MOMENTUM

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Report on **SIG 1** – Strategy and Management

'Strategy and management section of the Blueprint developed by practitioners'

Version 12

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Abstract
In 2012, the Momentum project conducted a survey of telemedicine services in Europe to identify common characteristics and best practices. This report presents a summary of the strategic and management aspects that emerged from the survey. Most telemedicine services were initiated as a result of a clearly identified, local need; they were not adopted because of a higher level of healthcare policy or legislation. A variety of public and private sector organisations were responsible for the development and implementation of the services. About half of these received initial funding from government. For the rest, the initial funding came from a variety of sources: these ranged from the European Union to private investment. While most services involved a broad range of stakeholders, the initiating organisation generally maintained control over the entire process, from business plan to deployment. Almost all of the services are undergoing or have completed an evaluation of the service.

ICT PSP – Empowering patients and supporting widespread deployment of telemedicine services

Key Word List

Analysis; assessment; blueprint; decision makers; deployment; financing; healthcare; implementation; management; policy; questionnaire; routine care; service; stakeholders; strategy; telemedicine.

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01 Initial version subject to first review.

02 First review: Version including main findings discussed in February 2013 in a Brussels-based meeting with other SIGs and responsible editorial groups.

03 Version of 5-6 April 2013 entailing the amendments received from several members of the SIG 1 editorial group. Associated PowerPoints used in a presentation in Berlin on 8 April 2013, critiqued by stakeholders.

04 Constructive criticism from L. Lapão; collation of all stakeholder feedback from Berlin-based 8 April 2013 meeting(s).

05 Textual additions to several components of the report by R. Kaye.

06 Textual additions to the report, particularly from G. Dafoulas and L. Lapão in relation to literature review; constructive criticism from several members of the SIG 1 writing team and the SIG 1 editorial team.

07 Editorial changes taking on board constructive criticism from several members of the SIG 1 editorial team and revision of literature review by J. Rasmussen.

08 Editorial changes to prepare for submission to Momentum quality checking procedure.

09 Review for consistency and formatting (M Strübin).

10 Literature reviews performed by R. Kaye and D. Whitehouse.

11 Review for consistency before submission to M. Lange (project co-ordinator).

12 Final consistency and formatting review before submission to M. Lange (project co-ordinator).

Statement of originality

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

Momentum bears some similarities to the more general, and earlier, eHealth-related thematic network, CALLIOPE. It builds on some of the good practices developed in CALLIOPE. Where recognition is due to earlier principles, policies or operational processes developed and fine-tuned within CALLIOPE, due recognition is paid to this.

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Executive summary

While twenty-five telemedicine services participated in the Momentum survey, only twenty-two provided consistent responses to the survey questions on strategy and management.

Most of the telemedicine services were initiated by local health authorities, health care organisations or health care insurers in response to a need or a priority of the organisation, quite uninfluenced by either policy or new legislation. The decision to implement the service was generally made at the managerial level of the organisation, with little involvement of politicians. Government agencies, along with health insurers, patient associations, private companies and providers were, however, reported as being important stakeholders.

As a rule, direct investment was required to implement the service (which was made by government at some level in half of the cases). The on-going financing of the telemedicine services after deployment was the same as for regular healthcare services in 56% (14/25) of the cases. A formal business case was prepared and approved for half of the services: in most cases, this was by the initiating organisation.

All of the services surveyed, with one exception, performed – or are in the process of performing – some type of outcomes assessment.

At the time of the survey in November 2012, it was not clear at what stage each service was on a continuum from pilot project, to small-scale deployment or large-scale deployment (see the associated deliverable on the Momentum model). However, it would appear that most of the services surveyed had gone beyond a pilot phase and were actually deployed.[1]

Many of the services surveyed have not yet completed a full assessment of their outcomes. Thus it would appear that the decision-makers involved had decided on deployment of the particular initiative/service, despite the fact that they did not have all of the (interim) results in hand.

In the area of strategy and management, based on the results of the Momentum survey, it is therefore possible to arrive at the following six preliminary conclusions:

1. **In general, the initiative for telemedicine is local** and not national. (Local can refer to a regional, municipal, or organisational level – i.e., it takes place at the level of a hospital or a hospital department, a social insurer, or a business entity). This localism would appear to be a contributing factor to the success of the service.

2. The initiative is based on an **identified need**. **The likelihood of success is much greater when the service is perceived as a healthcare service that provides added healthcare value** rather than a technology service.

3. **The body that initiates the service tends to be responsible for the entire process**. This initiating body involves other stakeholders, makes and approves the business plan, arranges the financing and actual deployment, and either does an evaluation itself or else arranges for one to take place. This would seem to imply that the purpose of the service, and what it is expected to accomplish, is very clear, well defined, and meets a very clear need or priority of the organisation.

4. **The presence or absence of legislation does not seem to be either much of an obstacle or a critical success factor**. One must, however, take into account that the services surveyed were by and

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[1] This observation does not preclude that some reflection, planning or testing may, nevertheless, still have preceded the deployment phase on the part of the initiating organisation.

large services that had been successfully implemented, at least at a pilot project level. The survey did not include projects that failed to get off the ground because of either legislative or other obstacles.

5. **The presence or absence of national policy does not appear to be a critical success factor.** This observation is qualified by the observation that a significant number of the services are still operating at the pilot level or at small-scale deployment level. It could, nevertheless, be that national policy may be important for large-scale levels of deployment. However, this is only a supposition as, at this phase of the Momentum project, there is no direct evidence provided for this conclusion from the projects surveyed.

6. **Most organisations make the decision to move from pilot to deployment prior to completing full-scale assessments of the outcomes of the service**. In further Momentum-based investigations, it will be important to explore what were the parameters considered by the responsible, decision-making parties in the transition from pilot to deployment, and/or from small-scale deployment to large scale deployment.

1. Introduction

The work in Work Package 3 (WP3) involved the collection of vital information on a large range of topics relating to telemedicine services that either are currently running as part of routine care or have been discontinued.[2] Out of this work, four special interest groups (SIGs) – in teams that have incorporated a high degree of stakeholder involvement – have analysed and reviewed the information obtained. The four SIGs are:

*   Strategy and management.
*   Organisational implementation and change management.
*   Legal, regulatory and security issues.
*   Technical infrastructure and market relations).

For the special interest group (SIG) working on strategy and management, the Momentum questionnaire was structured around four themes which each contained a number of questions and sub-questions:

*   Policy context and support and role of the political environment.
*   Decision-makers and stakeholders.
*   Financing.
*   Assessment of outcomes.

The purpose of the SIG on Telemedicine Strategy and Management was to conduct an in-depth exploration of these issues, problems and obstacles to telemedicine implementation from a range of perspectives relating to strategy and management. As a result, the SIG on Strategy and Management (called SIG 1) has produced this initial Report on its work - *Strategy and management section of the Blueprint developed by practitioners*.

Based on the information and data obtained from the questionnaire, and input from stakeholders (e.g. through workshops), SIG 1 has had three main aims with regard to telemedicine deployment at the level of strategy and management, to:

*   identify the common trends as well as the main differences that occur in the strategy and management aspects of telemedicine services,
*   create a sense of the range of the findings, and the way in which they are associated with particular countries or specific regions, and
*   provide an overview of what operates most effectively overall.

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[2] By "discontinued", it is understood that these services are no longer offered as either a project or routine service.

2. Policy context, support, and role of the political environment [Question 9]

Seventy-six per cent (19) of the telemedicine services that responded to this survey were developed independently, uninfluenced by either policy or new legislation, in response to a need or a priority of the initiating organisation. The remaining 24% (i.e., six organisations) initiated their telemedicine service(s) as a result of a policy or legislation related to healthcare. In this small group of cases, policy or legislation contributed to sustainability by solving data security issues or strengthening healthcare service delivery to remote areas.

2.1 Synthesis of the answers to the questionnaire

This section of the report describes the extent to which policy, context, and the role of the political environment affected the implementation or deployment of the specific telemedicine service. Each aspect of these considerations is prefaced by the wording of the exact question in the questionnaire that is being analysed, as per the question below:

> *Q9.1 Has the decision to implement the telemedicine service been influenced by particular policy or the entry into force of some new legislation?*

According to the outcomes of the survey, only around one-fifth, i.e., 21% of responses (or six services) reported that a policy or new legislation influenced the decision made on the deployment of the telemedicine service. In three cases, the telemedicine services reported were established after a national initiative was set up; in one case, this took place after a regional initiative was initiated.

The rest of the services reported seem to have been developed independently. They were initiated to address a special need or priority of the involved organisation, which committed the resources and implemented the service. Given the criteria of eligibility for the services that participated in the Momentum survey,[3] it can be concluded that **the engagement of local stakeholders is a key factor for the sustainability of a telemedicine service[4]**, rather than there being a need for a top-down implementation approach.

The six cases where the decision to implement the telemedicine service was influenced by a policy or legislation were predominantly related to the domains of Healthcare (five cases) and Information Society or Digitisation (one case). This would seem to indicate that policies focusing on the support of telemedicine services should be health service-oriented rather than technology-oriented.

The policies or legislations that were cited by respondents covered, for example, those aiming to create a web-based environment for secure data exchange (in Estonia), European Union – national structural development funding schemes (used in Greece), and a regional policy to deal with better access of minorities to health care (a teleinterpreting service set up in Denmark).

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[3] The projects surveyed are implemented as a service in daily operation; thus, they are no longer in either a testing, implementation or project phase, and were never terminated or never not launched.

[4] Our emboldening.

> **Q9.1(3) Did the policy or legislation have an influence on the design of the telemedicine service and its implementation strategy?**

In the case of the telemedicine services reported to have been deployed in the context of a background policy or legislation, this was said to have mostly influenced the design of the telemedicine service and its implementation strategy.

> **Q9.1(4) Has the policy or legislation contributed to transform the telemedicine service into a sustainable service that is used in routine care (i.e., it is part of mainstream service delivery)?**

In four of the six services established as a result of policy or legislation, respondents acknowledged that policies/legislation had contributed to transforming the telemedicine service into a sustainable service in two, rather different, ways. The first approach relates to security; the second to serving remote regions of the country.

In more detail: in one case, in Estonia, national action contributed by solving security issues related to telemedicine (e.g., by providing web-based environment for secure data exchange); in a second case, in Greece, national policy contributed by introducing the telemedicine services as a way of complementing the mainstream health services delivery to remote parts of the country.

2.2 Synthesis of the stakeholder feedback process

The policy context is seen by the stakeholders as complex.

In the second Momentum workshop held on 8 April 2013 in Berlin, the stakeholder feedback received was that national or regional telemedicine strategies might in reality be of a stronger influence than the overall responses to question 9 might currently indicate (particularly Q9.1(4)). For example, the stakeholders suggested that some of the inter-regional European programmes, and their links with medical information systems, might be important to generating sustainability.

With regard to Q9.1, stakeholders argued that the various telemedicine services might have gone forward in two ways: either they might have implemented their solution without considering legal or other regulations, or else the countries in which the services have been reported might have had weak legislation at the time of implementation.

The stakeholders expressed the opinion that technical infrastructure is an important underpinning mechanism, and a policy concern with security may also be an important influence.

Last but not least, the stakeholders considered that the critical success factors for a pilot project might, nevertheless, be quite different depending on whether the initiative begins in a localised ("bottom-up") way – which are the majority of cases in the Momentum survey – or is initiated top-down.

2.3 Synthesis of the literature review

Much of the academic literature in the field relates to eHealth (occasionally termed e-health) (e.g., Hage et al 2013) rather than telemedicine or telehealth. Some literature is written very generally about the need for eHealth policy (e.g., Crigger 2006; Crutzen & Gao 2012). Recent publications are, however, increasingly looking at

the use of telehealth in developing countries (e.g., Varghese & Scott 2004; Khoja et al 2007; Mars & Scott, 2010; Lapao & Lopez 2013), very often at the generic level of policy development. A great deal of the telemedicine literature is a decade (or more) years old (e.g., Field 1997; Ohinmaa et al 2001; Roine et al 2001): it may therefore not be entirely current in its analysis or interpretation.

Policy orientations at the federal level in the United States of America (USA) have been explored by e.g., Prinz et al (2008). Other studies focus on the kinds of funding mechanisms used to support or reimburse either telemedicine or communications programmes e.g., in the United States of America (USA) (Smits & Baum 1995; Smith 2005) or Japan (Nakajima 2010). Since the beginning of the century (e.g., Mair et al 2000), the literature increasingly focuses on evaluation or cost-effectiveness studies.

After a fifty-year history, the rate of introduction of technology in the health system has been slow (Whitten et al. 2010). However, the continued adoption of telemedicine does show promise in addressing significant barriers that have occurred in the health setting (Op. Cit., 2010). These authors indicate that previous telemedicine research has reported providing similar (and sometimes improved) clinical outcomes when compared to traditional care, and has demonstrated some cost savings.

In the eHealth field more generally, Khoja et al. (2012) undertook an international literature search that covered the decade from 1998-2008. Their review has shown that a lack of policy measures is a common barrier to the success of eHealth initiatives, and that it is essential to develop measures that both facilitate the adoption of initiatives and demonstrate their success through improvement in health services. They identified a set of important policy issues. These nine items were: (1) networked care, (2) interjurisdictional practice, (3) diffusion of eHealth/digital divide, (4) eHealth integration with existing systems, (5) responses to new initiatives, (6) goal-setting for eHealth policy, (7) evaluation and research, (8) investment, and (9) ethics in eHealth. They argued that distinct policies and strategies are required for the proper implementation and integration of eHealth at national and international levels.

The 2010 eHealth Strategies study (Stroetmann et al. 2011) analysed policy development, planning, implementation measures and progress achieved with respect to national and regional eHealth solutions in European Union and European Economic Community Member States. The authors reviewed a set of European experiences in eHealth strategy formulation, and identified key aspects which seem to strongly support the successful planning and implementation of eHealth strategies. The study placed an emphasis on barriers and enablers beyond technology. All its results are available on the eHealth Strategies website (http://www.ehealth-strategies.eu/).

However, the eHealth Strategies survey only partly covered telemedicine-related issues. With regard to eHealth strategies in general:

- The policy process should assure a comprehensive health policy dialogue that leads to well-defined goals that specify where eHealth solutions are expected to substantially contribute.
- The challenges involved in reaching agreement about eHealth strategies, implementing them, and meeting the related management and organisational tasks have been vastly underestimated.

- A global exchange of experience gained (including from failures), and lessons learned, may prove particularly beneficial.
- Many strategies acknowledge the need to assure strong trust by all stakeholders in eHealth infrastructures and applications. Inter alia, this requires legal and regulatory certainty (challenges which are among the most demanding aspects of eHealth implementations). Privacy, confidentiality, liability and data protection issues are also involved.
- Infrastructure elements concern items like governance rules and processes, competence centres, secure and unique identification of patients, health professionals and service provider entities, security and data privacy, regulation of technical and semantic standards, and payment/reimbursement issues.
- Until a public regional or national health institution exists, service providers do not usually have an incentive to establish such infrastructural elements. Thus, a market failure situation exists in which the need for a 'public good' can only be resolved by government intervention.
- Relevant qualified human resources are a key ingredient for success. Education, training and continuous professional development for all, including for those citizens and patients who are capable and motivated to become engaged in their own care, should be strongly promoted.

The 2007 eHealth ERA Coordination Action project contributed to the coordination of European Union Member States' eHealth strategy formulation and implementation as well as eHealth-related research and technology development. The project included a survey to analyse eHealth roadmaps and programmes across Europe, identified common priority issues, and developed suggestions for joint actions. It did not specifically contain references to telemedicine-related activities. All its results are available on the eHealth ERA website (http://www.ehealth-era.org).

In a recent paper, Hage et al. (2013) have argued that eHealth adoption too often fails due to an underestimation of the implementation factors and their interactions: implementation only leads to sustainable adoption (i.e. it "sticks") when the implementation carefully considers and aligns the eHealth content (the "clicks"), the pre-existing structures in the context (the "bricks"), and the interventions in the implementation process (the "tricks").

3. Decision-makers and stakeholders [Question 10]

Local health authorities, healthcare organisations, and departments in healthcare organisations were the primary decision-makers behind the decisions on which telemedicine services were to be initiated. The actual decision to implement the service is generally made at the managerial level of the organisation, with little involvement on the part of politicians. However, the decision is very much influenced by an acknowledgment of health needs. In this survey, stakeholders with a particular interest in the implementation and deployment of the service have included government agencies, health insurers, patient associations, private companies and providers.

3.1 Synthesis of the answers to the questionnaire

This part of the questionnaire was based around the question:

> *Q10.1. At which institutional level has it been generally decided which telemedicine services are to be implemented?*

Even though the decisions regarding telemedicine services have been made on all three institutional levels (national, regional, and local), the most common form of decision-making has been at the local level.

Whether the decision is made on the national or a regional level, the local institutional level has certainly participated in that decision – the person or entity concerned has been mainly the local manager or department.

Other local stakeholders have also formed part of the decision-making process. These stakeholders include examples such as a technical provider or the payer of the service provision (for example, a private health insurance provider).

These facts reflect several possibilities. For example, in technical settings, pre-procurement contexts or in relation to payment/funding issues, two situations may occur: *either* out-of-the box technical solutions are not always available to match the requirements of the specific telemedicine service *or* implementation teams do not possess the skills to address technology issues appropriately. In a pre-procurement context, professional negotiation with a technical provider/manufacturer is likely to be needed. With regard to payment issues, in the specific case of a private health insurance company, reimbursement of the telemedicine service may be an issue that is highlighted. In terms of the private funding of telemedicine services, the payers are crucial partners in the decision-making procedure.

The responses of the reported telemedicine services are presented in the figure below.

10.1.) At which institutional level has it been generally decided which telemedicine services are to be implemented? Please tick all the relevant answers.
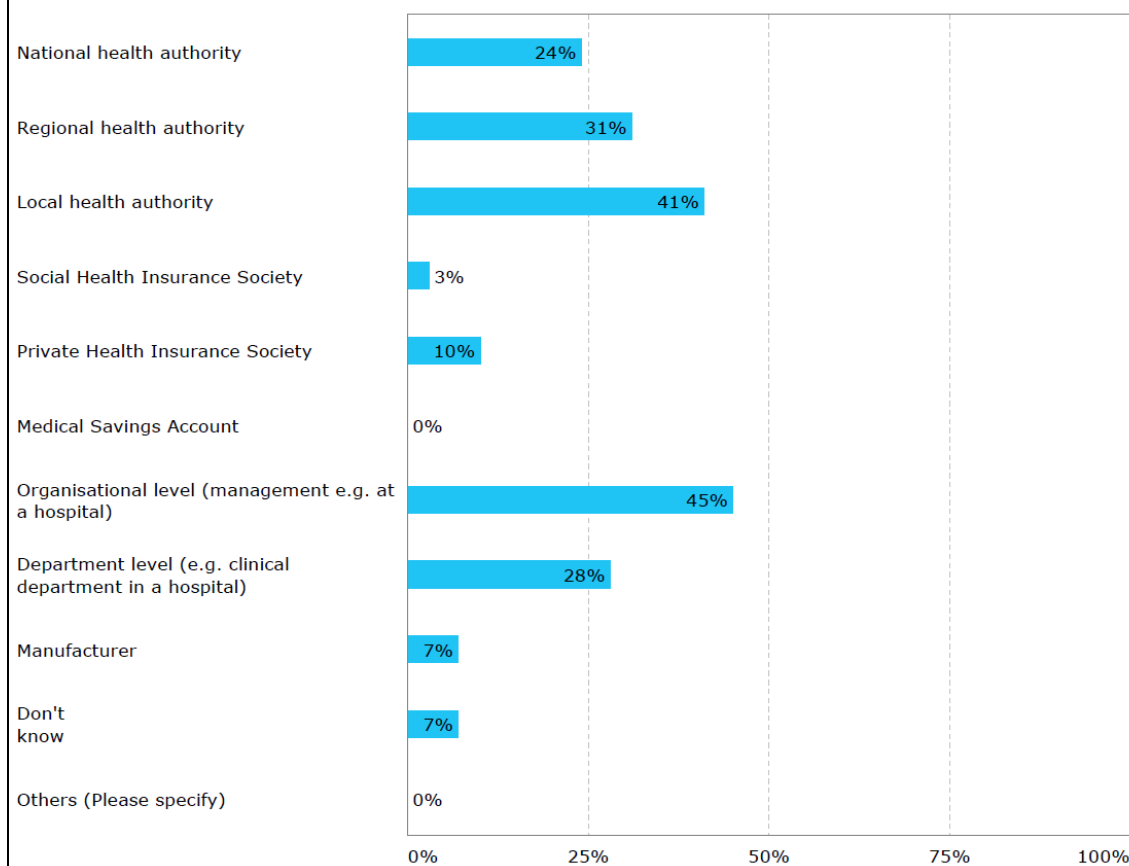
Institutional level	Percentage
National health authority	24%
Regional health authority	31%
Local health authority	41%
Social Health Insurance Society	3%
Private Health Insurance Society	10%
Medical Savings Account	0%
Organisational level (management e.g. at a hospital)	45%
Department level (e.g. clinical department in a hospital)	28%
Manufacturer	7%
Don't know	7%
Others (Please specify)	0%

Figure 1: Responses to Q10.1: Which institutional level decides generally?

The local institutional level and managerial levels were mainly responsible for the decision to implement/not implement a service. Decisions at both the organisational and department levels also played an important role.

When asked (in Q10.3)[5] about the individuals responsible for the final decisions on whether to implement/not implement the service, respondents reported that the decision is generally made at a managerial level (for example, by a board of directors, chief executive, technology director, medical director, or departmental head). Politicians play only a small role in the final decision.

The outcome of a piloted service was a major factor for the large-scale deployment of a telemedicine service in only two cases: a United Kingdom (UK) teledialysis project that reviews haemodialysis patients at remote dialysis units, and a Portuguese telecardiology project that assessed the clinical value of remote diagnosis.

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[5] The wording of Q10.3 was as follows: "For the institution that you think was the most influential in the decision to implement the service, who generally makes the final decision on whether to implement/not to implement telemedicine services?"

It might therefore be concluded that the engagement of the local stakeholders is an important factor in influencing the sustainability of a telemedicine service, rather than taking a top-down implementation approach.[6]

As the survey involved only 26 cases in total, it is important to highlight this limited number of responses gathered to date. This limitation in the volume of responses may impact on the interpretation of this question.

> **Q10.2. At which institutional level was it decided to implement/not to implement this specific telemedicine service? Please tick all the recent answers.**

The responses to this question reinforce and strengthen the conclusion that the decision to implement telemedicine services is local. As can be seen in Figure 2 (below), the decision to implement the specific services included in the survey were made overwhelmingly by a local body – either a local health authority, a specific organisation or even a particular department within an organisation.

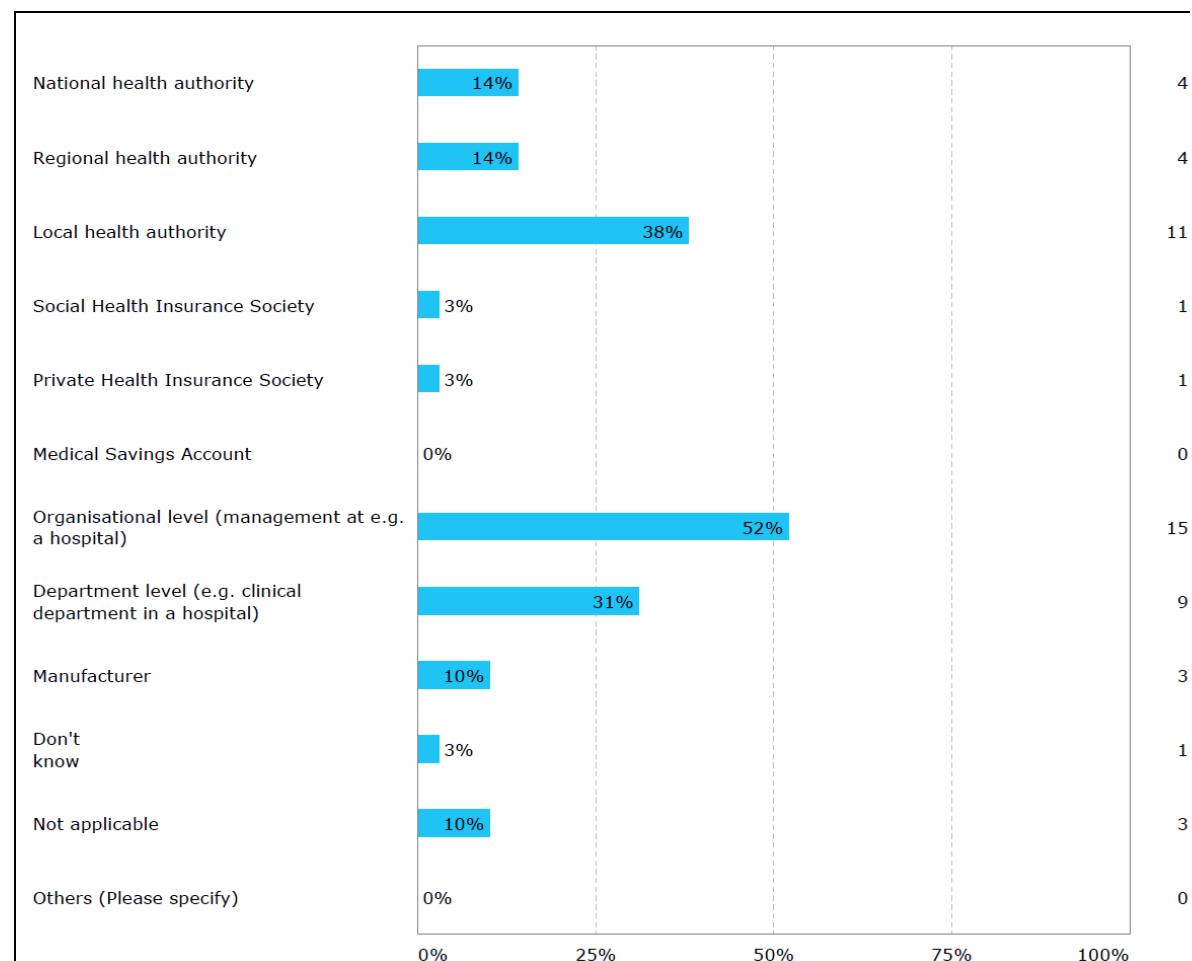**Figure 2: Responses to Q10.2: Which institutional level decided here?**

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[6] This is especially so since the criteria for eligibility for the services that participated in giving responses to the Momentum survey were that they should be implemented as a service in daily operation (i.e. no longer in testing, implementation, or a project phase and/or have never been terminated or never launched).

10.4. Please identify if there were external stakeholders with a particular interest in implementation (or non-implementation) of the telemedicine service.

Regarding the external stakeholders involved in a telemedicine service, Figure 3 (below) illustrates that there is a wide range of stakeholders. Since a telemedicine service involves the alternative and/or complementary provision of a health service, it is expected that it becomes the focus for many types of organisations active in the whole value chain of health care provision.

Telemedicine services can provide a more patient-centred approach and increase patients' engagement. Thus, the involvement of patients' associations appears to be a major factor in the implementation of a telemedicine service.

The challenges related to new types of clinical interventions and liability issues that a telemedicine service introduces increase the importance and interest of the health professional associations and societies (e.g., physicians and nurses) in its implementation (European Commission, 2011).

The involvement of payers of telemedicine services, e.g., health insurers, is required in order to deal with the reimbursement issues that these services introduce.

Given the fact that health is part of a local, regional or national policy, the involvement of geographically-based associations and political parties or institutions is also reflected in the findings of the survey. It is interesting to note that in 45% (13) of responses, the respondents acknowledge the important role of governments and politicians in either the implementation or, conversely, the non-implementation of the services.
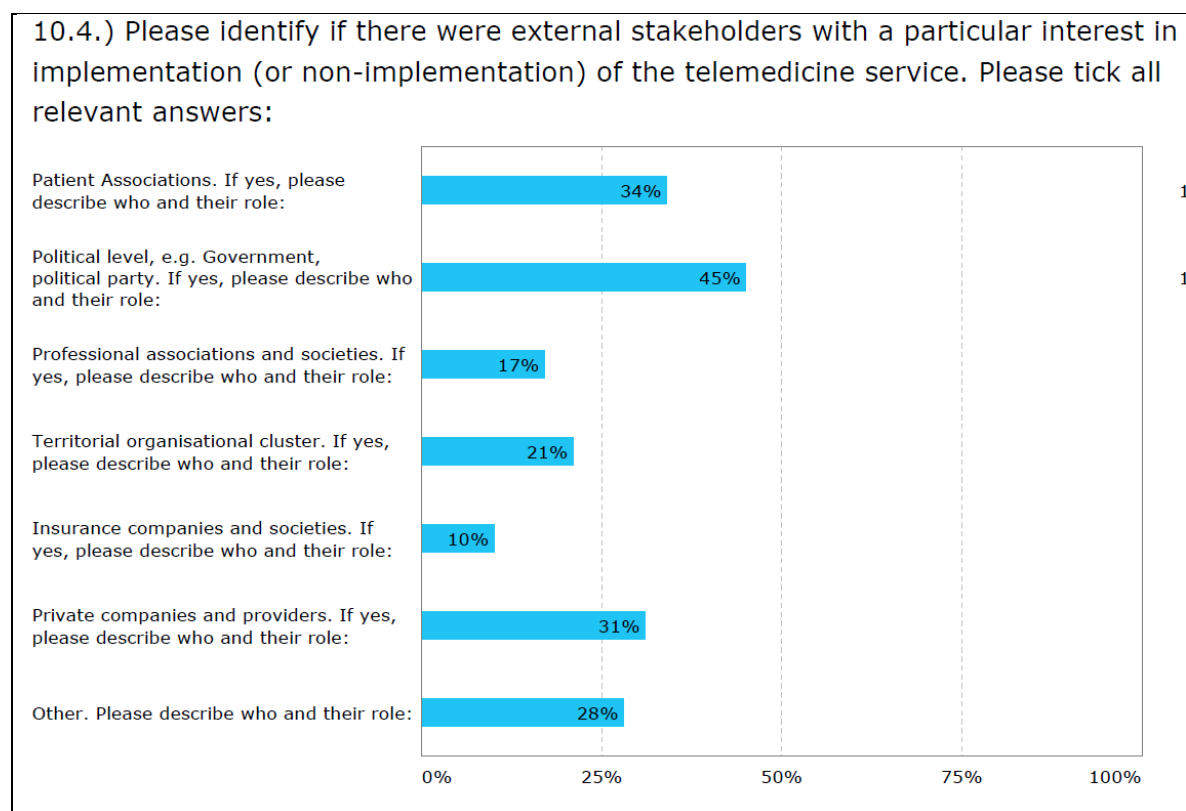

Figure 3: Responses to Q10.4: Were there external stakeholders?

3.2   Synthesis of the stakeholder feedback process

Stakeholder feedback was given during the second Momentum workshop held on 8 April 2013 in Berlin.

The stakeholders commented that it is important, in terms of the Momentum survey findings, to emphasise the extent to which the 26 services described seem to be among the early implementers of telemedicine. It was also commented that the different decisions made could also, in principle, take place at various different organisational levels.

In addition, the stakeholders showed some interest in the role of patients (and patient associations) in the decision-making process, and the extent to which patients are contractually bound to any decisions that they make or help to make.

3.3   Synthesis of the literature review

Q10 of the Momentum survey examines particularly which stakeholders and which decision-makers are involved in making decisions about telemedicine initiatives. Much of the currently available literature does not examine the stakeholder domain in any detail. This sub-section describes what little relevant materials have been found, much of it initially from the European context.

The tenth action in the European Commission Communication (European Commission 2008) was for the Commission to "*support the collection of good practice on deployment of telemedicine services in the different Member States.*" The work of Momentum implicitly supports this action. The Commission's complementary document, its 2009 Commission Staff Working Paper examines the challenges to enable wider deployment of telemedicine on the part of several stakeholders (European Commission 2009).

Other European studies: Unsurprisingly, some of the most potentially useful materials for Momentum, particularly with regard to stakeholders and decision-makers, looks as though it may relate to concepts developed in other, European Commission recently co-financed projects and studies. Examples include MAST – a model for the assessment of telemedicine applications (Kidholm et al 2012) – which permits the kinds of assessment needed by decision-makers to assist them in choosing the most efficient and cost-effective technologies, and Renewing Health.[7] The origins of such studies at the start of the 21st century lies in the domain of more generic health technology assessment (e.g., Ohinmaa et al 2001; Roine et al 2001).

Stakeholder variety: In their overview of the healthcare value system and its many actors, Jones and colleagues identify the diversity in stakeholder views:

> "*Modern healthcare should focus on making the best use of finite resources in order to balance the health outcomes produced with the needs of all stakeholders in the healthcare arena. Responsibilities and interests of different participants in healthcare are diverse: physicians have interests that differ from those of the citizens who receive treatment. Hospitals differ from a* [sic] *GPs' offices. Health insurances negotiate the payments for medical services with doctors and their associations. Medical care is dependent on data in order to create the*

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[7] See the accompanying list of documents on how to undertake the MAST method
http://www.renewinghealth.eu/assessment-method Accessed 30 July 2013

basis and transparency for balancing all the different needs and interests of these stakeholders (Jones et al, 2009, p27).”

Stakeholder discourse: In particular, Trisha Greenhalgh and colleagues (2012), in examining telehealth stakeholder discourse, recognise that: “*Introduction of telehealth and telecare is hampered because different stakeholders hold different assumptions, values and world views, 'talk past' each other and compete for recognition and resources. If investments in these technologies are to bear fruit, more effective inter-stakeholder dialogue must occur[8] to establish an organising vision that better accommodates competing discourses*.”

Hospital medical directors as stakeholders: Work sponsored by the European Commission (2011), in a study on its behalf undertaken by Deloitte and Ipsos Belgium, reviewed (in part) the opinions of 280 hospital Medical Directors in European member states on technology. A number of the findings covered by the Momentum project relate to hospital telemedicine services or hospital Medical Directors as stakeholders: thus, while they are not directly comparable, they may make useful comparisons (Ibid 2011). The Deloitte/Ipsos study concluded broadly that:

“***No clear barriers or impacts were identified concerning the adoption of telemonitoring[9]***. *However, the low rate of implementation might be explained by the Medical Directors' lack of perception that - in their hospitals - telemonitoring will lead to improvements in care if implemented. [I]mportant factors to explore in the future would be those potential barriers associated with **security and/or privacy issues, knowledge of ICT, and the degree of perceived change on organisational systems, work systems and reimbursement mechanisms[10]*** (Ibid 2011, p107, figure 63).”

Thus, the on-going work of Momentum can be concluded to form part of an effort, on the part of the European institutions, to undertake:

“*a) interviews with Medical Directors, clinicians and other healthcare professionals, b) a qualitative study with regard to their potential use of telemedicine and telemonitoring, and to consider c) conducting a survey that would concentrate on these issues specifically.*” (Ibid 2011, p109).

Other medical specialities: Although it took place in the USA, and was based on time-series regression analysis, the work of Schmeida et al (2007), based on Mary Schmeida's doctoral research of 2005 (Schmeida, 2005) may also be pertinent to Momentum's work. The objective of the study was to explore the variation in the implementation of telehealth programmes in the United States. In researching the topic, the researchers assessed the influence of traditional policy determinants on the extent of telehealth programme implementation. They examined 29 medical speciality groups and their use of telehealth from 1995-2003. One finding included that:

“*the interest groups who mobilized are the individuals who must carry out the policy. ...[A]lthough the policy literature does not treat interest*

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[8] Our emboldening.

[9] Our emboldening.

[10] Our emboldening.

*groups as important to execution of procedural policy, we must consider
how these policies will impact those who must carry them out. As an
interest group, they can either act as an impetus or barrier to
implementation."*

On the one hand, in the USA too, Lockamy & Smith (2009), report on field research
conducted at four healthcare organisations in terms of telemedicine design and
deployment, although they of course acknowledge the very small size of their
sample. On the other hand, Werner & Karniela (2003) examined the willingness to
use telemedicine and degrees of anxiety with regard to it, with a focus on the Israeli
context.

4. Financing [Question 11]

Responses on the financing of telemedicine services were provided relative to 22 services. Eighty-three per cent (18) of cases indicated that direct investment was required to implement the service. In 50% (11) of the cases, the investment was made by government at some level and, in the remaining 50% (12), the financing came either from a European research grant, a service provider or a business company. Two-thirds of the respondents indicated that on-going financing for the telemedicine services was the same as for regular healthcare services. A formal business case was prepared for half of the services. In most cases, the business case was prepared and approved by the same organisation. There are user fees (i.e., co-payments on the part of patients) operating in half of the services surveyed.

4.1 Synthesis of the answers to the questionnaire

The Momentum Survey addressed five aspects of financing telemedicine:

- Initial or Capital Investment.
- Financing operating or on-going costs.
- Preparation and Approval of a business plan.
- Relationship between the financing body and those who benefit from the service.
- User fees.

4.1.1 Initial or Capital Investment

Initial or capital investment in the telemedicine service was addressed in the survey by two questions:

> **Q11.3 Please describe where the financing of the telemedicine service came from during the project phase (i.e. the phase prior to implementation as a routine care service before the service became part of mainstream service delivery) or in development, testing and/or validation?**
>
> **Q11.5 Was any direct investment required to implement the telemedicine service?**

Eighty-three per cent (18/22) of the responses indicated that a direct investment was required to implement the telemedicine service. Only 7% (2) of the responses indicated that no initial investment was required: the Spanish ECOPIH (a tool for communication between primary care and acute care), and the Swedish Electronic healthcare programme. For half of the respondents who answered in the affirmative, the initial investment was made either by government at some level or another form of public investment (many of them with some form of grant for the project phase).

The initial investment ranged from European funding (for example, from the Structural Funds), to national, regional or local funds. During the pilot project phase, there was a similar range of sources of financing. Four of the programmes that received initial investment replied that "financing in the project phase" was not applicable. For example, e-Trikala indicated that it used European Structural Funds – which were not specifically earmarked for either health or ICT – to get the programme up-and-running. However, e-Trikala did not indicate whether the on-going initiative is still being supported by European Union funding.

Table 1: Programmes with public investment

Programme	Investor	Financing in project phase
Denmark: Teleinterpreting service	Danish regions.	Kr 41 million from The Danish Public Welfare Technology Fund, and the five regions contributed in different ways.
Greece: Sismanoglio coordinator of national telemedicine network	Ministry of Health, NATO.	Pilot project funded by NFS Programme of NATO in collaboration with Ministry of Health.
Greece: Telehealth service –Trikala	The Municipality of Trikala using the European Union Structural Fund of the 3rd Community Framework Support (CSF) for Greece.	n/a
Norway: COPD patient's briefcase	Health authority.	n/a
Slovenia: Home care for chronic pulmonary patients	Hospital regional authorities.	National project.
Spain: ENDOBLOC virtual community for clinical practice in endocrinology	Grant of the Spanish Ministry of Science and Innovation.	n/a
Spain: Guttmann neuro Personal trainer	*Plan Nacional del sistema de Salud*, plan Avanza, *Fundacion Princip de Girona*.	Competitive National/International Grants Own funding.
Spain: Xarxa Telelctus	CATSALUT made a contribution; the hospitals bought the equipment; and TICSALUT paid the maintenance.	n/a
Sweden: Electronic Healthcare	Local health authority.	There was no project phase. We bought the technical equipment and started off directly.
UK: Teledialysis programme	The Northern Peripheries Programme and the health board.	The Northern Peripheries Programme and match funding and on-going costs from the health board.
UK: Telescot programme	The Scottish government.	Scottish government grant, research charities.

Note: The table is ordered alphabetically by country, then by the names of the telemedicine services within each country.

For the remainder of the respondents, there was a variety of investors. These ranged from other sources of funds received from the European Commission, an insurance fund, the hospitals involved, various companies ranging from international companies to other that were more locally-based, and a "care-giving organisation".

Financing during the pilot project phase itself came from European Union framework programmes and project funds, competence centres, companies and investors.

Table 2: Programmes with investors other than government

Programme	Investor	Financing in project phase
Denmark: Health Optimum diabetes teleconsultation	Hospital and European Union project.	n/a
Estonia: Home monitoring of Diabetic patients	East Tallinn Central Hospital.	From the European Union project DREAMING and from ELIKO Technology Competence Centre in Electronics-, Info- and Communication Technologies.
Spain: doc@home	Private investors and European Commission funds.	Private investors and European Union framework programmes.
Greece: Telecardiology Service of CardioExpress SA	The company itself (Cardio Express SA).	The company's capital was used for the equipment costs. The service is provided with a contract for a fee.
Israel: Home monitoring and management of chronic disease patients	Maccabi Health Insurance Fund and the Gertner Institute (non-profit research institute).	The project phase - which was the four-year Congestive Heart Failure (CHF) program - was financed jointly by a grant from the Maccabi Institute for Health Services Research and the Gertner Institute.
Netherlands: Remote intraoperative neuromonitoring	The hospitals [requesting] the service made an investment for the device needed to acquire the monitoring data.	n/a
Norway: Decentralised psychiatrist on call service using videoconference	University Hospital of North Norway (UNN).	n/a
Norway: Electronic platform for integrated home care chronic ulcers	University Hospital of North Norway (UNN).	n/a
Norway: teledialysis	The hospital invested economic resources over a period of time.	n/a
Spain: Ithaca	Novartis.	The set-up of the service was financed by the pharmaceutical company, Novartis.
Spain: RxEye Remote reading	Care giving organisation	Investors.

Note: This table is ordered alphabetically by the name of the country in which the service or programme is located.

The following are additional responses to Q11.3 (that reflect funding methods in the pilot phase):

• In the prior phase, the financing came from an external telecommunications provider.
• It came from the development and testing: they realised that two consultations with two different physicians were required and that they needed to cover both

costs. Otherwise it was impossible to have both participating in the telemedicine consultation.

The following are some additional responses to Q11.5. They reflect the kinds of investors involved in the initiatives: National, *Revidert nasjonalbudsjett (*Revised National Budget).

- Ministry of Justice and the *Centro de Telecomunicaciones y Tecnologia de la Informacion* (this centre belongs to the public administration).
- Collaboration between provider and manufacturer.

4.1.2 Operating or on-going costs

The issue of operating on-going costs was covered in this survey by two questions:

> *Q11.1 Is the financing of the telemedicine service different from the financing of the health care sector in your country that is not using telemedicine?*
>
> *Q11.4 Please describe the payment structure of the service; i.e. who pays and how.*

In response to the question of whether financing of telemedicine is different from regular healthcare, almost half of the respondents indicated that it was not. Thus, overall, the financing for telemedicine is the same as for regular healthcare. However, a third of the respondents stated that the financing for telemedicine was different.

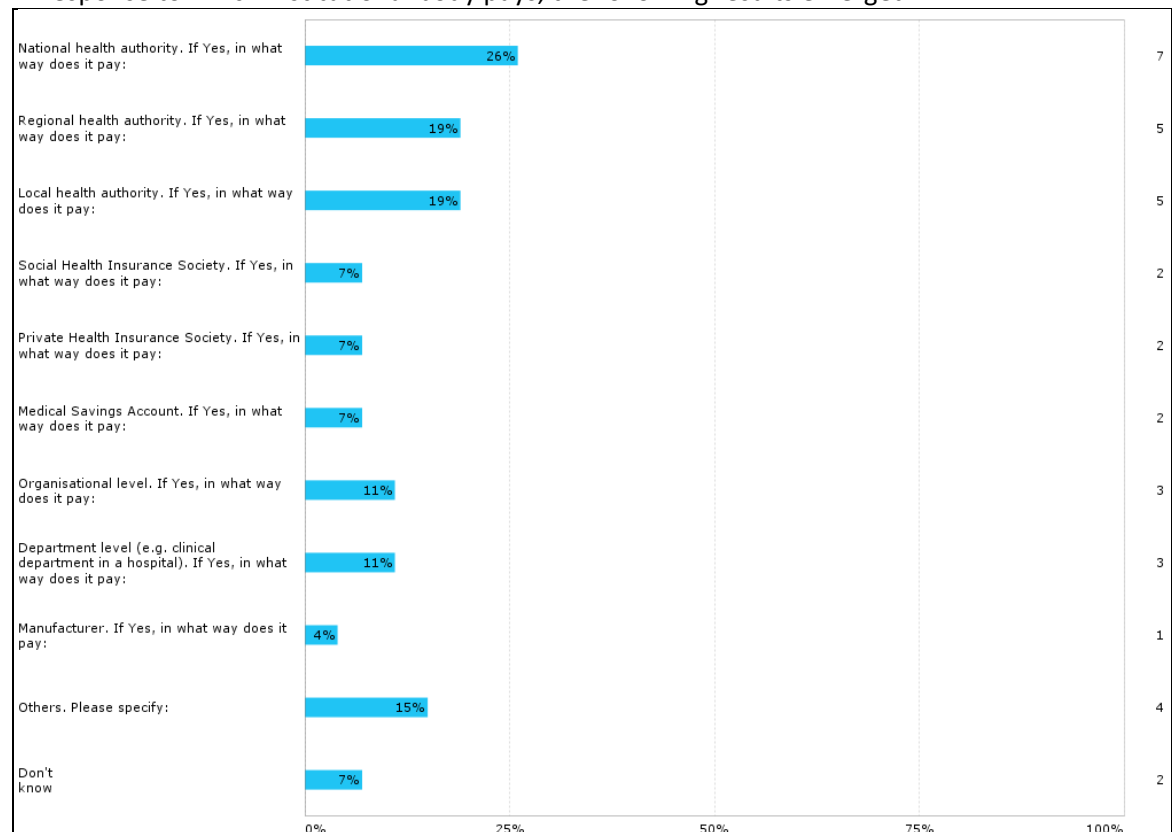In response to which institutional body pays, the following results emerged:

Figure 4: Responses to Q11.4: Payment structure

Since the instructions to respondents were to select all the institutional bodies that were applicable, there is no direct correlation between the responses to Q11.1 and Q11.4. It can, however, be noted that, in both sets of responses, the majority of the

telemedicine services were financed by the same public bodies that were financing regular health care.

The respondents who indicated that the financing was different were the following seven. Descriptions of each follow in the table below.

**Table 3: Programmes with financing that is different
from the general health care sector**

Country	Programme
Denmark	Health Optimum Diabetes Teleconsultation
Greece	Telecardiology Service of CardioExpress
Greece	Telehealth Service of Trikala
Norway	Norway COPD
Spain	ENDOBLOC
Spain	Guttman NeuroPersonalTrainer
Sweden	RxEye Remote Reading

Note: This table is ordered alphabetically by the name of the country in which the service or programme is located.

- Health Optimum (OPTIMisation throUgh telemedicine), approved by the European Commission in the eTEN programme is a project that is being financed by the European Commission as well as Odense Hospital, Denmark. It is assumed that, if the project is to continue beyond its European funding, it will be totally financed by the hospital/regions. The expected outcome of the on-going second phase of the project is an operational system which is deployed in all the regions and which is financially self-sustaining because it pays for itself through the savings that are achieved in the routine delivery of healthcare.
- The Telehealth Service of Trikala in Greece is funded by the Municipality of Trikala. However, health care in the country is generally provided by the state through a universal health care system, called the National Healthcare Service (or ESY). The Municipality of Trikala, located in central Greece, has designed a long-term strategic plan for the transformation of the local community, based on the opportunities created by the information society era. Telehomecare is planned to function as an alternative and complementary social service that can provide value-added healthcare to patients with chronic diseases, with a reduction in costs for the health and social care system and the improvement for the quality of life of the chronic patients.
- Telecardiology Service of CARDIOEXPRESS Telemedical Services S.A. is a company that was founded in Athens, Greece in 1993. The sole purpose of the company's foundation was to introduce telemedicine services. It specialises in cardiology. Today, CARDIOEXPRESS is one of the largest European telemedicine companies on the market. Its services are purchased either by the local health authorities, private insurers, or the patients themselves. The company is profitable as it also provides telemedicine services to the private sector. It supports hotels, ships, and ferries as well as large industrial groups such as manufacturers and oil distilleries.

- <u>Norway COPD Patient's Briefcase</u> is a programme for telemedicine assisted discharge of patients who experience chronic obstructive pulmonary disease (COPD) to their own home environment. The COPD patients' briefcase is intended to offer the patients more quality days in their home, shorter stays in hospital, and fewer readmissions. Home-dwelling patients with an FEV1 of under 50 % are the targeted population of the service. The Norwegian government has given financial support to the initiative. It is financed by the national health authority, which pays for the service with polyclinic rates.

- <u>ENDOBLOC</u> is a virtual community of professionals working with endocrinology diseases (including diabetes) at the University Hospital Arnau de Vilanova (Lleida, Spain) together with primary care physicians and nurses in the territory (country). It uses the official governmental platform called e-Catalunya. The e-Catalunya platform is a shared service platform, which is part of the corporate technological infrastructure of the Generalitat de Catalunya.

- <u>Guttmann, NeuroPersonalTrainer</u> is a telemedicine platform that allows intensive cognitive rehabilitation for patients experiencing cognitive impairment (Acquired Brain Injuries), dementia (aging), mental disorders, or intellectual disability. There are currently 21 operating platforms: hospitals, social health (*socio sanitario*), integrated care centres, and sheltered/nursing homes. This platform was developed, and continues to be operated, by the Institut Guttmann which has also invested its own funds to finance the project.

- <u>RxEye Remote Reading</u> is a teleradiology platform that offers companies a way to deal with the lack of radiologists/pathologists and the resourcing problems. It offers a simple and secure solution for engaging remote reviewers with transparent costs and flexible, yet secure, contracts. The service is a web platform that enables fast procurement processes and communication to work in a network where expertise, images and patient data can be exchanged. It is organised as a company that sells its own services. Private and public companies procure imaging diagnostics via RxEye in a manner that complies with the provisions of the Swedish Public Procurement Act.

One remark is needed with regard to the data provided in the responses to this question. Aside from the issue of "who pays", all of the other aspects of Q11.4 are very confused (even if they were intended to elicit additional information on the payment structure of telemedicine services). One of the respondents addressed co-payment by patients. For example, in the description of the Estonian home monitoring of diabetic patients service, it is indicated that there is some out-of-pocket payment by the patient. In the Norway electronic platform for integrated home care chronic ulcers, however, it was stated that "*The University Hospital of North Norway (UNN) bought the platform. UNN pays for the use of the service. The operation is free of charge for the patients, the home care personnel*". The issue of reimbursement to clinicians – which is considered to be a crucial subject in most countries that have contractual relationships with clinicians – was not addressed by any of the responses to this question.

4.1.3 Business case

Q11.2 Was a formal business case prepared for your telemedicine service?

About half of the respondents to this question answered that a formal business plan was prepared for the telemedicine service. For those who answered in the affirmative, Table 5 (below) shows who prepared and who accepted the business case.

The responses indicate that the business case preparation was done by a range of entities including diverse staff in the institutions themselves – sometimes senior decision-making staff and, at other times, IT management or marketing staff; staff in private corporations; consultants; and members of programme research teams.

Those who accepted (or on occasions, refused to accept) the business plans included the national ministry, funding programme members, the health board, the institution's board of directors, and staff.

In instances of the preparation of the business case and of its acceptance, the efforts undertaken, and the decisions eventually reached were made at very different levels according to the type of decision-making in the particular country/region or locale:

Table 4: Entities that prepared or accepted the business case

Programme	Entity that prepared the business case	Entity that accepted the business case
Denmark: COPD Briefcase	Iben Fasterholdt.	Board of directors.
Denmark: Teleinterpreting	Medcom with consultancy.	The Danish Public Welfare Technology Fund and National eHealth.
Estonia: home diabetes monitoring	It was prepared by the hospital and private companies which were responsible for telemonitoring devices and broadband connection.	It was not accepted by the consortium formed by hospital and private providers because of the lack of reimbursement from health insurance and [the] too small [a] number of out-of-pocket customers.
Greece: Telecardiology	CardioExpress SA with consultants.	Company manager.
Israel: chronic disease management	It was prepared jointly by the Maccabi and Gertner Institute senior staff.	The business plan was accepted and approved by the Maccabi CEO together with the head of the Gertner Institute.
Netherlands: remote intraoperative neuromonitoring	Head of department of clinical neurophysiology together with head of department of vascular surgery at that time.	Board of directors.
Slovenia: home care chronic pulmonary patients	Partners in a project (technological partners) and University Hospital Golnik.	Ministry for Health Slovenia.
Spain: Ithaca (Catalonia)	The IT department of the hospital together with the municipality.	Hospital management and the municipality.

Spain: Guttman NeuroPersonal trainer (Catalonia)	Marketing and Sales Department.	General Management.
Spain: Electronic Healthcare	The chief management staff.	The chief management staff.
Spain: RxEye remote reading	Management.	The investors and the initial customers.
UK: Telescot programme	Regional Primary Care Group.	UK Government funder.
UK: teledialysis	The National Peripheries Programme research team.	Health board.

Note: This table is ordered alphabetically by the name of the country in which the service or programme is located.

4.1.4   Relationship Between Financing and Benefit

Question 11.6 Is there a direct relation between those financing the service and those who receive the main benefits?
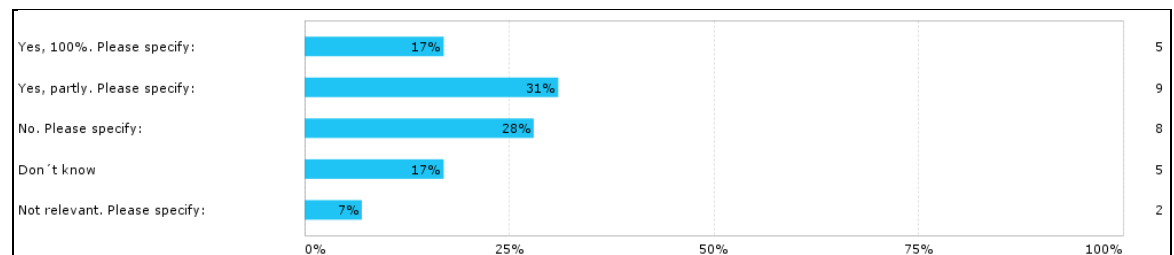

Figure 5: Responses to Q11.6: Direct relation between payers and recipients?

More responses were positive (47% – 14 – said "yes") than negative (28% – 8), although around a further quarter (24% – 7) indicated that they either did not know the answer or the question was not relevant. Respondents were asked to specify more detail with regard to their answers. The following were the comments for each of the above options.

For those who answered "yes, 100%" and "yes, partly", the explanations were basically that multiple parties benefit. The beneficiaries include not only those financing the services but others as well, such as patients and professionals.

For those who replied "no" the comments were:

- It is a bundled service,
- Funding is general – benefits are specific and local,
- Patients receive the main benefits,
- The regional Health Ministry paid and the savings were a profit for the justice ministry.

It should be noted that the choice of the answers, "yes, partly" and "no", was based on the individual approach of the specific respondent and the definition for that person of what constitutes "benefit". In some cases "benefit" was defined as a "health benefit", in others as "increased access, timeliness or efficiency", and in yet others as "cost savings".

4.1.5 User fees

> *Q11.7 Does the principle of a direct user fee apply to the delivery of the telemedicine service?*

Over one-half of the respondents (52% – 15) indicated that there was no direct user fee applied whereas for around one-quarter (24% of respondents – 7) this appeared to be the case either fully or partly. For around a further one-quarter (24% – 7) the question was either not relevant or the respondent did not know. The responses were as follows:
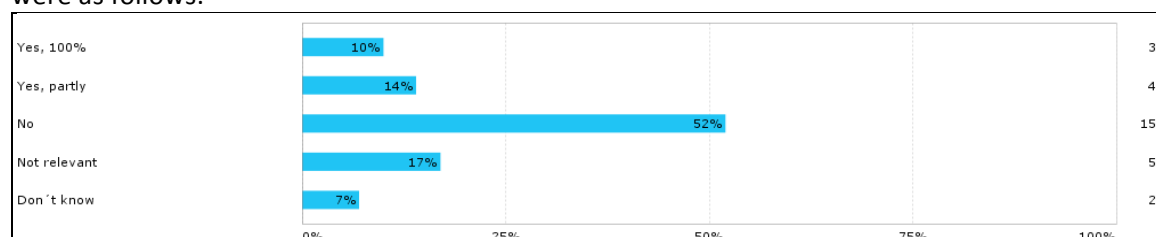
Yes, 100%	10%	3
Yes, partly	14%	4
No	52%	15
Not relevant	17%	5
Don´t know	7%	2

(scale: 0%, 25%, 50%, 75%, 100%)

Figure 6: Responses to Q11.7: Do user fees apply?

4.2   Synthesis of the stakeholder feedback process

In the second Momentum workshop held on 8 April 2013 in Berlin, the stakeholders particularly offered comments on the data from the survey on financing.

Stakeholders were especially interested in the results to the Q11.1 on whether the financing of telemedicine services is different from the general financing of the health care sector in the particular countries. With regard to Q11.6, and the status of the person developing the business case for specific telemedicine services, the stakeholders were curious whether the person involved in this process in a specific initiative was always the same person; they were also keen to comment that those who plan or design the service are not necessarily those who benefit from it. The perception of the benefits emerging from a particular telemedicine service can be quite varied.

The notion of a business case is especially complex. For example, a business case can be much more than simply an economic plan; patients' views might need to be given greater weight. It was proposed that the character of a business case, and what it means, needs to be defined much more clearly: so that, besides money, a business case could also include such elements as time; resources; and a patient perspective.

Overall, the stakeholders also required more information on reimbursement issues, since they considered that reimbursement/financing might be a more important issue than this survey tends to show, e.g., either with relation to the reimbursement of physicians/clinicians or the reimbursement of care treatment for the patient.

4.3   Synthesis of the literature review

An article by Bashshur et al. (2013, p5) on "Sustaining and Realizing the Promise of Telemedicine" points out that the promise of telemedicine rests on the three pillars of care: improved access (e.g., access in remote areas); enhanced quality (e.g., access to more qualified professionals); and cost containment (Op. Cit, p6). The authors maintain that a comprehensive definition of cost containment is needed over and above the opportunity costs for patients, and/or providers and should not be limited to obviating or reducing the need for travel. It is critical to understand the processes by which telemedicine would reduce redundancy and waste of resources, reduce

intensity of care while minimising adverse events, and provide less costly interventions while producing similar health outcomes.

The same authors conducted a review of well-established US telemedicine academic medical centre programmes, which revealed a set of creative business strategies or serendipitous circumstances that led to their initial start-up. These include:

• Securing start-up as well as competitive grants and "set aside" line items in federal and state agency budgets,
• State advocacy (and some advocacy at the national level) to enact laws aimed at removing reimbursement barriers for telemedicine services,
• Direct state sponsorship of services,
• Institutional funding,
• Membership fees from participating sites,
• Private donations.

The most successful programmes have relied on a combination of all of the above mechanisms (Op. Cit, p6).

A study performed in 2005 to examine the relationship between financial factors and decisions to employ telemedicine attempted to identify the financial indicators that are of greatest concern to decision-makers (Smith 2005). The basic research question was whether "financial indicators play a major role in decisions to deploy telemedicine". The work showed the relative importance of the following five financial indicators:

• Initial or capital investment,
• Operating or on-going costs,
• Profitability or net income,
• Cash flow,
• Reimbursement.

Not surprisingly, the results were that financial issues are a major concern for decision-makers – whether they are administrative, clinical, financial or technological. The three most important factors were: initial capital investment, annual operating expenses, and reimbursement. The latter factor supports Moore's contention that reimbursement appears to be the largest barrier to wide-scale deployment of telemedicine (Moore, 1996).

In investigating the procurement (i.e., commissioning) of eHealth, Vogt et al (2011) draw on the examples of four telehealth initiatives. From the perspective of Momentum, these examples are interesting since at least one of them is the same as those submitted to the project's November 2012 survey questionnaire (e-Trikala) and another has been presented at a Momentum workshop (Berlin, April 2012) (Ibid 2011, p26/27). In contrast to the Momentum services, these procurement initiatives are by no means small or unconnected initiatives. For example, they include England's Whole System Demonstrator projects (a national attempt to introduce three very large-scale telemedicine pilots).

5. Assessment of outcomes [Question 12]

All of the services surveyed, with one exception, have performed or are in the process of performing some type of outcomes assessment. Many of the services used more than one assessment methodology. Forty-three per cent (12) of respondents used some type of experimental design, the most prevalent being the pragmatic controlled trial. Thirty-two per cent (9) used a non-experimental design, most frequently these were case studies. One-quarter (7) did not know what type of assessment was performed. As there were only 24 respondents that answered these questions, it is clear that some organisations used both experimental and non-experimental types of designs. The most frequent topics assessed were, in order of frequency: clinical effectiveness, organisational aspects, patient perspectives, and economic aspects. For those services that already have assessment results, the results are predominantly positive. However, in seven of the cases, the evaluation was still on-going at the time of the survey.

5.1 Synthesis of the answers to the questionnaire

All of the respondents to the questionnaire answered all of the questions with the exception of one case, the Swedish RxEye Remote Reading Programme.

The range of validated methods used to evaluate telemedicine services is surprising. It is revealing, however, that specific but simple methods are currently absent.

The questionnaire on the question of assessment of outcomes was very well structured, and therefore the responses were quite clear and straight forward.

As in all other sections, a discussion of the responses to each question is preceded by the question itself:

> ***Q12.1 How were the effects and consequences of the implementation of the telemedicine service measured / evaluated?***

The survey findings indicate that the main types of measurement/evaluation of the effectiveness and consequences of the implementation of the telemedicine services are clinical studies (non-randomised controlled trials) (11 – 39%); clinical trials (randomised control trials) (8 – 29%); health technology assessment (7 – 25%); comparative effective research (7 – 25%); and other (7 – 25%). A reasonable number of economic evaluations (6 – 21%) and business cases (5 – 18%) were also used as methods. These findings indicate that, both historically and at present, the evaluation methods used are quite diverse in terms of their approaches.
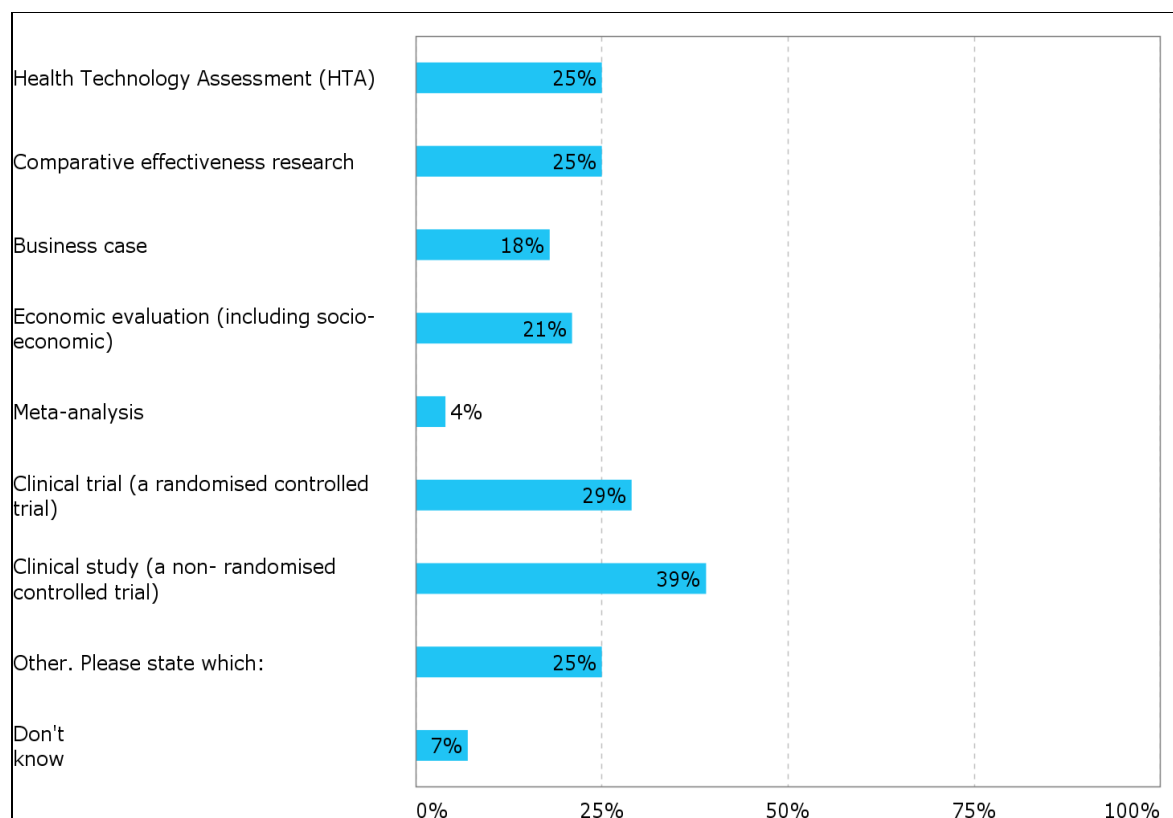
Health Technology Assessment (HTA) — 25%
Comparative effectiveness research — 25%
Business case — 18%
Economic evaluation (including socio-economic) — 21%
Meta-analysis — 4%
Clinical trial (a randomised controlled trial) — 29%
Clinical study (a non- randomised controlled trial) — 39%
Other. Please state which: — 25%
Don't know — 7%

Figure 7: Responses to Q12.1: How were effects measured / evaluated?

Respondents were asked to tick all relevant answers to Q12.1. In many cases, respondents did in fact tick more than one box.

Several respondents also made additional comments. These remarks elaborated further on the diversity of evaluation methods that are being used, including interviews, studies, and statistical analysis. Several of the responses emphasise the use of qualitative methods.

Some examples follow:
- The Greek Telecardiology Service did a qualitative study,
- The Greek Sismanoglio Center maintains statistics of the telemedicine service,
- The respondent for the Norway Electronic Platform for Integrated home care of chronic ulcers indicated that there are two on-going research projects in this domain. One has just started, the other one will be completed in a year or two. The two on-going projects use different methods. One uses a randomised controlled trial; the other takes a qualitative approach,
- The respondent for the Norway Teledialysis programme stated that the effects and consequences of the introduction of the service are not being systematically measured/evaluated any more since the actual project stage was completed ten years ago,
- The respondent for the Norway Decentralized Psychiatrist on Call Service (that uses videoconferencing) wrote that the research project was designed to follow the implementation,
- The Norway COPD Patient's Briefcase is doing a user survey,
- The Swedish Electronic healthcare programme is doing Interviews with patients and staff.

One respondent (the Norway Teledialysis service) commented that "*The effects and consequences are not systematically measured / evaluated after the project period ten years ago*" implying that a well-established service perhaps no longer needs on-going evaluation. It is perhaps also possible that, at a late stage of maturity (with over a decade of operation), a service needs monitoring and assessment of other factors than the ones initially assessed.

> **Q12.2 What methods were used to collect evidence / documentation of the effects of the telemedicine service?**

The responses to Q12.2 seem to imply that more programmes used an experimental design of some type than a non-experimental design. However, the percentage of "don't know" responses is very high. Efforts should be made in a next stage of the study to see if these "don't know" answers indicate that these programmes were not systematically assessed.
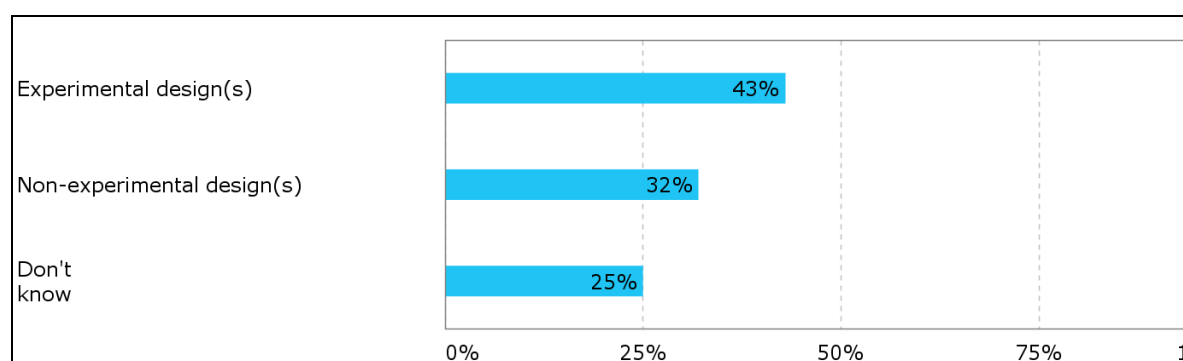

Figure 8: Responses to Q12.2(a): How was evidence collected?

The respondents to this question who indicated that assessment was done by experimental design were asked to specify which designs they had used; they were instructed to tick all relevant answers. The results show that the most popular design was the pragmatic controlled trial. However, some programmes used a combination of designs.
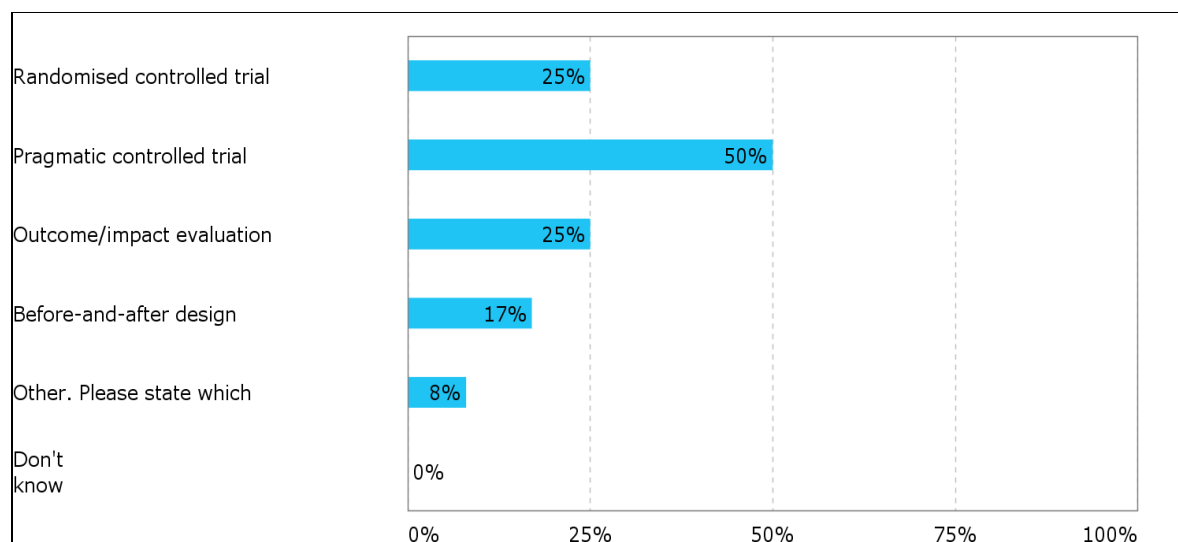
Figure 9: Responses to Q12.2(b): The types of experimental design used.

The programmes that used a Randomised Controlled Trial were:

- Estonia Home Monitoring of Insulin dependent diabetics (an initiative that was discontinued),
- Israel (Maccabi) remote monitoring of patients with severe Congestive Heart Failure,
- The UK Telescot Programme.

The programmes that used the Pragmatic Controlled Trial were:

- Denmark COPD briefcase,
- Greek Telehealth Service of the Municipality of Trikala,
- Spain Xarxa Telelctus,
- Spain Ithaca – the respondent added that they assessed impact using a before and after design,
- Slovenia Home care for chronic pulmonary patients.

The programmes that used outcome/impact evaluation were:

- UK Teledialysis,
- Spain Ithaca (as noted above in combination with a pragmatic controlled trial),
- Portugal Telecardiology.

The respondent for the Spain ECOPIH programme ticked "other", and commented that the number of medical referrals observed among those clinicians using ECOPIH is much lower than the number of medical referrals in the control group (that is, of those professionals who are non-users of ECOPIH).

For programmes that used a non-experimental design, case studies were used most often (5 – 71%), followed by observation studies (4 – 57%), time-series analysis (3 – 43%) and process evaluation (3 – 43%).

The case study method has been used often, and was used by the following programmes:

- Greece Telecardiology service,
- Greece Sismanoglio Telemedicine Center,

- Norway Decentralised Psychiatrist on Call Service. They also did qualitative interviews,
- Denmark teleinterpretation service. This service also did an observational study and a time series analysis.

The programmes that indicated that they undertook an observational study were:

- Spain ENDOBLOC,

- Netherlands Remote intraoperative Neuromonitoring which also did a time series analysis and a process evaluation.

> **Q12.3 Please indicate the number of patients with which the telemedicine service was tested/piloted (do not include the control group if one was used).**

The number of patients with which the telemedicine service was tested/piloted (an experimental group only in those cases where a control group was used) was as follows:
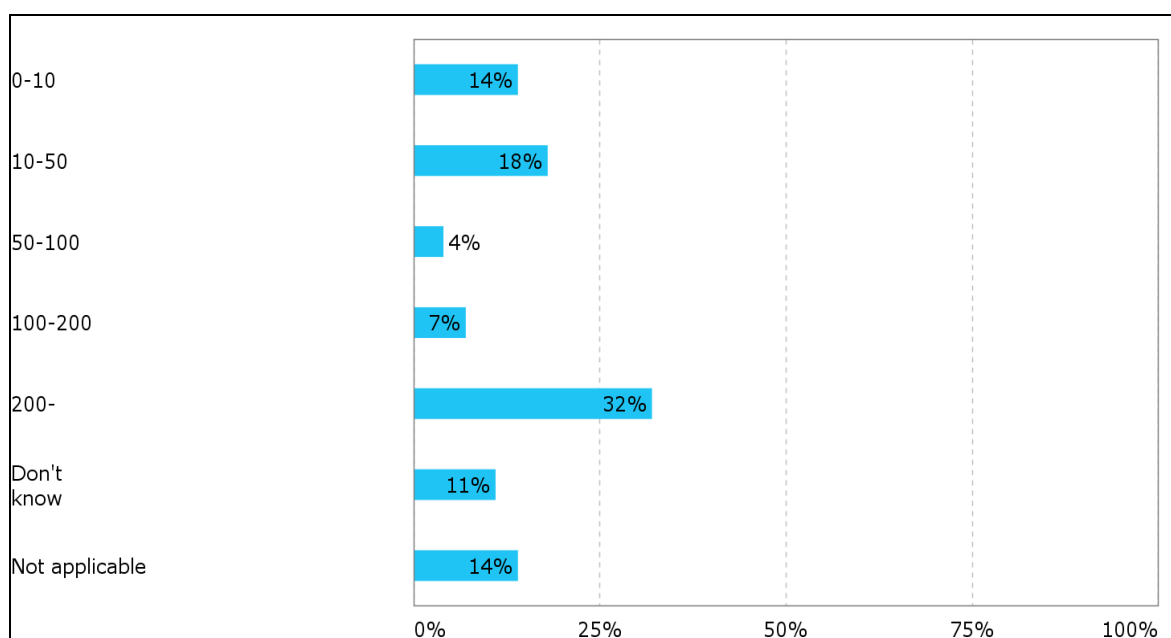

Figure 10: Responses to Q12.3: Number of patients

As a significant number of programmes (32% – 9) answered "200+" it is probably worthwhile to find out from the questionnaire respondents what the larger numbers were.

However, perhaps more significantly, 43% of responses (12) indicated patient piloting sample numbers of fewer than 200! This possibly shows a limited impact of the telemedicine services in the population, but may be explained by the fact that these services were early implementers, who self-organised their initiatives locally, and hence they perhaps did not affect large numbers of patients/citizens.

> **Q12.4 Which topics were included in the evaluation / assessment you performed? Please tick all relevant options regardless of what type of study or methods you used**

The topics covered most often in the evaluation/assessment included clinical effectiveness (23 – 82%), organisational aspects (19 – 68%), patient perspectives (17 – 61%), economic aspects (14 – 50%), and health problems (13 – 46%).

> **Q12.5 Please name the overall outcomes/results of the evaluation?**

In terms of the initiatives that examined the overall positive outcomes of their telemedicine services, the range was from 86-71%, in terms of clinical effectiveness (86%), quality of life (84%), higher job satisfaction (79%), patient empowerment (75%), and financial consequences/benefits (71%).

The results are as follows:

5.1.1 Financial consequences/benefits

Almost all of the programmes (20) assessed the financial consequences and benefits of the service. In 74% (14) of the cases, the results were overall positive whereas in four of the cases there was no change. Only one programme reported negative financial outcomes.

5.1.2 Clinical effects

The majority of the programmes (24) assessed clinical effects. Of these, 14 reported positive outcomes and four reported no overall change.

5.1.3 Quality of Life for patient

Twenty-one programmes assessed quality of life for the patient. Sixteen reported positive outcomes. Three programmes stated that there was no overall change in quality of life.

5.1.4 Patient Empowerment

Only half of the programmes (14) assessed patient empowerment. Of these, nine indicated that the assessment showed positive outcomes, while three programmes showed no overall change.

5.1.5 Job satisfaction

Fifteen (54%) of the programmes assessed whether there was any impact of the service on job satisfaction. The majority (11) found that the impact on job satisfaction was positive.

5.1.6 Other Outcomes

The survey asked the respondents if there were any other outcomes assessed other than those cited above. As can be seen in the figure (below), seven out of 12 of the cases that answered this question indicated that the evaluation of the programme is still on-going. This fact therefore reflects on the responses to all of the above questions. In many cases where the outcomes are being assessed, the results of the evaluation are not yet available.
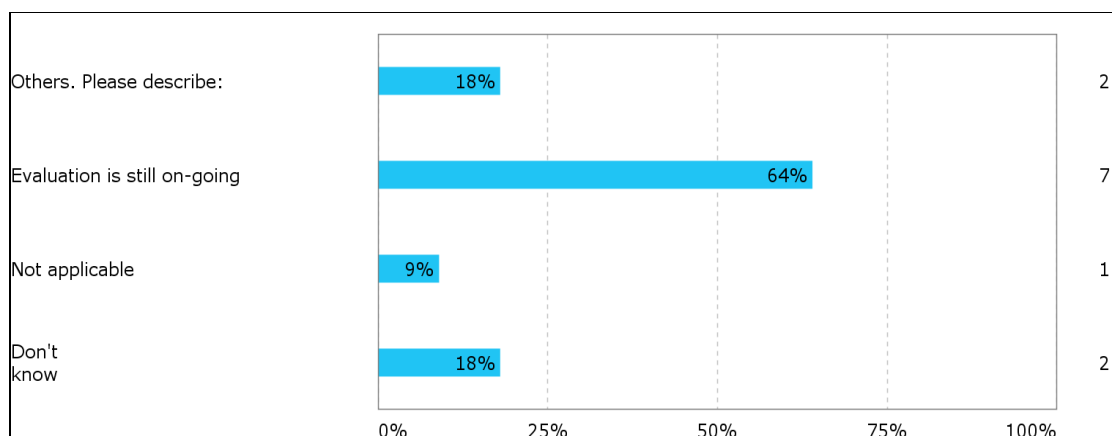
Figure 11: Responses to Q12.5(f): Other assessments

The two projects that ticked "Others" (in terms of other outcomes) made the following comments:

- The respondent for the United Kingdom Telescot Programme indicated that two main projects have been evaluated: one was positive; the other showed no effect. Both were more expensive than usual care,

- The respondent for the Norway Electronic Platform for Integrated Care of chronic ulcers noted that the outcome cannot be described now, as these evaluation/assessment studies are still running.

The programmes that indicated that an evaluation is still on-going are:

- Denmark Health Optimum,
- Israel Chronic Disease Management,
- Norway Decentralised psychiatric on call service,
- Spain ECOPIH,
- Spain Xarxa,
- Spain ENDOBLOC.

With so many programmes (about one-third) that have evaluations that are still in process, it needs to be recognised that this has implications for the results cited with regard to the various outcomes of the initiatives. What can be said at this point of the Momentum study is that almost all of the programmes reported are assessing and evaluating most of the following five outcome components:

- Financial Benefits,
- Clinical Effects,
- Quality of Life,
- Patient Empowerment,
- Job satisfaction.

Furthermore, for those programmes that have completed (or partially completed) outcome assessment, the results appear to be generally positive.

A few other comments may be made with regard to this section of the questionnaire on assessment/evaluations:

- It is obviously difficult for initiatives that ended over a decade ago (e.g., in Norway) to describe precisely what evaluation methods (if any) were used in an early stage of the initiative.

- A wide variety of evaluation methods appear to be being used currently: they range from quantitative to qualitative.
- Several of the countries that appear to be undertaking evaluations are the Nordic or northern European countries.
- From a technical point of view, this part of the questionnaire was well thought out and well structured.
- It is, however, suggested that a more in-depth analysis of the outcomes be done at a later stage in the Momentum project, when most of the programmes will have completed their evaluations, and after a greater number of questionnaire respondents have been included in the analysis.

5.2   Synthesis of the stakeholder feedback process

In the second Momentum workshop held on 8 April 2013 in Berlin, the stakeholder feedback on evaluation was quite limited. However, the stakeholders did indicate that they were especially interested, in terms of Q12.1, in the kinds of evaluation/assessment methods used. They desired to see a detailed degree of explanation of the various methods. In addition, they thought it might be useful to develop some form of use case validation.

5.3   Synthesis of the literature review

"*The initial impetus behind the development of telemedicine was its intuitive appeal as an effective substitute for in-person medical care and as an efficient tool in developing integrated systems of care*." (Bashshur et al, 2005).

While this appeal has been supported by substantial experiential data in various settings and clinical applications, as well as a growing body of empirical knowledge, the field of telemedicine evaluation still faces many barriers and has not yet reached full maturity. Despite this situation, telemedicine continues to proliferate and is experiencing rapid growth. There are great expectations that telemedicine will benefit many players: local authorities (through cheaper specialised services), hospitals, primary healthcare centres (with improved services and increased supply of expertise); patients (changes in state of health and quality of life, and savings in costs and time); healthcare personnel (increased proficiency); employers (reduced absenteeism from work); and the social insurance system (through reduced reimbursements) (Ohinmaa et al, 2001).

At the same time, policy-makers and decision-makers are seeking evidence for "return on Investment" as a basis for investing in and financing telemedicine. Along with the professional commitment to evidence-based healthcare, this has continued to spur considerable efforts in developing the appropriate methodologies for assessing the impact of telemedicine. There is consensus that the goal of evaluation should be to produce objective and credible evidence regarding the merits of telemedicine (Bashshur et al, 2005, p297). However, there is still considerable debate as to the most appropriate methodologies for assessing and evaluating telemedicine. Bashshur and colleagues point out that since the telemedicine field (including technology and applications) is in constant flux, the most appropriate evaluation should be aimed at investigating the benefits and costs of alternative modalities and various dynamic combinations and configurations of technology, human resources, and health applications. Dávalos et al (2009) point out that there is a need for rigorous economic evaluation of telemedicine programmes without

which the field will continue to suffer from a lack of reliable, comparative economic data for policy-makers, health administrators and other stakeholders.

The literature is replete with articles describing telemedicine projects and how they were evaluated, and there is a not inconsiderable amount of literature dedicated to evaluation approaches and methodologies. In 1999, Ohinmaa and colleagues published the results of a project funded by the International Network of Agencies for Health Technology Assessment (INHATA) for the development of general principles and a systematic review of the assessment of telemedicine, which was summarised in an article published in 2001 in the International Journal of Technology Assessment in Health Care (Ohinmaa et al, 2001). The focus was on the use of telemedicine in routine care, rather than in experimental situations or feasibility studies. The assessment framework included the following general concepts:

- The development of a business case for the telemedicine application.
- Initial assessment of its use and longer term assessment after it moves into routine use.
- Comparison between the present (non-telemedicine) system, the present system when upgraded and the telemedicine alternative.
- Assurance that the telemedicine option is sufficiently mature for assessment to be meaningful (prototypes not fully integrated with the healthcare system can be assessed in pilot studies but these only provide an interim indication for feasibility).
- Assessment of substantial changes to healthcare processes such as the structure of personnel used, legal responsibility and the place and nature of the interventions
- Assessment of changes in patterns of care, including quality of service, time, availability, health outcomes and patient satisfaction.

The general hierarchy for the evaluation of telemedicine applications included the following stages to be considered in addressing the efficacy and effectiveness of the technology:

- **Technical Assessment** including the technical quality of the images after a transmission and whether the transfer of all data was made successfully.
- **Diagnostic and Therapeutic Effectiveness**.
- **Study Design** – while randomised controlled trials offer the strongest evidence for decision making, their use in telemedicine to assess the efficacy of the technology may not be widely generalisable and will not necessarily be more than a general guide to the effectiveness of the telemedicine application.
- **Quality of Life Measures** – the relatively short-term intervention of most telemedicine applications and the indirect nature in health effects are impediments to the long term measurement of outcomes, including quality of life.
- **Costs of Telemedicine** – direct, indirect, and intangible.
- **Economic Evaluation Methods** – cost minimisation analysis (the most frequently used approach), cost-effectiveness analysis, cost-utility analysis and cost benefit analysis. The authors comment that, although the basic theory of economic evaluation is reasonably clear, its implementation to telemedicine is less certain. Difficulties can be found in the estimation of both the effectiveness and the cost side of the analysis.
- **Sensitivity Analysis** – in which cost and outcome factors are simulated under various basic assumptions in order to make some allowance for future

developments. The four broad areas of uncertainty in the analysis relate to variability in sample data, generalisability of results, extrapolation, and analytical methods

- **Summaries of Monetary and Nonmonetary Factors –** such as a social audit approach bringing together monetary and nonmonetary factors in different areas of impact for comparison, with additional detail and values being included as assessment results become available (Ohinmaa et al, 2001).

The MAST model for assessment of telemedicine applications developed as part of the European Union-funded MethoTelemed study was also strongly influenced by Health Technology Assessment methodology. Yet, the method underwent considerable adaptation and significant changes to assure its appropriateness to some of the unique attributes of telemedicine applications. The MAST model is also meant to be used in the assessment of "mature" telemedicine applications. It is based on three main steps:

- **Preceding Consideration** which addresses the purpose of the telemedicine application, whether there are relevant alternatives, the level of the assessment (international, national, regional or local), and the maturity of the application.

- **Multidisciplinary Assessment** that includes the health problem and the characteristics of the application, safety, clinical effectiveness, patient perspectives, economic aspects, organisational aspects, socio-cultural, ethical and legal aspects.

- **Transferability Assessment** which addresses whether the application can be used cross-border, its scalability and generalisability (Kidholm et al, 2012).

Dávalos et al (2009) concentrate on the economic evaluation of telemedicine. They review the economic evaluation methods including cost analysis (usually the main focus of most economic evaluations of telemedicine), cost effectiveness analysis which considers both costs and outcomes, and cost-benefit analysis. The authors view the latter as a particularly useful approach in telemedicine, noting that it has so far been used only infrequently. This could be due to several facts: it is data intensive and technically sophisticated and, moreover, requires assigning monetary values to outcomes such as health improvements. In their article on the economic evaluation of telemedicine (Op. Cit., 2009), they present research guidelines for conducting cost-benefit analyses of telemedicine programmes, emphasising opportunity cost estimation, commonly used programme outcomes and monetary conversion factors to translate outcomes into monetary values.

After a detailed review of the impediments, problems and unique challenges of telemedicine evaluation (including the fact that telemedicine continues to evolve in scope, application and underlying technology, hence making it futile to evaluate it as a fixed entity), Bashshur et al (2005, p308) propose a multidimensional cumulative evaluation approach which is in many ways very consistent with the underlying goals of the Momentum project. Their proposal is to fund large-scale experimental telemedicine programmes and projects that can be designed and implemented to collect data sufficient to test specific dimensions and effects of the technology. Data from these kinds of studies can then be assessed with statistical confidence to draw probable and credible conclusions. They use a three-dimensional model (as depicted in the figure below) for evaluating telemedicine on the basis of the varied perspectives of the client, provider, and society at large, the specific clinical or other application, and the technological configuration
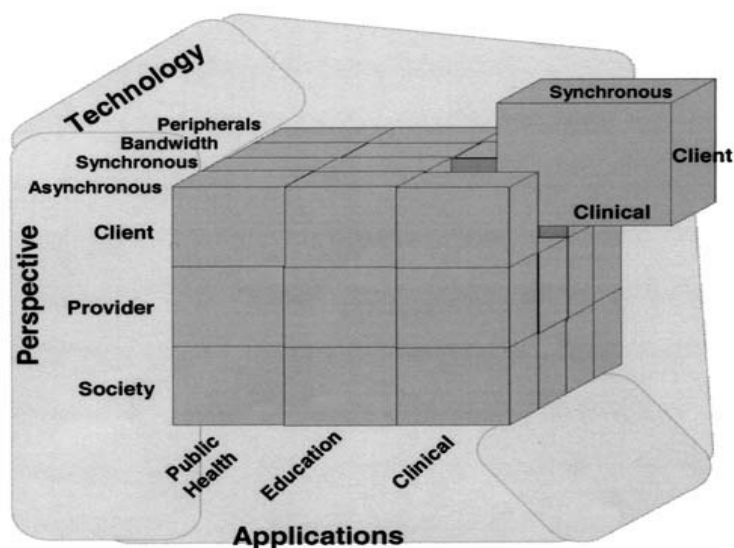
Figure 12: Technologies, perspectives, and applications (Bashshur et al, 2005)

This model is meant to provide a framework for interpreting and integrating research findings from different empirical studies by compiling them over time in a coherent set. The findings from each study or set of studies on the same topic may be used to fill in one compartment or cube in the model. This can subsequently be added to findings from other studies for a cumulative total that combines all other studies in the other compartments until the picture is complete (Op. Cit., p308).

A second, concomitant strategy for evaluating telemedicine uses a triangulation process which involves the application and combination of several research methodologies in studying the same phenomenon. It combines multiple sources of data, theories, methods and empirical materials. The authors suggest that such triangulation may overcome the weakness of research design or intrinsic biases that come from small studies with inconclusive findings. The components of the proposed triangulation process are illustrated in the figure (below):
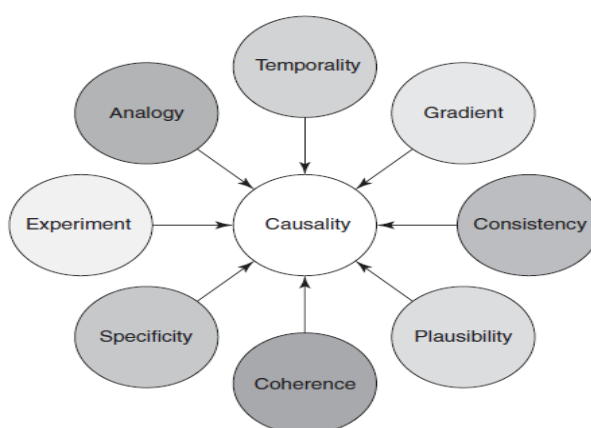

FIG. 2. Causality in telemedicine.

Figure 13: Causality in telemedicine (Bashshur et al, 2005)

The following is a brief description of the eight components included in the figure:

- Temporality deals with the duration of the telemedicine programme; that is, the longer the programme has been in existence, the greater will be the observed impact.
- Gradient refers to the increase or decrease in access for persons using telemedicine versus those who use in-person care for the same conditions and the same severity of illness.
- Consistency pertains to the degree of consensus on the impact of telemedicine on access obtained from a wide variety of people, places, settings, and applications, interaction processes.
- Plausibility describes a decreasing probability of interaction with a place as the distance from that place increases.
- Coherence means that the increase in accessibility is compatible with existing theory and knowledge.
- Specificity occurs when it is possible to demonstrate that a single aspect of telemedicine is associated with a single effect on access.
- Experiment involves the demonstration that, under controlled conditions, changing the exposure causes a change in the outcome.
- Analogy involves the application of a commonly accepted phenomenon in one area to another area. For telemedicine and access, this would refer to the voluminous literature that supports the notion that placing a medical facility closer to its target population increases utilisation of the service by that population (Ibid pp. 312-3).

In summary, Bashshur and colleagues present two strategies, which should be pursued in conjunction with each other and facilitate the integration of results from both quantitative and qualitative research designs (Ibid, p. 315).

6. Observations or concerns

Momentum will reach its overall aim of providing European Momentum for Mainstreaming Telemedicine Deployment in Daily Practice incrementally through the gathering of data and creation of a Telemedicine Deployment Blueprint. This report is to be considered as a step in this direction, and thus as a work in progress. As the data gathering and stakeholder involvement process continues throughout the lifespan of the Momentum project, SIG 1 will incorporate the knowledge and information obtained on a continuing basis.

The content of SIG 1 Report on 'Strategy and management section of the Blueprint developed by practitioners' is based on the survey information available through the Momentum questionnaire, as per November 12, 2012.

There are a number of reservations with regard to the data quality and representativeness, and the sample size. There are several difficulties with the wording of the questions. In particular, the size of the sample of respondents is not always clear nor is the exact percentage of respondents. Ideally, a standard way of referring to these numbers and percentages should be used. In particular, in figures referring to texts where multiple responses to a specific question were feasible, this should be highlighted. Figures should especially identify this fact, i.e., by specifying "N = [...]".

Hence, if the survey were to be conducted again, the questions should be modified or clarified. Methodologically, the use of focus groups or Delphi Groups at a later stage of the Momentum project might be a useful re-orientation of the data gathering method.

Apart from other sources of information – from stakeholders and from the literature – the information on the telemedicine services reported in this report is displayed directly as it appears in the questionnaire response. This means that missing, unfinished, or unclear responses have not been further clarified at this point in time. Any data quoted from the questionnaire itself, whether numeric or textual, must be read and considered in that context.

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