D7.1 MAST 1.0 Validation Workshop

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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This deliverable contains original unpublished work except where clearly indicated otherwise.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.

Executive summary

This deliverable includes the background information and results of the MAST 1.0 validation workshop.

The MAST 1.0 validation workshop is part of WP7 in SmartCare as the use of MAST represents one of the synergies between BeyondSilos, CareWell and SmartCare.

Several decision makers and experts in the field of telehealth were invited to the workshop to support the validation process that was built around the concept of a modified Delphi process.

The validation of the original MAST model serves as the basis for the further adaptation of the model to evaluations of integrated care.

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1 Introduction

1.1 Purpose of document

This deliverable includes the background information and results of the MAST 1.0 validation workshop held on 16th March 2016 in Brussels and results from the final Delphi round.

The MAST 1.0 validation workshop is part of WP7 in SmartCare as the use of MAST represents one of the synergies between BeyondSilos, CareWell and SmartCare.

1.2 Background to MAST

In 2009, the EU commission initiated the MethoTelemed project with the objective of developing a generic framework for the assessment of telemedicine. The idea was that this could be used as the basis for decision making in the healthcare systems in Europe and thereby improve the basis for evidence based decision making.

The MethoTelemed project resulted in the development and publication of MAST (Model for Assessment of Telemedicine) (Kidholm et al., 2012). Subsequently, MAST has been used and is being used in a number of large European telemedicine projects:

- Renewing Health   19 RCT studies, 7.000 patients
- United4Health   3 observational studies, 10.000 patients
- SmartCare   1 observational study, 9.000 patients
- BeyondSilos   1 observational study, 10.000 patients
- CareWell   1 observational study, 13.900 patients
- InCASA   5 feasibility studies, 150 patients
- MasterMind   1 observational study, 5200 patients
- Connected4Health   6 feasibility studies, 200 patients

On the basis of these and other projects, MAST has been used in a number of publications in scientific journals (Charrier et al., 2016, Rosenbaek Minet et al., 2015, and Rasmussen et al., 2015). Thus, the value of MAST for researchers who carry out assessments of telemedicine has been demonstrated. However, the validity of MAST for the decision makers who are supposed to use the results based on MAST in the end has remained unclear.

The objective of this workshop, a part of WP7 in the SmartCare project, is therefore to assess the validity of MAST, by asking a group of European healthcare decision makers about the validity of the information included in MAST.

1.3 Outline of MAST

The objective of MAST (Kidholm et al., 2012) is to produce a basis for decision makers when decisions on investment in new telemedicine services have to be made.

MAST can be used to describe the effectiveness and contribution to quality of care of telemedicine applications, and to produce a basis for decision making. An assessment based on MAST includes a multidisciplinary process which summarises and evaluates information about the medical, social, economic and ethical issues related to the use of

telemedicine in a systematic, unbiased and robust manner. In practice, MAST includes three elements:

1. Preceding considerations of a number of issues to be considered before an assessment of a telemedicine application is initiated, e.g. maturity.

2. A multidisciplinary assessment of the outcomes of telemedicine within seven domains:
   o Domain 1: Health problem and characteristics of the application
   o Domain 2. Safety
   o Domain 3. Clinical effectiveness
   o Domain 4. Patient perspectives
   o Domain 5. Economic aspects
   o Domain 6. Organisational aspects
   o Domain 7. Socio-cultural, ethical and legal aspects

3. An assessment of the transferability of results found in the scientific literature and results from new studies.

1.4 Glossary

KPI   Key Performance Indicators

MAST   Model for Assessment of Telemedicine

2   Method

2.1 Face validity

The type of validity tested in this validation workshop is called face validity. Face validity is defined as the extent to which MAST is subjectively viewed as covering the concept it purports to measure (Gravetter, 2012). Therefore, this type of validity can be tested empirically by examining a group of experts' opinion of the model and its content.

Face validity should be distinguished from the term "construct validity" which is the degree to which a test measures what it claims, or purports, to be measuring (Beck, 2012). Evaluation of construct validity is more challenging because it requires the correlation of the measure to be examined with regard to variables that are known to be related to the construct.

2.2 Delphi process

The method used in the validation process is the Delphi technique (Hsu et al., 2007). This technique can be used to achieve convergence of opinions concerning real-world knowledge solicited from experts within certain topic areas.

The aim of the technique is to conduct detailed examination and discussion of a specific issue for the purpose of goal setting, policy investigation or prediction of the occurrence of future events through a group communication process.

The Delphi technique is suited as a method for consensus building, using a series of questionnaires to collect data from a panel of selected subjects (Hsu et al., 2007). In practice, the Delphi process involves three to four rounds:

- Round 1: Collection of information with an open-ended questionnaire followed by conversion of the information into a well-structured questionnaire which is used for the second round. Using reviews of the literature as the basis for this first round is a common modification.

- Round 2: Each Delphi participant receives the structured questionnaire, and is asked to rate or rank-order the items in the questionnaire, whereby areas of disagreement or agreement are identified.

- Round 3: Each Delphi panellist receives a questionnaire that includes the items and ratings summarised by the investigators in the previous round, and is asked to revise his/her judgements or to specify the reasons for remaining outside the consensus.

- Round 4: The list of remaining items, their ratings, minority opinions and items achieving consensus are distributed to the panellists. This is often the final round, but the number of Delphi iterations depends largely on the degree of consensus sought by the investigator, and can vary from three to five.

The modified Delphi process in this validation process included the following rounds, similar to a Delphi study by Jeon et al. (2014):

- Round 1: Development of a structured questionnaire about the importance of the different domains and topics in MAST based on the description of MAST in Kidholm et al. (2012).

- Round 2. Presentation of information about MAST and examples of the use of MAST to the panellist at the workshop, and subsequently asking the panel to answer the Delphi questionnaire at the workshop.

- Round 3: Discussion of the validity of MAST at the workshop.

- Round 4: Submission of the questionnaire and the results from the second round to the panel. This is done four weeks after the workshop.

3 The MAST validation process

3.1 The questionnaire (Round 1)

The structured questionnaire includes questions about the importance of the seven MAST domains and the 26 topics within the domains. In addition, seven questions were included in the questionnaire about the importance of information related to the transferability of information from the different domains.

Finally, the questionnaire included two open questions about other aspects or outcomes of telemedicine. One question concerned aspects currently missing which should be part of the basis for making decisions on investments in telemedicine. The other question concerned whether some outcomes within the MAST domains should be excluded from the basis for making decisions on investments in telemedicine.

The questionnaire is presented in Appendix B.

To assist the respondents, examples of the different topics were included in the questionnaire.

The importance of each domain and each topic within each domain was assessed on a 0-3 Likert scale:

- 0 = Not important.
- 1 = Somewhat important.
- 2 = Moderately important.
- 3 = Highly important.

A proportion of 70% or higher viewing each domain and topic as "Moderately important" or "Highly important" was used as an indication of stability of the participants' consensus with regard to the face validity of the domain or topic. A similar approach was used by Jeon et al. (2014) in a study of healthcare managers' perception of the face validity of a framework for clinical leadership. This criterion has also been recommended by Green (1982).

3.2 The validation workshop (Round 2)

A workshop was arranged on 16th March 2016 in Brussels to ensure that the participants had a sufficient understanding of MAST, the information included in an assessment of telemedicine based on MAST, and the objective of the validation of MAST. The objective of the workshop was also to initiate the discussion of the value and importance of the different domains among the participants.

3.2.1 Workshop programme

The programme for the workshop is presented below.

Table 1: The workshop programme

10.00	Welcome	Kristian Kidholm
10.30	Introduction to MAST	Kristian Kidholm
12.00	Lunch	
13.00	Examples of use of MAST in studies of home monitoring: • Telemedicine in the treatment of diabetic foot ulcer; • Telemedicine for patients with COPD; • Telemedicine for patients with diabetes.	Mette Bøg Horup Josep Roca George Dafoulas
14.30	Answering Delphi Questionnaire	All
14.45	Coffee break	
15.00	Discussion in groups: • Does MAST produce the information you need as decision makers? • Is any useful information missing? • Should some information be excluded?	Group 1: Claus Duedal Pedersen Group 2: Panos Stafylas
16.00	Presentation of results from the groups and discussion in plenum	Kristian Kidholm
17.00	Close	

3.2.2 Selection of participants

Respondents in a Delphi process are supposed to possess a certain amount of expertise on the matter being discussed.

The inclusion criterion for the participants was that they should be potential users of the results from an assessment of telemedicine, thus decision makers in the European healthcare systems. In addition, a group of researchers with knowledge of decision making on health technologies and telemedicine were invited. It was decided not to invite representatives from and advocates for the telemedicine industry. The argument was that their views on the need for information about telemedicine for decision making were expected to be quite different from the needs of the healthcare managers who have to make these decisions.

3.2.3 Participants in the workshop

The table below shows the number of persons invited and participants from the various European countries. In total 56 persons were invited and of these 19 persons participated in the workshop. The participants represent 13 hospitals or regional health authorities from 12 European countries. In addition five participants are from universities or other research organisations, and one represents a patient organisation. The full list of participants is presented in Appendix C.

In addition to the 19 participants, six persons accepted to participate but cancelled shortly before the workshop took place. Of these three were from Denmark, one from Norway, one from Germany and one from England.

Table 2: Number of persons invited and participating in the workshop

Country	Persons invited	Participants
Austria	2	0
Belgium	2	1
Denmark	5	1
England	3	1
EU	4	0
Finland	4	2
France	6	3
Germany	4	1
Greece	4	3
Italia	3	0
Netherlands	1	1
Norway	5	3
Portugal	1	0
Scotland	1	1
Spain	5	1
Sweden	2	0
Switzerland	2	0
Turkey	2	1
Total	**56**	**19**

3.3 Results: the answers to the questionnaire

Table 3 below presents the participants´ answers to the questions in the structured questionnaire. As the table shows, all respondents considered all domains to be moderately or highly important, except with regard to domain 7 on ethical, legal and socio-cultural issues which was considered important by 17 of the 19 respondents. Thus, the face validity of all domains was confirmed by the respondents.

Table 3: Response to questions about importance of domains and topics

How important is the following information as part of the basis for decisions on investment in telemedicine?	No. with Moderate or Highly important	%
Domain 1: Health problem and description of the application	19	100%
Health problem of the patients (e.g. burden of disease, current treatment of patients)	18	95%
Description of the application (e.g. what does the telemedicine intervention include)	18	95%
Technical characteristics (e.g. devices, IT-systems, need for integration, etc.)	16	84%

How important is the following information as part of the basis for decisions on investment in telemedicine?	No. with Moderate or Highly important	%
Domain 2: Safety	19	100%
Clinical safety (e.g. impact on safety of patients and staff)	19	100%
Technical safety (e.g. technical reliability of devices and IT systems)	19	100%
Domain 3: Clinical effectiveness	18	95%
Effects on morbidity (effects on incidence or prevalence of a disease or condition)	19	100%
Effects on mortality (e.g. effects on number of heart failure related deaths)	19	100%
Effects on quality of life (e.g. effects on SF-36, QALYs)	13	68%
Behavioural outcomes (e.g. effects on amount of physical exercise and activity)	16	84%
Use of health service (e.g. effects on number of readmissions, GP visits)	19	100%
Domain 4: Patient perspectives	19	100%
Patient satisfaction (e.g. effects on subscales for patient satisfaction)	18	95%
Patients understanding of information (e.g. understanding of information about device)	17	89%
Patient acceptance (e.g. proportion of patients accepting to use the device)	18	95%
Patients confidence in the telemedicine treatment (e.g. effects on scale for confidence)	16	84%
Patients ability to use the application (e.g. proportion of patients able to use a device)	19	100%
Patients access and accessibility (e.g. change in proportion of patient using health care)	18	95%
Patients empowerment and self-efficacy (e.g. effects on patient empowerment scale)	16	84%
Domain 5: Economic aspects	19	100%
Societal economic evaluation (e.g. cost-effectiveness analysis)	18	95%
Business case (e.g. expenditures and revenue per patient for a hospital)	16	84%
Domain 6: Organisational aspects	19	100%
Consequences for the process (e.g. task shifting, change in time spent on specific tasks)	19	100%
Consequences for the structure (e.g. change in number of hospitals offering a service)	16	84%
Consequences for the culture (e.g. staff attitudes and experience)	17	89%
Consequences for the management (e.g. change in management span of control)	15	79%

How important is the following information as part of the basis for decisions on investment in telemedicine?	No. with Moderate or Highly important	%
Domain 7: Socio-cultural, ethics, legal aspects	17	89%
Ethical issues (e.g. impact on patient autonomy)	16	84%
Legal issues (e.g. whether a telemedicine service is in accordance with health laws)	16	84%
Social issues (e.g. impact on patients work life, gender issues)	15	79%
Transferability of the described results to your local setting	18	95%
Transferability of information on safety	18	95%
Transferability of information on clinical effectiveness	19	100%
Transferability of information on patient perspectives	19	100%
Transferability of information on economic aspects	17	89%
Transferability of information on organizational aspects	19	100%
Transferability of information on socio-cultural, ethical and legal aspects	17	89%

When looking at the perception of the topics within the different domains, the results show more variation. Whereas both topics related to an assessment of safety (domain 2) were considered moderately or highly important by all respondents, only 13 of the 19 participants (68%) considered the effects on quality of life (e.g. effects on SF-36, QALYs) (in domain 3 clinical effectiveness) moderately or highly important. In addition, only 15 of the 19 (79%) participants considered the organisational consequences for management (in domain 6) and the social aspects (in domain 7) as moderately or highly important.

The transferability of the information included in an assessment of telemedicine was also considered to be moderately or highly important by 17 or more of the 19 participants.

Based on the open questions at the end of the questionnaire, a number of suggestions and comments about additional information that could be included in the assessment of telemedicine were proposed:

- The business case for the hospital.
- The reimbursement model.
- Impact on accessibility.
- Relevance of telemedicine for patients with comorbidity.
- Impact on strategy and image of the hospital.
- Integration with other devices and ICT systems.
- Key Performance Indicators for the telemedicine intervention.
- Impact of telemedicine on the costs of healthcare for the patients.
- Regional aspects such as inland versus island regions.
- Usability of the telemedicine device.

A few participants suggested topics or outcomes of telemedicine which should be removed from an assessment of telemedicine:

- Legal issues are a prerequisite.

- The perception of the telemedicine service by the health care professionals.
- Societal economic evaluation.

3.4 Discussion of the validity of MAST at the workshop (Round 3)

The following issues were central in the discussion of the content of MAST at the workshop:

1. The level of detail of how preceding considerations and maturity can be done in practice.
2. Consider the link and the possible use of information across domains, e.g. the use of information in both the economic and the organisational domain, or the domain regarding clinical aspects and patient perception.
3. Consider use of Key Performance Indicators (KPI) within each domain that can be used for future assessments and quality assurance. Examples could be the number of patients, mean number of readmissions per 6 months, mortality rate, reimbursement per patient.
4. Consider the level of detail on how long term effects on patient health and economics, effects on patient economy, and effects on a more wide scale implementation can be assessed.
5. Clarifications of how staff views can be assessed and included in MAST.

3.5 Results from the second round to the panel (Round 4)

On 8th April 2016, the fourth Delphi round was carried out by submitting a web-based questionnaire to the participants from the workshop. The content was similar to the first questionnaire (see Appendix B) but included additional information about the proportion of responses, indicating that the information was considered moderately or highly important, similar to the information in Table 3.

The deadline was 20th April, and after a maximum of five reminders, all of the 19 respondents answered the questionnaire. The results are presented in the Table 4 below.

As the table shows, all respondents considered all domains to be moderately or highly important. This is similar to the answers from the first questionnaire, except for domain seven, which was considered important by 17 of the 19 respondents. Thus, the face validity of all domains was again confirmed by the respondents.

The results within the domains show a bit more variation. The lowest level of perception of importance is with regard to effects on quality of life (e.g. effects on SF-36, QALYs) in domain 3 clinical effectiveness. Here, 16 of the 19 participants (84%) found this information moderately or highly important. Generally the answers describe that the respondents consider the domains and the topics as being a bit more important in this final round of the Delphi process.

Based on the open questions at the end of the questionnaire, a few suggestions for additional information that could be included in the assessment of telemedicine were proposed: Usability of the telemedicine service by the patients and the staff, and reimbursement and incentives for use of telemedicine by the healthcare provider.

Table 4: Response to questions about importance of domains and topics in the final Delphi round

How important is the following information as part of the basis for decisions on investment in telemedicine?	No. with Moderate or Highly important	%
Domain 1: Health problem and description of the application	19	100%
Health problem of the patients (e.g. burden of disease, current treatment of patients)	18	95%
Description of the application (e.g. what does the telemedicine intervention include)	18	95%
Technical characteristics (e.g. devices, IT-systems, need for integration, etc.)	17	89%
Domain 2: Safety	19	100%
Clinical safety (e.g. impact on safety of patients and staff)	19	100%
Technical safety (e.g. technical reliability of devices and IT systems)	19	100%
Domain 3: Clinical effectiveness	19	100%
Effects on morbidity (effects on incidence or prevalence of a disease or condition)	19	100%
Effects on mortality (e.g. effects on number of heart failure related deaths)	19	100%
Effects on quality of life (e.g. effects on SF-36, QALYs)	16	84%
Behavioural outcomes (e.g. effects on amount of physical exercise and activity)	18	95%
Use of health service (e.g. effects on number of readmissions, GP visits)	19	100%
Domain 4: Patient perspectives	19	100%
Patient satisfaction (e.g. effects on subscales for patient satisfaction)	19	100%
Patients understanding of information (e.g. understanding of information about device)	19	100%
Patient acceptance (e.g. proportion of patients accepting to use the device)	19	100%
Patients confidence in the telemedicine treatment (e.g. effects on scale for confidence)	19	100%
Patients ability to use the application (e.g. proportion of patients able to use a device)	19	100%
Patients access and accessibility (e.g. change in proportion of patient using health care)	19	100%
Patients empowerment and self-efficacy (e.g. effects on patient empowerment scale)	19	100%
Domain 5: Economic aspects	19	100%
Societal economic evaluation (e.g. cost-effectiveness analysis)	17	89%
Business case (e.g. expenditures and revenue per patient for a hospital)	18	95%

How important is the following information as part of the basis for decisions on investment in telemedicine?	No. with Moderate or Highly important	%
Domain 6: Organisational aspects	19	100%
Consequences for the process (e.g. task shifting, change in time spent on specific tasks)	19	100%
Consequences for the structure (e.g. change in number of hospitals offering a service)	19	100%
Consequences for the culture (e.g. staff attitudes and experience)	19	100%
Consequences for the management (e.g. change in management span of control)	18	95%
Domain 7: Socio-cultural, ethics, legal aspects	19	100%
Ethical issues (e.g. impact on patient autonomy)	19	100%
Legal issues (e.g. whether a telemedicine service is in accordance with health laws)	18	95%
Social issues (e.g. impact on patients work life, gender issues)	18	95%
Transferability of the described results to your local setting	19	100%
Transferability of information on safety	19	100%
Transferability of information on clinical effectiveness	19	100%
Transferability of information on patient perspectives	19	100%
Transferability of information on economic aspects	18	95%
Transferability of information on organizational aspects	19	100%
Transferability of information on socio-cultural, ethical and legal aspects	19	100%

4 Discussion

Overall, the results from the rounds of the Delphi process confirm the face validity of the domains included in MAST. More than 80% of the participants in the process considered the seven MAST domains to be moderately or highly important in an assessment of telemedicine. The final Delphi round confirmed the results from the second round.

A number of considerations should be taken into account when interpreting the results.

Firstly, the selection of participants: In this workshop, the objective was to include decision makers from the European healthcare systems. In addition, a group of researchers with knowledge of decision making on health technologies and telemedicine were invited. Of the 19 participants, 13 were managers from hospitals or regional health authorities from 12 European countries. Thus, they were persons who are expected to participate in making decisions on investment in health technologies such as telemedicine.

In the selection of participants, we tried to avoid recruiting persons who have previously worked with the project team in studies of telemedicine in which MAST has been used to assess telemedicine interventions in EU-projects. Of the 19 participants, 14 meet this criterion. In practice, the network of the project team has been used to appoint potential participants and persons who could have other potential participants in their own network. It is difficult to assess whether 19 other persons from the total group of 56 potential participants would have produced a different result. However, the very high level of agreement between the 19 participants in this study could indicate that having another group of participants would most likely have given a similar result.

Secondly, the sample size: While the workshop only included 19 participants, Delbecq et al. (1975) recommend including the minimal sufficient number of subjects and to verify the results through follow-up exploration. He suggests that ten to fifteen subjects could be sufficient if the background of the Delphi subjects is homogeneous. Further to this, Ludwig (1997) documents that the majority of Delphi studies have used 15 to 20 respondents.

Thirdly, the criterion of 70% agreement: It has been suggested by Ulschak (1983) that consensus is achieved when 80% of participants fall within two categories on a seven-point scale. However, if 80% is used as the criterion, the overall result of the face validity of the seven MAST domains remains the same.

Finally, there is a risk that some participants felt a social pressure to give answers in support of MAST, since several of the authors behind the article describing MAST (Kidholm et al., 2012)) participated in the workshop as facilitators. This potential bias is described as "social desirability bias" in the literature (Hebert et al., 1995). To counter this, in the fourth and final round of the Delphi process, the participants were anonymous, which could reduce the risk of this bias in the final result. The fact that the results from the final round are very much similar and confirm the results from the first questionnaire could be seen as an indication for that social desirability bias is not influencing the results.

5   Conclusion and future plans

This MAST workshop and the Delphi process have supported the validation of the original MAST evaluation framework.

The results indicate positive outcomes of the validation process as most workshop participants found the elements in MAST relevant and important in the assessments and evaluations of telemedicine solutions as a foundation for decision making.

The original MAST model has served as the basis for the evaluation work in the three integrated care projects SmartCare, BeyondSilos and CareWell, but as the original MAST model is targeted at telemedicine solutions, it is extremely relevant to adapt the model to evaluations of integrated care solutions. However, in order to adapt the evaluation framework, it was first necessary to validate the original model.

In June, a second workshop will be carried out where a group of decision makers and experts in integrated care will help to adapt the MAST framework to the evaluation of integrated care.

Appendix A: References

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Appendix B: Delphi questionnaire

Delphi Questionnaire regarding the validity of MAST

1. Please state your name: _____

> In the following questions we are asking for your perception of the importance of the different types of information included in an assessment of a telemedicine intervention based on MAST.
>
> The objective of the questions is to assess whether MAST includes the information about telemedicine interventions that you find relevant when making decisions about investment or introduction of telemedicine in your local health care system. Or whether new information should be added or some information is irrelevant.

On a scale from 0 (not important) to 3 (highly important):

How important is the following information as part of the basis for decisions on investment in telemedicine?

	Not important	Somewhat important	Moderately	Highly important
Domain 1: Health problem and description of the application	0	1	2	3
Health problem of the patients (e.g. burden of disease, current treatment of patients)	0	1	2	3
Description of the application (e.g. what does the telemedicine intervention include)	0	1	2	3
Technical characteristics (e.g. devices, IT-systems, need for integration, etc.)	0	1	2	3

On a scale from 0 (not important) to 3 (highly important):

How important is the following information as part of the basis for decisions on investment in telemedicine?

	Not important	Somewhat important	Moderately important	Highly important
Domain 2: Safety	0	1	2	3
Clinical safety (e.g. impact on safety of patients and staff)	0	1	2	3
Technical safety (e.g. technical reliability of devices and IT systems)	0	1	2	3

On a scale from 0 (not important) to 3 (highly important):

How important is the following information as part of the basis for decisions on investment in telemedicine?

	Not important	Somewhat important	Moderately important	Highly important
Domain 3: Clinical effectiveness	0	1	2	3
Effects on morbidity (effects on incidence or prevalence of a disease or condition)	0	1	2	3
Effects on mortality (e.g. effects on number of heart failure related deaths)	0	1	2	3
Effects on quality of life (e.g. effects on SF-36, QALYs)	0	1	2	3
Behavioural outcomes (e.g. effects on amount of physical exercise and activity)	0	1	2	3
Use of health service (e.g. effects on number of readmissions, GP visits)	0	1	2	3

On a scale from 0 (not important) to 3 (highly important):

How important is the following information as part of the basis for decisions on investment in telemedicine?

	Not important	Somewhat important	Moderately important	Highly important
Domain 4: Patient perspectives	0	1	2	3
Patient satisfaction (e.g. effects on subscales for patient satisfaction)	0	1	2	3
Patients understanding of information (e.g. understanding of information about the device)	0	1	2	3
Patient acceptance (e.g. proportion of patients accepting to use the device)	0	1	2	3
Patients confidence in the telemedicine treatment (e.g. effects on subscale for confidence)	0	1	2	3
Patients ability to use the application (e.g. proportion of patients able to use a device)	0	1	2	3
Patients access and accessibility (e.g. change in proportion of patient using health care services)	0	1	2	3
Patients empowerment and self-efficacy (e.g. effects on scales for patient empowerment)	0	1	2	3

On a scale from 0 (not important) to 3 (highly important):

How important is the following information as part of the basis for decisions on investment in telemedicine?

	Not important	Somewhat important	Moderately important	Highly important
Domain 5: Economic aspects	0	1	2	3
Societal economic evaluation (e.g. cost-effectiveness analysis)	0	1	2	3
Business case (e.g. hospital expenditures and hospital revenue per patient)	0	1	2	3

On a scale from 0 (not important) to 3 (highly important):

How important is the following information as part of the basis for decisions on investment in telemedicine?

	Not important	Somewhat important	Moderately important	Highly important
Domain 6: Organizational aspects	0	1	2	3
Consequences for the process (e.g. task shifting, change in time spent on specific tasks)	0	1	2	3
Consequences for the structure (e.g. change in number of hospitals offering a service)	0	1	2	3
Consequences for the culture (e.g. staff attitudes and experience)	0	1	2	3
Consequences for the management (e.g. change in management span of control)	0	1	2	3

On a scale from 0 (not important) to 3 (highly important):

How important is the following information as part of the basis for decisions on investment in telemedicine?

	Not important	Somewhat important	Moderately important	Highly important
Domain 7: Socio-cultural, ethics, legal aspects	0	1	2	3
Ethical issues (e.g. impact on patient autonomy)	0	1	2	3
Legal issues (e.g. whether a telemedicine service is in accordance with health laws)	0	1	2	3
Social issues (e.g. impact on patients work life, gender issues)	0	1	2	3

Transferability assessment

On a scale from 0 (not important) to 3 (highly important): How important is the following information as part of the basis for decisions on investment in telemedicine?	Not important	Somewhat important	Moderately important	Highly important
Transferability of the described results to your local setting	0	1	2	3
Transferability of information on safety	0	1	2	3
Transferability of information on clinical effectiveness	0	1	2	3
Transferability of information on patient perspectives	0	1	2	3
Transferability of information on economic aspects	0	1	2	3
Transferability of information on organizational aspects	0	1	2	3
Transferability of information on socio-cultural, ethical and legal aspects	0	1	2	3

Additional questions about other aspects

Is there **other aspects** or outcomes of telemedicine that should be part of the basis for decisions on investment in telemedicine?	
Is there any aspects or outcomes of telemedicine within the MAST domains that should **NOT** be part of the basis for decisions on investment in telemedicine?	

Thank you for your answers. Please give you questionnaire to the organizers of the workshop.

Appendix C: List of participants

Organisation	Title	Country		Name
Hospital or clinical manager				
University Clinic Barcelona	Professor of Medicine, Director of the Lung Function Unit at Hospital Clinic Barcelona	Spain	JROCA@clinic.ub.es	Josep Roca
Odense University Hospital	Chief Medical Director Region South Denmark	Denmark	Peder.Jest@rsyd.dk	Peder Jest
URCEco Ile de France Hôpital de l'Hotel Dieu	Head of service	France	isabelle.durand-zaleski-ext@aphp.fr	Isabelle Durand-Zaleski
URCEco Ile de France Hôpital de l'Hotel Dieu	Public health medical doctor	France	kevin.zarca@urc-eco.fr	Kevin Zarca
E-trikala SA of the Municipality of Trikala, Faculty of Medicine, University of Thessaly	E-health consultant	Greece	gdafoulas@e-trikala.gr	George E. Dafoulas
Tire Hospital	CMIO	Turkey	zincircioglu@hotmail.com	Gürhan Zincircioğlu
Public Health England	GP and lead for preventable dementia	England	alessicws@gmail.com	Charles Alessi
Sismanoglio General Hospital of Athens	CIO of Sismanoglio Hospital	Greece	stavroula.petropoulou@0308.syzefxis.gov.gr	Stavroula Petropoulou
2nd Regional Health Authority of Piraeus and Aegean	Deputy Administrator of the 2nd Regional Health Authority of Piraeus and Aegean	Greece	platsis.h@gmail.com	Haralampos Platsis
Haukeland Universitetssjukehus	Senior consultant, MD	Norway	micaela.thierley@haraldsplass.no	Micaela Thierley,
Haukeland Universitetssjukehus	Special adviser	Norway	marie.vigdis.heimseter@helse-bergen.no	Marie Vigdis Heimseter
South Karelia Central Hospital South Karelia Social and Health Care District	Specialist in respiratory and internal medicine Special competence for healthcare information technology Chief Administrative Physician	Finland	lauri.lammi@eksote.fi	Lauri Lammi
Pflegewerk Managementgesellschaft mbH	Information Technology Consultant	Germany	andrea.croci@gmx.de	Andrea Croci
Patient Organisation				
Diabetes association	Chief Executive Officer	International	Petra.Wilson@idf.org	Petra Wilson

Organisation	Title	Country		Name
Research and science				
Direction de l'Organisation Médicale et des relations avec les Universités (DOMU)	MD	France	sophie.dechambine@aphp.fr	Sophie de Chambine
University of Edinburgh	Professor	Scotland	Brian.McKinstry@ed.ac.uk	Brian Mckinstry
Professor of Psychiatric Research Methodology. Managing Director of Research & Innovation	Professor	Holland	JH.Smit@ggzingeest.nl	Jan Smit
EunetHTA, National Institute for Health and Welfare	Senior Medical Officer	Finland	kristian.lampe@thl.fi	Kristian Lampe
Norwegian Centre for eHealth Research	Senior Adviser	Norway	elin.breivik@telemed.no	Elin Anne Breivik