Table 9. Scenario description for BelMAPO pilot.*

| Name | Professional support of doctors (general practitioners) from remote areas using tele-consultations. |
|---|---|
| Scenario |  <br>When facing a problem (establishing or confirming a diagnosis or discussing the treatment schedule) the doctors from Ostrovets CRH or general practitioners from hospital-based outpatient clinics (HBOC) can refer to the specialists from General Practice Department and Public Health and Health Care Department of BelMAPO for a tele-consultation. The final decision is made by the doctor. |



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| | |
|---|---|
| Solution idea | Video conferencing, web based documentation |
| Partners | BelMAPO - Ostrovets Central Regional Hospital |
| Responsible | BelMAPO (Irina Moroz, Nikolay Gvozd)<br>Ostrovets CRH (Uladzimir Mazheika) |
| Timing | The timing depends the approval of the project by the Government of the Republic of Belarus and the initiation of the project financing. |

### 11.3.3. Situation analysis

In Belarus, healthcare system informatization is carried out within the state programmes on the following directions:

- information systems automatization in the healthcare organizations, which makes it possible to keep medical records in electronic documents;
- inclusion of the healthcare organizations in E-mail and Internet network in order to provide electronic documents circulation and data exchange;
- organization of the common information area of the Belarusian healthcare system based on the corporative information exchange network;
- provision with medical (discharge forms, records, history, analysis data, etc.), regulatory, organizational and executive documentation based on the common network in electronic form using the electronic signature;
- tele-medical technologies improvement;
- public health care and epidemic welfare monitoring systems development;
- formation of public electronic medical resources.

The following projects in the sphere of tele-medical technologies were introduced into practice in Belarus:

1. Automated republican tele-medical system of unified electronic consultations, which covers 10 republican, regional and district healthcare organizations in Minsk, Mogilev and Gomel regions.
2. Republican tele-medical consultation system in the most injured Chernobyl areas of Brest, Gomel and Mogilev regions. Tele-medical system covers 11 district (CDH), 9 regional and 10 republican (RSPC) healthcare organizations.

This system makes it possible for district and regional healthcare organizations to use distant consultations based on X-ray, ultrasound and cytological examinations and diagnosing the patients. The technology of distant ECG consultation has also been developed.



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There are several constantly working tele-medical systems:

- Consultation network on the thyroid nodules pathologies (the recipient is the RSPC of Radiation Medicine and Human Ecology (RSRC of RMHE) in Gomel, the consulting organization is the Republican Centre for Thyroid Cancer (RCTC).
- Photofluorographic consultation network on the basis of TB dispensaries №№ 1 and 2 and Minsk polyclinic № 27.

The implementation of tele-consultation into the various spheres of life including healthcare has been activated recently. There is also quiet a good experience in carrying out the distant education via tele-systems.

State Educational Establishment «Belarusian Medical Academy of Post-Graduate Education» (BelMAPO) is a unique educational and scientific center that has been successfully realizing extended advanced training and retraining, certification of doctors, medical teachers, scientists and healthcare professionals in Belarus.
Directions of the activity:
providing advanced training and retraining for doctors;

- training of PhD and clinical residency fellows;
- carrying out scientific research in different fields of medicine, biology, economics and healthcare management;
- treatment-and-consultation and treatment-and-diagnosis work.

### 11.3.4. Context situation

BelMAPO has significant scientific and pedagogic human resources. There are 2 Academicians and 3 Correspondent Members of the National Academy of Sciences of the Republic of Belarus, more than 80 Doctors of Medicine and 250 PhDs, Honored Masters of Sciences and Laureates of State Prizes.

BelMAPO has the special permission (license) of the Ministry of Education of the Republic of Belarus to carry out the educational activity and the license of Ministry of Health of the Republic of Belarus to carry out the medical activity.

BelMAPO provides training on 76 medical specialties at 4 faculties:

- pediatrics
- surgery
- therapy
- public health and healthcare management.

Every year, more than 18 000 doctors and medical teachers from Belarusian and foreign medical educational establishments take advanced courses on 51 departments of the Academy.



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The web-site of BelMAPO provides the information about the courses and educational programs, scientific, medical and consultation activities. The electronic database called “Personnel” for the registration of medical professionals attending advanced and retraining courses has been operating since 2007. Nowadays, it contains the information about 48 346 specialists (with higher and secondary medical education) employed in the system of the Ministry of Health of the Republic of Belarus.

### 11.3.5. Relevance

The pilot is relevant fort he rural aspects of tele-consultation in the project. BelMAPO carries out medical and consultation activities on the bases of 16 republican healthcare establishments (Republican Scientific and Practical Centers and republican hospitals); 6 Minsk region and 32 Minsk-city healthcare establishments. Besides, the specialists of BelMAPO carry out consultations of the doctors from regional and district healthcare establishments of the republic (distant areas).

### 11.3.6. Technical needs

The IT Centre of BelMAPO deals with technical and software issues of the educational process, provides technical support of scientific and practical conferences.

BelMAPO is experienced in conducting tele-consultations and tele-conferences. Wider implementation and dissemination of tele-consultations and tele-conferences into medical practice is holding back by the lack of technical resources. With the equipment we have now the Academy is not able to provide specialists from the distant areas with the high quality tele-consultations, it requires upgrading.

To realize WP4 tasks of the PrimCareIT we have defined the following participating parties (Scheme 1):

- BelMAPO (departments and specialists),
- Ostrovets Central Regional Hospital (70 doctors in 21 specialties)
- 4 hospital-based outpatient clinics affiliated to Ostrovets CRH

To carry out valuable tele-consultations of specialists in distant areas we are in need of the following equipment:

*Table 10. Purchasing needs BelMAPO pilot.*

| | Name | Quantity |
|---|---|---|
| Main room and three distant rooms: | | |
| | | |
| 1. | PC (GA-G41MT / INTEL Pentium E5700 3,0ГГЦ / COOLER / DDR3 4Gb 1333MHz / CD-DVD-RW / HD 1000Gb / GF440-1Gb / InWin ATX 450W / KBD USB / MS USB) | 10 |



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Baltic Sea Region
Programme 2007-2013

| | | |
|---|---|---|
| 2. | Display 22" | 10 |
| 3. | Power supply (APC Back-UPS CS 650VA, 230V) | 10 |
| 4. | Multi-functional unit (HP LaserJet Pro M1217nfw MFP ) | 1 |
| 5. | Headset | 10 |
| 6. | Web и IP cameras | 15 |
| 7. | Windows 7 Ult | 10 |
| 8. | Office Pro 2010 Russian | 10 |
| 9. | Laptop 15,6 | 1 |
| 10. | Local network (switch, modem, Wi-Fi, cable) for 11 PCs + 4 rooms | 1 |
| 11. | Projector (with a screen) or LCD (cable VGA) | 4 |
| 12. | Videoconference equipment for the main room (video terminal: codec+camera+mic.) with a multiconnection (up to 4 points) | 1 |
| 13. | Videoconference equipment for the distant point (video terminal: codec+camera+mic.) without multiconnection (up to 1 point) | 3 |
| 14. | Communication channels, high-speed Internet (receiving/sending 15/7,5 Mbit/sec) | 4 |

## 11.4. Pilot 3 – KPHCD - Central hospital to home care units

### 11.4.1. Purpose

Our Health and Social services are all under the same administration. Secondary care is provided by the Central Hospital in Seinäjoki.

We have 6 Health Centers in 6 different locations, 4 hospital nursing units (2 acute, 1 rehab and 1 respite) in 3 locations. Our permanent staff is 802 + 200 temporary.
Additionally we have 6 care units for chronically ill and 6 home care units for home care

We have 3 trained mentor-doctors and 4 nursing mentors, 15 consulting doctors, 7 nurse specialists.

### 11.4.2. Scenario

To be further elaborated.

### 11.4.3. Situation analysis

Our Health and Social services are all under the same administration. Secondary care is provided by the Central Hospital in Seinäjoki.

We have 6 Health Centers in 6 different locations, 4 hospital nursing units (2 acute, 1 rehab and 1 respite) in 3 locations. Our permanent staff is 802 + 200 temporary.
Additionally we have 6 care units for chronically ill and 6 home care units for home care

We have 3 trained mentor-doctors and 4 nursing mentors, 15 consulting doctors, 7 nurse specialists.

We need consulting and mentoring between all these units and their staff. It is somewhat difficult to separate the equipment list for different pilots when in the reality we are using the same equipment for both pilots in WP4 and WP5. It is possible to arrange pilots in different locations as well. We have a certain need for equipment but final costs shall determine the amount we can afford. We calculated that listed total amount is possible to obtain.

### 11.4.4. Context situation

To be further elaborated.

### 11.4.5. Relevance

To be further elaborated.

### 11.4.6. Technical needs

Pilot focus:



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Teleconsultation and telementoring between units in different locations and professional staff

1. Group videoconferencing (consulting, Mentoring) between
   a) our 6 Health Centers (802 staff)
   b) group videoconferencing between other institutions

2. Individual videoconferencing (consulting, mentoring) between single/multiple users
   a) Our own doctors, nurses and other professionals
   b) Between professionals in other institutions (Uni, hospital, national institutions)

Equipment list:

1. 6 teleconferencing units with stands for meeting rooms
   (alternative if money not enough: 2 teleconferencing units and 4 PCs +tv + web-camera, mic and speakers)
   Distribution: WP4: 4, WP5: 2
2. 40 web-cameras, 40 microphone-loudspeaker units (ecco-free) for individual PCs
   Distribution: WP4: 25, WP5: 15
3. teleconferencing licence-bridge (may be part of the teleconferencing equipment rental fare).
4. licence for 40 PC-PC-conferencing
5. 3 laptop-units including web-camera, mic, loudspeakers
   Distribution: WP4: 2, WP5: 1

Present:

1. fixed network 100 Mb/s between units and professionals
2. hired server
3. those 40 PCs

Present network system

1. can rent us teleconferencing equipment and virtual room services/teleconferencing license.
2. can rent teleconferencing licenses for PC-PC conferencing (Cisco Movi)



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## 11.5. Pilot 4 – VCC - Psychogeriatric in distant rural area

### 11.5.1. Purpose

To be further elaborated.

### 11.5.2. Scenario

To be further elaborated.

### 11.5.3. Situation analysis

The VCC pilot project for implementation of telemedicine will be in the form of a process of implementing specialist distance consultations in psychogeriatric in distant rural area. This will start with an analysis and data collections to be able to answer questions such as a check of and documentation of present local knowledge, administrative including budget and medical visions, preparing the different roles in the process and also include plan to follow and evaluate the implementation process. Important is to find sponsors that are active enough and will to actively support the processes. IN next step this information will be analyses and visions moved to more detailed plans for Information, education and service specifications (especially technical equipments). Plans information and educational activities will be planned in details. After this two steps the pilot will start and reviewed in relations to the previous planning. A rough time estimated is that the pilot will be actually running before the end of this year. Thus, during beginning of next year, there will be a possibility to analyses the pilot implementation phase and do a relevant report to the PrimCareIT project.

### 11.5.4. Context situation

To be further elaborated.

### 11.5.5. Relevance

To be further elaborated.

### 11.5.6. Technical needs

To be further elaborated.



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## 11.6. Pilot 5 – Lithuania – VUHSK and LUHS

### 11.6.1. Purpose

To be further elaborated.

### 11.6.2. Scenario

To be further elaborated.

### 11.6.3. Situation analysis

- Vilnius University Hospital Santariskiu Klinikos and
- Lithuanian University of Health Sciences

Its core is creating the shortest possible pathway of professional competence development for a family physician of virtual educational space. The most significant elements are optimal form and amount of knowledge transferred in proper modules by the consultant as well as family physician activity connected with it. The criteria of an effective tele-consultation system are the rapid response time, medical image quality and communication manner. With the advance of the communication technology, such as the Gigabit Ethernet, highspeed WLAN (wireless LAN) and WiMAX (Worldwide Interoperability for Microwave Access), it provides seamless, reliable and fast transmission to meet the response time requirement. When a family physician needs consulting about the disease question, he or she can use the desktop computer or personal mobile computing devices to search the user on-line list with client interface and ask the remote expert for consulting. The family physician shares the retrieved medical image with the remote expert through the infrastructure network, and they can discuss like face-to-face way with web-camera and microphone.

### 11.6.4. Context situation

To be further elaborated.

### 11.6.5. Relevance

To be further elaborated.

### 11.6.6. Technical needs

Currently used technical tools (modern e-learning platform, e.g. Moodle, server system, databases, broadband Internet access) allow for using micro technology achievements as a new approach to design virtual education. The following mobile devices might be used: notebooks, palmtops (PDA), smart phones and mobile phones. Modern development of professional education should be taken into consideration in designing virtual courses for particular family physicians.
Almost all of the family physicians and specialists in the consultation clinics have use computers at their working place. All specialists in the Hospitals have good access to computers, as all of the Lithuanian physicians are obliged to use qualified electronic signature (PKI infrastructure) for sickness documents, as they are completely electronic in the country. Physicians are able to sign


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electronic documents using mobile phones and tablets using mobile signature that is provided by all three Lithuanian mobile operators. More than 60 health care institutions (80 different places) - VUH Santariskiu klinikos partners are able to use private medical network (based on VPN), PACS and Telemedicine infrastructure for images and ECG teleconsultation. VUH lecture rooms are equipped with H.323 enabled videoconferencing capabilities, some cardioechoscopy at regional machines are able to transmit live investigation to VUH specialists or colleagues. Some of the GP's workstation are able to use software solutions for videoconferences. All computer hardware is up to date, using Windows 7, or at least Windows XP OS. VUH has their own Moodle server for eLearning.

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## 11.7. Pilot 6 – Estonia Vormsi Health Centre

Terviseagentuur Ltd have 5 small healthcare units in rural areas in Estonia. One site is situated in small island Vormsi, with 200 inhabitants.

### 11.7.1. Purpose

To be further elaborated.

### 11.7.2. Scenario

To be further elaborated.

### 11.7.3. Situation analysis

Vormsi healthcare center is open 5 days a week 8 hours per day, and there are always one nurse. Family doctor is visiting island 1-2 times per week. In other days communication between nurse and doctor is organized by skype or telephone consultations. Doctor can access patient record remotely, and can renew prescriptions. There is also need to consult patients with specialist in the mainland (East-Tallinn Central Hospital).

Three different scenarios can be tested there:

- teleconsultation between nurse and family doctor
- teleconsultation between nurse and specialist in the hospital
- teleconsultation between nurse, doctor and specialist in the hospital

In all cases patient can be involved or not, depending of the situation.

### 11.7.4. Context situation

To be further elaborated.

### 11.7.5. Relevance

To be further elaborated.

### 11.7.6. Technical needs

There is PC and screen, and web camera with external microphone in use.



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## 11.8. Pilot 7 – National Health Service

### 11.8.1. Purpose

Supporting GPs from remote areas via tele-consultations

### 11.8.2. Scenario

Two regions are selected to pilot the solution of tele-consultation in Latvia

The GP practices in Kurland (West Part of Latvia)
1) Ilga Grigale (Ruba, Saldus district)
2) Lidija Vigrieze (Piltene)
3) Elena Gavrilova (Skrunda)
4) Ieva Pupola (Aizpute)

The GP practices in Latgale (East part of Latvia
1) Olga Golube (Dagda)
2) Iveta Civkule (Naujiena)
3) Liga Kozlovska (Balvi)

All GP are located in sparely populated areas. The nearest Health center from some of the GP are more than 50 km with bad road infrastructure.
All activities will be carried out with involvement of local commissioners of primary health care services of NHS Kurland region Ms. Dzintra Eglite and the head of NHS Latgale region is Mr, Janis Pitrans. .
Association of rural GP and Association of GP will be involved from 1 March 2013 to support Latvian pilots in exchange of knowledge and dissemination of results of the project PrimCareIT in whole Latvia.

All activities are coordinated and managed by Project unit of NHS (Aigars Miezitis and Madara Vegnere).

The start of activities 1 November 2012
The end of activities 1 December 2013.

### 11.8.3. Situation analysis

At present the telemedicine projects in Latvia are implemented only in inpatient care. The best result is project BITNET (*BalticInternational Telemedicine Network*) Project that created the telemedicine network of Balticand North European countries. Project was implemented in year 2002 and the developed solutions are used till now..
The goal of this Project was to make consultations from the distance without sending specialists out from university clinics when the local doctors are not sure about the decision based on the images of computertomograph. Using the solution of this Project it is possible to get



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consultation in one our from the hospitals which are participants of this network.
With support by Sweden Baltic Sea Information Technology Fund it is developed the Project BITNET to support health care institutions in Telemedicine in Latvia, Lithuania and Estonia and S-Petersburg (Russia). The technical centre for Latvia - Stradina University hospital where it was procured computertomograph, equipment of magnetic resonance, ultrasound, gamma camera, equipment for angiography.
Similar solutions for primary health care specialists does not exist in Latvia. Project PrimCareIT is excellent possibility to start to introduce IT solutions in primary health care.

### 11.8.4. Context situation

**The National Health Service** (NHS) is the operating direct administrative institution subordinate to Ministry of Health. It was established on 1st November 2011.
**The aim of the NHS is to:**

- **implement** State policy for availability of health care services,
- **administrate** the State budgetary funds prescribed for health care,
- **implement** State policy in the planning of health care services,
- **ensure** rational and the most effective use of State budget,
- **implement** the e-Health programme according to the policy decided by the State.

**The scope of activities and functions of the NHS is to:**

- **administrate the State budgetary funds** prescribed for health care and in accordance with the concluded agreements to settle accounts for the provided health care services, as well as the medication and medical equipment prescribed for outpatient treatment;
- **supervise the expenditures of State budgetary funds** in medical institutions and pharmacies submitted to the administration of the National Health Service;
- **analyze the financial and quantity indices of health care services**, to make prognoses concerning the volume of health care services, as well as to evaluate the necessity of these services;
- **inform the society about the available health care services** and the procedure according to which the latter can be received, as well as advise the country's residents on their rights while receiving health care services;
- **organize and carry out the State centralized purchases** of medications and medical equipment in the field of health care, which are stipulated in the normative acts;
- **provide with the implementation of the programme on timely detection of cancer**;
- **in the regression procedure to recover the financial means** for course of treatment for persons, provided that the present course of treatment is the consequence of an unlawful activity, inactivity or criminal offence;
- **ensure the execution of the international liabilities** in the implementation of the availability of health care services, as well as in the administration of the State budgetary funds prescribed for health care;
- **determine the health care services funded from the State budget** and calculate their tariffs;
- **develop, maintain and update the list of State reimbursed medicine**, that is based on the principles of health economics;


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Baltic Sea Region
Programme 2007-2013

- **develop health care financing models** and to determine types of health care services funded from the State budget;
- **approve medical technologies and register them**, to create and maintain the medical technology accounting and database;
- **develop and evaluate clinical guidelines**, as well as ensure the implementation of methodological guidance;
- **develop guideliness of rational pharmacotherapy**;
- **administer the Medical Treatment Risk Fund**;
- **cooperate with foreign and international institutions**, as well as to exchange information in the field related to the service;

**implement the e-Health programme according to the policy decided by the State** (now carrying several co-funded projects by ERDF (European Regional Development Fund): electronic health record; e-booking; e-prescription etc.).

### 11.8.5. Relevance

- To introduce the first telemedicine solution (tele-consultations) for primary health care in Latvia with further aim to organize bigger network for PHC specialists.
- Increase primary health care specialists knowledge, understanding and skills in rural areas
- Increase treatment quality, safety, professional medical investigation and treatment.
- Health economic gains from a a national health care perspective as well as well from an individual patient perspective.

### 11.8.6. Technical needs

Tablet computer with camera - 8 pieces
Lap top - 1 piece

## 11.9. Technical purchase list of pilots

The needs for technology related to the above pilots have been summarized (to be read together with WP5 since pilots are overlapping) in the following document[18]; PrimCareIT-WP4-PurchaseList-v0.1-20120630.xlsx (on PrimCareIT portal); and contains the following information (comments excluded), as in Table 11.

[18] WP4 Purchase list on PrimCareIT project portal.



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*Table 11. Identified purchasing needs in WP4 (some pilots have their needs in WP5 meaning they need synchronization).*

| PARTNER | DESCRIPTION | UNITS/LICENSES | METHOD |
|---|---|---|---|
| **SOHCD (South Ostrobothnia Health Care District)** | | | |
| | Tablet computer | 1 | Purchase |
| | Web camera (external) | 1 | Purchase |
| | Microphone (external) | 1 | Purchase |
| | Videoconferencing equipment | 1 | Lease |
| | Teleconferencing software | 1 | Purchase |
| **BTH (Blekinge Institute of Technology)** | | | |
| | Tablet computer (iPad) with camera | 8 | Purchase |
| | Smartphones with camera | 4 | Purchase |
| | Videoconferencing software | 8 | Purchase |
| | Lap top (with integrated camera+mic) | 4 | Purchase |
| | Web camera (external) | 4 | Purchase |
| | Microphone (external) | 4 | Purchase |
| | 50" LED screen or projector/sccreen | 2 | Purchase |
| | 4G network access | 12 | Purchase |
| | Portable WIFI hub | 4 | Purchase |
| | Media server/storage | 1 | Purchase |
| **BelMAPO & Ostrovec** | | | |
| | PC (stationary) | 10 | Purchase |
| | LCD display 22" | 10 | Purchase |
| | Power backup | 10 | Purchase |
| | Printer | 1 | Purchase |
| | Headset | 10 | Purchase |
| | Web IP camera | 15 | Purchase |
| | MS Office Pro 2010 Russiona | 10 | Purchase |
| | PC Laptop | 1 | Purchase |
| | Network hub | 1 | Purchase |
| | Projector with screen or LED display | 4 | Purchase |
| | Videoconferencing (sending) | 1 | Purchase |
| | Videoconferencing (receiving) | 3 | Purchase |
| | High speed internet access | 4 | Purchase |



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### 11.10. Summary of pilots

Pilots are going to be deployed in parallel with a short delay between first and second pilot in order to learn from firsts pilot deployment. Hence pilot 1 is described in more detail and also ready to go (start October 1) while pilot 2 is almost ready, and following pilots to be planned in detail during October. Assessment of situation have been done by pilot owners to complete initial purchasing list of equipments.

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