

## D7.3 MAST 2.0 Validation Workshop

### WP7 Synergy Implementation

Version 1.0, 11<sup>th</sup> August 2016

The SmartCare project is co-funded by the European Commission within the ICT Policy Support Programme of the Competitiveness and Innovation Framework Programme (CIP) . Grant agreement no.: 325158

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### Dissemination level

P Public

### Version history

Version	Date	Changes made	By
0.1	27 <sup>th</sup> Jul 2016	Initial draft	Emilie Nielsen, Signe Daugbjerg, Kristian Kidholm, Mette Bøg Horup, Claus Duedal Pedersen,
0.2	2 <sup>nd</sup> August 2016	Updates following internal review	Emilie Nielsen
1.0	11 <sup>th</sup> August 2016	Version for issue	Emilie Nielsen

### Outstanding Issues

**Filename:** D7.3 v1.0 SmartCare MAST 2.0 validation workshop

### 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This deliverable contains original unpublished work except where clearly indicated otherwise.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 2.0 workshop that was held in Brussels on 22<sup>nd</sup> June 2016. The workshop covered the use of MAST for integrated care; the aim was to validate whether or not the original MAST framework was suitable for assessments of ICT supported integrated care, and how it could be adapted to cover this field. Several decision makers and experts in the field of integrated care were invited to the workshop to support the process that was built around the concept of a modified Delphi process.

The document includes the composition and background of the panel of experts, and summarises the outcome of the workshop. Finally, it contains the comments and suggestions received from the experts that participated in the workshop. The results from the workshop have been incorporated in the development of the MAST manual for assessments of integrated care presented in D7.8.

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

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## 1 Introduction

### 1.1 Purpose of document

This deliverable reports on the background information and results of the MAST 2.0 validation workshop that was held in Brussels on 22<sup>nd</sup> June 2016. The document covers phase 4 of Task T7.5 Extension of MAST in the DoW:

"Phase 4 - MAST 2.0 validation workshop

- Presentation of the outcome of SmartCare to a large group (30+) of European decision makers from the health insurance, health, social and informal care sectors using the extended MAST framework (MAST 2.0);
- Discussion on the validity of the framework to identify the need for further refinement of the framework."

The use of MAST for evaluating ICT supported integrated care interventions represents one of the synergies between the three projects BeyondSilos, CareWell and SmartCare; the workshop was carried out as part of WP7 activities.

### 1.2 Structure of the document

This report on the MAST 2.0 validation workshop describes the Delphi process and the validation of the MAST framework related to assessments of ICT supported integrated care.

The workshop was used to establish whether or not it was possible to extend the existing MAST framework to assess integrated care and gather experiences and opinions from decision makers and experts on how this could be done.

Section 2 describes the original MAST framework and how it was adapted to be used in SmartCare, BeyondSilos and CareWell.

Section 3 covers the Delphi process that the workshop was built around in order to gather relevant information in a systematic manner.

Section 4 presents the results from the MAST validation process and the results of the different rounds in the Delphi process.

Sections 5 and 6 comprise the discussion, conclusion and future work to be done in order to describe how the MAST framework can be expanded to cover ICT supported integrated care.

Whenever MAST is mentioned as "MAST", it refers to the original MAST model for assessments of telemedicine applications. As MAST 2.0 for integrated care is an expansion and not an improvement of the original MAST framework, in the remainder of this document it is referred to as MAST-IC.

### 1.3 Glossary

<b>D</b>	Deliverable
<b>DoW</b>	Description of Work
<b>MAST</b>	Model for Assessment of Telemedicine
<b>RSD</b>	Region of Southern Denmark
<b>WP</b>	Work Package

## 2 Background

### 2.1 Background of MAST

In 2009, the European Commission initiated the MethoTelemed project in order to develop 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 of MAST (Model for Assessment of Telemedicine) (Kidholm et al., 2012).

MAST is 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 it evaluates information about the medical, social, economic and ethical issues in a systematic, unbiased and robust manner. In practice, the MAST framework 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:
  - Domain 1: Health problem and characteristics of the application.
  - Domain 2. Safety.
  - Domain 3. Clinical effectiveness.
  - Domain 4. Patient perspectives.
  - Domain 5. Economic aspects.
  - Domain 6. Organisational aspects.
  - 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.

The value of MAST for researchers who carry out assessments of telemedicine has been demonstrated in several large European projects. Furthermore, the validity of MAST has been confirmed by a group of decision makers, whom have found the results based on MAST to be very valuable in the decision making process as part of WP7 (D7.1) in SmartCare.

### 2.2 From MAST to MAST-IC

The task of extending MAST (T7.5 of the SmartCare DoW) covered several phases as described in the DoW; this MAST 2.0 validation workshop constitutes Phase 4. However, the majority of the other phases were linked to this workshop.

Phase 1 was the MAST 1.0 validation workshop (held in March 2016), where the original MAST framework was validated in a workshop with experts and decision makers. The validation process in the first workshop was the prerequisite to move forward with the expansion of the framework to cover ICT supported integrated care, so that the extension work could be carried out on a validated framework.

Phase 4, the MAST 2.0 validation workshop, had the purpose of validating whether or not the original MAST framework could be used to assess ICT supported integrated care, and serve as the foundation for the development of the MAST-IC manuals. During the workshop, some preliminary results from Phase 2 (Systematic literature review for MAST extension)

and Phase 3 (Extraction of lessons and new indicators from deployment of integrated care) were included. The workshop agenda shows how the preliminary experiences with the use of MAST in SmartCare, BeyondSilos and CareWell were presented, which included a presentation of the preliminary findings from the literature review.

The final results of the literature review, the existing experience of using MAST to assess integrated care, and the results from the validation workshops are used in order to complete Phase 5 (Manuals preparation) and to develop the MAST-IC manual presented in D7.8 MAST 2.0 manuals.

### 2.3 The adaptation of MAST in SmartCare, BeyondSilos and CareWell

MAST is being used as the evaluation framework for the three European projects SmartCare, BeyondSilos and CareWell. However, the aim of these projects is to assess ICT supported integrated care and not telemedicine applications. Therefore, the MAST framework was adapted by the three projects to reflect the focus on the evaluations of integrated care instead of telemedicine. There are no changes in steps 1 and 3, but some of the domains in step 2 are re-named to ensure that the assessment included the social care aspects:

1. Preceding considerations of a number of issues to be considered before an assessment of ICT supported integrated care is initiated, e.g. maturity.
2. A multidisciplinary assessment of the outcomes of integrated care within seven domains:
  - Domain 1: Health and social situation of the care recipient and characteristics of the service
  - Domain 2: Safety
  - Domain 3: Clinical and care effectiveness
  - Domain 4: Care recipient perspectives
  - Domain 5: Economic aspects
  - Domain 6: Organisational aspects
  - 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.

### 3 Method

In the DoW, the task of extending MAST included two validation workshops. In order to gather the information from the workshops according to a validated process and in a systematic manner, the workshops were incorporated in a Delphi process and thus supported by questionnaires

The MAST 2.0 validation workshop followed the same process as the MAST 1.0 validation workshop in order to ensure the alignment and consistency of the validation processes. The full description of the Delphi process can be found in D7.1 and this deliverable only contains a summary of the process.

#### 3.1 Face validity

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

#### 3.2 Delphi process

The method used in the validation processes of MAST is the Delphi technique<sup>1</sup>. This technique can be used to achieve convergence of opinions concerning real-world knowledge elicited from experts within certain topic areas.

The aim of the technique is to conduct a 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<sup>1</sup>. In practice, the Delphi process involves three to four rounds, but a modified Delphi process has been used in this validation process; it included the following rounds, identical to the Delphi study described in D7.1:

- Round 1: Development of a structured questionnaire about the importance of the different domains and topics in the original MAST framework, including the alterations of the domains in terms of wording corresponding with the reporting guideline of SmartCare and BeyondSilos.
- Round 2. Presentation of information about MAST and examples of the use of MAST to the workshop participants, and subsequently asking them to answer the Delphi questionnaire at the workshop.
- Round 3: Discussion of the validity of MAST for integrated care at the workshop.
- Round 4: Submission of the online version of the questionnaire and the results from the second round (of the questionnaire) to the participants. This was done one week after the workshop.

The Delphi questionnaires used in rounds 1 & 4 were built around the adaptations and experiences from the three projects on using MAST for the assessment of ICT supported integrated care.

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<sup>1</sup> Hsu et al., 2007

## 4 The MAST validation process

### 4.1 The questionnaire (Round 1)

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

The questionnaire was similar to the questionnaire distributed at the MAST 1.0 workshop, but the domains were changed to correspond with the wording used in the projects SmartCare and BeyondSilos.

After each domain, it was possible to make comments in two open ended questions regarding other aspects or outcomes of integrated care. The first question asked if some aspects were missing that should be part of the basis for making decisions, and the second concerned whether any outcomes already included in the domains should be excluded.

The questionnaire can be found in Appendix B.

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.

If 70% or more of the respondents found a domain or topic “Moderately important” or “Highly important”, it was used as an indication of the participants’ consensus with regard to the face validity of the domain or topic.

### 4.2 The validation workshop (Round 2)

The workshop was held on 22<sup>nd</sup> June 2016 in Brussels; the aim was to initiate discussion among the participants in order to adapt MAST (1.0) to MAST integrated care (2.0). The workshop included presentations in order to ensure that the participants had a sufficient understanding of

- 1) MAST as a framework;
- 2) the information included in an assessment based on MAST; and
- 3) the objective of why MAST should be adapted.

#### 4.2.1 Workshop programme

The programme for the workshop is presented in Table 1 below.

Table 1: The workshop programme

Time	Subject	Presenter
09.30	Welcome.	Claus Duedal Pedersen
09.45	Introduction to MAST and key elements from the first validation workshop.	Kristian Kidholm
11.15	Use of MAST as an evaluation framework for ICT supported integrated care interventions. Examples from SmartCare ( <a href="http://www.pilotsmartcare.eu">www.pilotsmartcare.eu</a> ) and BeyondSilos ( <a href="http://beyondsilos.eu/project">beyondsilos.eu/project</a> ).	Signe Daugbjerg
12.00	Lunch	
13.00	Evaluation of ICT supported integrated care. Development of MAST for integrated care.	Signe Daugbjerg
14.00	Answering the Delphi Questionnaire	All
14.30	Discussion in groups: <ul style="list-style-type: none"> <li>• How does the "original" MAST model fit assessments of integrated care?</li> <li>• Which aspects (topics) should be included in assessments of ICT supported integrated care before it is implemented in daily practice?</li> </ul>	Group 1: Kristian Kidholm Group 2: Claus Duedal Pedersen
15.30	Presentation of results from the groups and discussion in plenum.	Claus Duedal Pedersen & Kristian Kidholm
16.30	Wrap up.	Claus Duedal Pedersen
16.45	Presentation of next steps - Predictive Modelling and Change Management.	Marco D'Angelantonio & Panos Stafylas
17.00	End of workshop.	

#### 4.2.2 The workshop participants

The participants invited to the workshop were potential decision makers that could use the results from an assessment of integrated care in their decision making process. The participants also covered a wide range of European countries and regions. In addition, a few researchers were invited, as they could bring a broad view on what are key elements in the assessment of integrated care services.

As integrated care covers different sectors, it can be challenging to appoint decision makers in the field, which is why the group of participants was very diverse, and also included a number of researchers from different fields related to integrated care.

The network of the project team was used to appoint potential participants and persons who could identify other relevant participants. In the selection process, it was decided that only a limited number of the participants could come from the project teams in SmartCare, BeyondSilos and CareWell in order to receive new input on the use of MAST for integrated care.

Out of the 17 participants, all three projects had one representative present. Compared to the MAST 1.0 validation process, people were not deselected if they had previous experience with MAST. However, it was important that they had extensive knowledge within the field of integrated care. In order to control the invitation list, the project team

closely followed the selection process and invitations to make sure that the group of participants lived up to the criteria. Two of the participants had taken part in the MAST 1.0 validation workshop, as they were also part of the decision making related to implementation of ICT supported integrated care in their region.

Table 2 below shows the number of people invited divided by country and the number who accepted to participate. In total, 61 people were invited, and 17 people accepted the invitation and participated in the workshop. The full list of participants is presented in Appendix A.

A few more people accepted the invitation to participate, but cancelled prior to the workshop.

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

Country	Persons invited	Participants
Belgium incl. Flanders	4	0
Denmark	6	3
UK (England, Scotland, Ireland & Northern Ireland)	10	4
EU	2	0
Finland	4	1
Germany	2	0
Italy	7	2
Netherlands	3	1
Norway	4	2
Spain	6	2
Sweden	7	2
Romania	1	0
Estonia	3	0
Austria	1	0
Serbia	1	0
<b>Total</b>	<b>61</b>	<b>17</b>

Prior to the workshop, the participants received the document that describes the original MAST framework. As some of the participants did not have experience in using the MAST, an introduction was provided during the workshop to ensure that all participants had the same background information.

### 4.3 Results: the answers to the first questionnaire

The first Delphi questionnaire was distributed during the workshop, so the response rate was 100%.

of all domains were confirmed.

Table 3 below presents the participants' answers to the first Delphi questionnaire. As the table shows, all respondents considered domain 1, 4, 6, and 7 to be moderately or highly important.

In the case of domains 2, 3 and 5, one respondent indicated that the domains were not moderately or highly important.

However, as the indication of face validity depends on a minimum of 70%, the face validity of all domains were confirmed.

**Table 3: Response to first questionnaire about importance of domains and topics**

How important is the following information as part of the basis for making decisions on investment in integrated care?	No. of respondents	No. with Moderate or Highly important	%
<b>Domain 1: Health and social situation of the care recipient and characteristics of the service</b>	15	15	100%
Health and social situation of the care recipients (e.g. burden of disease, current treatment of patients)	17	17	100%
Description of the service (e.g. what does the integrated care service include)	17	15	88%
Technical characteristics (e.g. devices, IT-systems, need for integration, etc.)	17	13	76%
<b>Domain 2: Safety</b>	14	13	93%
Clinical safety (e.g. impact on safety of care recipients and staff)	16	15	94%
Technical safety (e.g. technical reliability of devices and IT systems)	17	14	82%
<b>Domain 3: Clinical and care effectiveness</b>	16	15	94%
Effects on morbidity (effects on incidence or prevalence of a disease or condition)	17	12	71%
Effects on mortality (e.g. effects on number of heart failure related deaths)	16	14	88%
Effects on quality of life (e.g. effects on SF-36, QALYs)	17	15	88%
Behavioural outcomes (e.g. effects on amount of physical exercise and activity)	17	16	94%
Use of health service (e.g. effects on number of readmissions, GP visits)	17	16	94%
<b>Domain 4: Care recipient perspectives</b>	11	11	100%
Care recipient satisfaction (e.g. effects on subscales for care recipient satisfaction)	17	16	94%
Care recipients' understanding of information (e.g. understanding information about devices)	17	15	88%
Care recipient acceptance (e.g. proportion of care recipients accepting to use the devices)	16	16	100%
Care recipients' confidence in the integrated care service (e.g. effects on subscale for confidence)	17	15	88%
Care recipients' ability to use the application (e.g. proportion of care recipients able to use a device)	17	17	100%
Care recipients' access and accessibility (e.g. change in proportion of care recipients being treated by means of health and social services)	16	14	88%

How important is the following information as part of the basis for making decisions on investment in integrated care?	No. of respondents	No. with Moderate or Highly important	%
Care recipients' empowerment and self-efficacy (e.g. effects on scales for care recipient empowerment)	17	15	88%
<b>Domain 5: Economic aspects</b>	13	12	92%
Societal economic evaluation (e.g. cost-effectiveness analysis)	16	14	88%
Business case (e.g. hospital expenditures and hospital revenue per care recipient)	17	16	94%
<b>Domain 6: Organisational aspects</b>	14	14	100%
Consequences for the process (e.g. task shifting, change in time spent on specific tasks)	17	17	100%
Consequences for the structure (e.g. change in number of hospitals offering a service)	17	16	94%
Consequences for the culture (e.g. staff attitudes and experience)	17	16	94%
Consequences for the management (e.g. change in management span of control)	17	15	88%
<b>Domain 7: Socio-cultural, ethics, legal aspects</b>	15	15	100%
Ethical issues (e.g. impact on care recipient autonomy)	17	17	100%
Legal issues (e.g. whether an integrated care service is in accordance with relevant laws)	17	17	100%
Social issues (e.g. impact on care recipients' work life, gender issues)	17	15	88%
<b>Transferability of the described results to your local setting</b>	15	14	93%
Transferability of information on safety	17	15	88%
Transferability of information on clinical and care effectiveness	17	16	94%
Transferability of information on care recipient perspectives	17	16	94%
Transferability of information on economic aspects	17	16	94%
Transferability of information on organisational aspects	17	15	88%
Transferability of information on socio-cultural, ethical and legal aspects	17	15	88%

When looking at the perception of the topics within the different domains, there was more variation.

In terms of topics, there was 100% agreement among the participants on high or moderate importance of the following topics:

- Health and social situation of the care recipients, e.g. burden of disease, current treatment of patients. (Domain 1).

- Care recipient acceptance, e.g. proportion of care recipients accepting to use the device. (Domain 4).
- Care recipients' ability to use the application, e.g. proportion of care recipients able to use a device. (Domain 4).
- Consequences for the process, e.g. task shifting, change in time spent on specific tasks. (Domain 6).
- Ethical issues, e.g. impact on care recipient autonomy. (Domain 7).
- Legal issues, e.g. whether an integrated care service is in accordance with relevant laws. (Domain 7).

All topics were rated moderately or highly important by more than 70% of the respondents, which means that the face validity of the topics suggested in each domain is confirmed.

The transferability element was considered to be moderately or highly important by 14 out of 15 participants.

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

- Description of citizen needs (both health and social) and purpose of the service.
- Description of the local context.
- Aspects of data safety.
- Description of personal safety (i.e. related to falls, drugs, drug interactions, adverse events).
- Maintenance of the technical service (including certification).
- Satisfaction of informal carers.
- Risk stratification.
- Patient perception in terms of quality of care and coordination, and motivation.
- Description of changes in the ecosystem surrounding the patient (citizen) i.e. disruption in work relations.
- Staff empowerment.
- Assessment of impact on legal aspects.
- Assessment of coordination (integration).
- Addressing cultural aspects in relation to transferability.

A few participants suggested topics or outcomes which should be removed from an assessment to support decision making related to integrated care:

- The technology should not be the main focus.
- Change in management.

### 4.4 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 elements related to domain 7 should be more dominant as they contribute to the context where the integrated care service is implemented.
2. Consider the possibility of measuring the level of integration.

3. The focus on the end user should be increased. Integrated care is not only about the technology, but the citizen's needs.
4. Consider an increased focus on relatives and informal carers.
5. Political strategies and goals related to the integrated care service should be considered.
6. The difficulties related to assessing integrated care were addressed, as integrated care services are very complex and comprehensive.

#### 4.5 Results from the second questionnaire (Round 4)

Round 4 in the Delphi process covers the second questionnaire which was distributed as an online survey. On 29<sup>th</sup> June, the questionnaire was distributed to the workshop participants and by 6<sup>th</sup> July, which was within the given deadline, all responses were submitted except for one due to the holiday period.

The online questionnaire was identical to the paper version distributed during the workshop (see Appendix B), but additional information about the proportion of responses indicating that the information was considered moderately or highly important was included. The purpose of the online questionnaire was also to support the results of the first Delphi questionnaire.

Additionally, the comments from the first Delphi questionnaire were reviewed and 12 overall aspects were defined and incorporated in the second questionnaire to confirm or disconfirm the respondents' opinion about these overall aspects. The respondents were asked whether there should be more focus on each of the aspects to which they could answer "yes", "no", and "don't know".

The results are presented in the table and figure below.

The results of this questionnaire showed that all respondents considered all domains to be moderately or highly important.

This is similar to the answers from the first questionnaire in the case of domains 1, 4, 6 and 7; in the case of domains 2, 3 and 5 all respondents now find the domains highly or moderately important. Therefore, the face validity of all domains was again confirmed by the respondents.

**Table 4: Response to questions in second Delphi questionnaire**

How important is the following information as part of the basis for decisions on investment in integrated care?	No. of respondents	No. with Moderate or Highly important	%
<b>Domain 1: Health and social situation of the care recipient and characteristics of the service</b>	16	16	100%
Health and social situation of the care recipients (e.g. burden of disease, current treatment of patients)	16	16	100%
Description of the service (e.g. what does the integrated care service include)	16	16	100%
Technical characteristics (e.g. devices, IT-systems, need for integration, etc.)	16	16	100%

How important is the following information as part of the basis for decisions on investment in integrated care?	No. of respondents	No. with Moderate or Highly important	%
<b>Domain 2: Safety</b>	16	16	100%
Clinical safety (e.g. impact on safety of care recipients and staff)	16	16	100%
Technical safety (e.g. technical reliability of devices and IT systems)	16	16	100%
<b>Domain 3: Clinical and care effectiveness</b>	16	16	100%
Effects on morbidity (effects on incidence or prevalence of a disease or condition)	16	12	75%
Effects on mortality (e.g. effects on number of heart failure related deaths)	16	15	94%
Effects on quality of life (e.g. effects on SF-36, QALYs)	16	16	100%
Behavioural outcomes (e.g. effects on amount of physical exercise and activity)	16	16	100%
Use of health service (e.g. effects on number of readmissions, GP visits)	16	16	100%
<b>Domain 4: Care recipient perspectives</b>	16	16	100%
Care recipient satisfaction (e.g. effects on subscales for care recipient satisfaction)	16	16	100%
Care recipients' understanding of information (e.g. understanding of information about device)	16	16	100%
Care recipient acceptance (e.g. proportion of care recipients accepting to use the device)	16	16	100%
Care recipients' confidence in the integrated care service (e.g. effects on subscale for confidence)	16	16	100%
Care recipients' ability to use the application (e.g. proportion of care recipients able to use a device)	16	16	100%
Care recipients' access and accessibility (e.g. change in proportion of care recipients being treated by means of health and social services)	16	16	100%
Care recipients' empowerment and self-efficacy (e.g. effects on scales for care recipient empowerment)	16	16	100%
<b>Domain 5: Economic aspects</b>	16	16	100%
Societal economic evaluation (e.g. cost-effectiveness analysis)	16	16	100%
Business case (e.g. hospital expenditures and hospital revenue per care recipient)	16	15	94%
<b>Domain 6: Organisational aspects</b>	16	16	100%
Consequences for the process (e.g. task shifting, change in time spent on specific tasks)	16	16	100%
Consequences for the structure (e.g. change in number of hospitals offering a service)	16	15	94%

How important is the following information as part of the basis for decisions on investment in integrated care?	No. of respondents	No. with Moderate or Highly important	%
Consequences for the culture (e.g. staff attitudes and experience)	16	16	100%
Consequences for the management (e.g. change in management span of control)	16	15	94%
<b>Domain 7: Socio-cultural, ethics, legal aspects</b>	16	16	100%
Ethical issues (e.g. impact on care recipient autonomy)	16	16	100%
Legal issues (e.g. whether an integrated care service is in accordance with relevant laws)	16	16	100%
Social issues (e.g. impact on care recipients' work life, gender issues)	16	16	100%
<b>Transferability of the described results to your local setting</b>	16	16	100%
Transferability of information on safety	16	16	100%
Transferability of information on clinical and care effectiveness	16	16	100%
Transferability of information on care recipient perspectives	16	16	100%
Transferability of information on economic aspects	16	15	94%
Transferability of information on organisational aspects	16	16	100%
Transferability of information on socio-cultural, ethical and legal aspects	16	16	100%

The results within the domains showed some variation, but not to the same degree as in the first questionnaire. All respondents found most of the topics highly or moderately important except for the following three topics:

- Effects on morbidity, e.g. effects on incidence or prevalence of a disease or condition. (Domain 3).
- Effects on mortality, e.g. effects on number of heart failure related deaths. (Domain 3).
- Business case, e.g. hospital expenditures and hospital revenue per care recipient. (Domain 5).

In general, the respondents confirmed the validity of all topics, but their answers also indicate that they found the domains and the topics a bit more important in this second questionnaire in the Delphi process.

Based on the open-ended questions at the end of the questionnaire, a number of suggestions and comments were proposed about additional information that could be included in the assessment of integrated care. Only additional suggestions not proposed in questionnaire 1 are included below:

- Include organisational profiles and profiles of professionals.
- Description of changes in work procedures in relation to integrated care.
- Assessment of independence and mental well-being.



- Security related to psycho-social issues??
- Measurements of survival rates could be more interesting than mortality rates.
- Reasons for drop-outs.
- Use of home care.
- Assessment of changes in quality of individualised care plans.
- Assessment of changes in quality of patient’s needs assessments.
- Assessment of effects on perception of coordination.
- Perception of carers, as they can be important in the successful implementation of integrated care services.
- The business case for the integrated care organisations as a whole, including shifts of resources and costs.
- The overall investment for the implementation.
- The common view of the care strategy.
- Assessment of collaboration between care providers.

No participants suggested topics or outcomes which should be removed from an assessment to support decision making related to integrated care in this second questionnaire round.

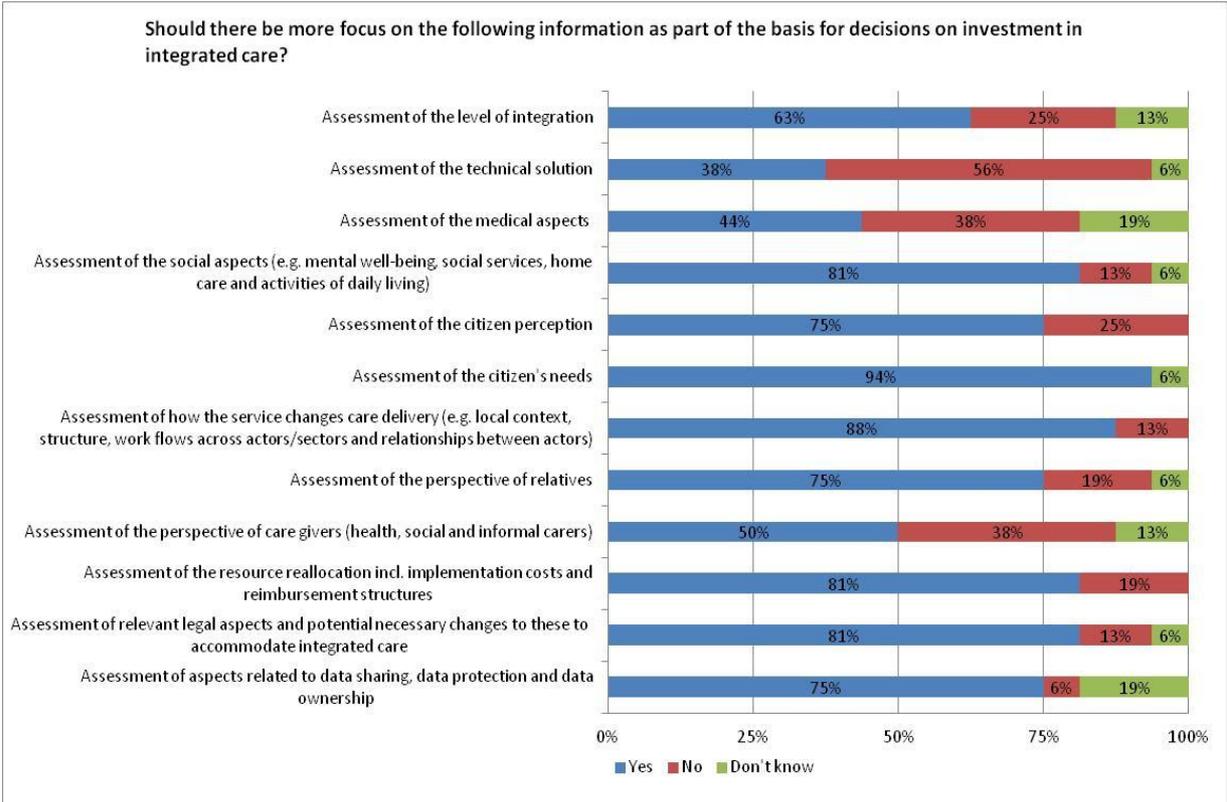


Figure 1: Responses to additional questions based on comments from questionnaire 1

The responses to the additional questions confirm that the majority of respondents believed that there should be more focus on: the assessment of social aspects; citizens’ perspectives and needs; changes in care delivery; relatives’ perspectives; resource reallocation; legal aspects; and data sharing. The responses are showed in Figure 1.

In relation to social aspects, one respondent commented that these should be related to saving of costs and prevention of diseases.

In relation to resource reallocation, one respondent commented that this aspect can support the demonstration of effectiveness of the integrated care interventions.

### 4.6 Summary

The main comments from the first questionnaire, the second questionnaire, and discussion from the workshop are summarised in Table 4 below:

Table 4: Results from Delphi

1 <sup>st</sup> Delphi round (1 <sup>st</sup> questionnaire)	3 <sup>rd</sup> Delphi round (discussion during workshop)	4 <sup>th</sup> Delphi round (2 <sup>nd</sup> questionnaire)
<p>The following comments were made in the first Delphi questionnaire:</p> <ul style="list-style-type: none"> <li>• Description of care recipient needs (both health and social) and purpose of the service.</li> <li>• Description of the local context.</li> <li>• Aspects of data safety.</li> <li>• Description of personal safety (i.e. related to falls, drugs, drug interactions, adverse events).</li> <li>• Maintenance of the technical service (incl. certification).</li> <li>• Satisfaction of informal carers.</li> <li>• Risk stratification.</li> <li>• Patient perception in terms of quality of care and coordination, and motivation.</li> <li>• Description of changes in the ecosystem surrounding the patient (care recipient) i.e. disruption in work relations.</li> <li>• Staff empowerment.</li> <li>• Assessment of impact on legal aspects.</li> <li>• Assessment of coordination (integration).</li> <li>• Addressing cultural aspects in relation to transferability.</li> </ul>	<p>The following issues were central in the discussion of the content of MAST at the workshop:</p> <ul style="list-style-type: none"> <li>• The elements related to domain 7 should be more dominant as they contribute to the context where the integrated care service is implemented.</li> <li>• Consider the possibility of measuring the level of integration.</li> <li>• The focus on the end user should be increased. Integrated care is not only about the technology but the care recipient's needs.</li> <li>• Consider an increased focus on the relatives and informal carers.</li> <li>• The use of the term "care recipient" might indicate a passive user; the term "citizen" should be considered.</li> <li>• Political strategies and goals related to the integrated care service should be considered.</li> <li>• The difficulties related to assessing integrated care were addressed as integrated care services are very complex and comprehensive.</li> </ul>	<p>The following comments were made in the second Delphi questionnaire:</p> <ul style="list-style-type: none"> <li>• Include organisational profiles and profiles of professionals.</li> <li>• Description of changes in work procedures in relation to integrated care.</li> <li>• Assessment of independence and mental well-being.</li> <li>• Security related to psycho-social issues.</li> <li>• Measurements of survival rates could be more interesting than mortality rates.</li> <li>• Reasons for drop-outs.</li> <li>• Use of home care.</li> <li>• Assessment of changes in quality of individualised care plans.</li> <li>• Assessment of changes in quality of patient's needs assessments.</li> <li>• Assessment of effects on perception of coordination.</li> <li>• Perception of carers as they can be important in the successful implementation of IC service</li> <li>• The business case for the integrated care organisations as a whole incl. shifts of resources and costs.</li> <li>• The overall investment for the implementation.</li> <li>• The common view of the care strategy.</li> <li>• Assessment of collaboration between care providers.</li> </ul>

### 5 Discussion

The overall aim of the Delphi process was to establish consensus among the workshop participants in terms of what should be included in an assessment framework for ICT supported integrated care.

This was done by inviting decision makers from the European health and social care systems and relevant researchers to participate in a workshop regarding the use and possible modification of the MAST framework to fit assessments of ICT supported integrated care.

Overall, the results from the rounds of the Delphi process confirmed the face validity that the domains included in MAST are useful for assessments of integrated care.

More than 90% of the respondents in the process considered the seven MAST domains to be moderately or highly important related to integrated care. The second Delphi questionnaire confirmed the results from the first questionnaire.

The comments provided by the respondents in each of the questionnaires reflected a need for new topics and information to be included in the MAST framework when it is used to assess integrated care services. As the questionnaires only included questions based on the domains and topics from the original MAST framework, the answers from the participants might have been restricted. If there had been only open ended questions or if the questionnaire had been based on a different assessment framework, the results from the workshop might have been different.

The repetition of questionnaires in the Delphi process was an attempt to confirm or disconfirm the participants' comments to provide a stronger basis for including them in the MAST framework for integrated care.

In relation to the number of people invited, a relatively low number accepted to participate (17 out of 61). The recent terror event in Brussels and the resulting stricter security rules in airports, and also restrictions by many organisations on travelling to Brussels, may have affected the number of participants at the workshop, including some of the cancellations just before the workshop was held.

As was mentioned in D7.1 in relation to sample size, the majority of Delphi studies have used 10 to 15 or 15 to 20 respondents depending on the background of the Delphi subjects. This means that the sample size in this Delphi process is sufficient.

It is uncertain whether the outcome of the workshop would have been different if more or different people had participated. The comments related to each domain could have differed, as there was some diversity among the comments. However, the very high level of agreement between the 17 participants could indicate that the results would not have been much different in terms of rating of the domains.

## 6 Conclusion and future plans

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, the work set out for this workshop was to adapt the model to assessments of integrated care services.

The results indicate positive outcomes of the validation process as the majority of the workshop participants found the current elements in MAST relevant and important.

Therefore, the results of the workshop and the Delphi process have supported the validation of the use of MAST for assessments of integrated care services as a basis for decision making. However, there was a request for more information in the framework, which means that there is a clear need for a modification of the original framework in order for it to cover the needs related to assessments of ICT supported integrated care.

The workshop and the Delphi questionnaires resulted in many comments from the participants and discussions about integrated care, and it was evident that more work is needed in terms of adapting MAST to integrated care before it can and should be finally validated in actual studies of ICT supported integrated care.

The results from the workshop will be included in deliverable D7.8 MAST 2.0 manuals.

## Appendix A: List of participants

Name	Title	Organisation	Country	E-mail
Michael Rigby	Professor in Health Information Strategy	Keele University, UK	UK	m.j.rigby@keele.ac.uk
Esteban de Manuel	Director	Kronikgune	Spain	edemanuel@kronikgune.org
Charles Alessi	Senior Advisor and Doctor	Public Health England	UK	alessicws@gmail.com
Maria Gabriela Barbaglia	Researcher	Agency of Health Quality Assessment of Catalonia	Spain	<a href="mailto:mgbarbaglia@gencat.cat">mgbarbaglia@gencat.cat</a>
Helene Richardsson	Business Development Manager	The Swedish eHealth Agency	Sweden	helene.richardsson@ehalsomyndigheten.se
Christiaan Vis	Associate researcher	Vrije Universiteit Amsterdam	Netherlands	<a href="mailto:p.d.c.vis@vu.nl">p.d.c.vis@vu.nl</a>
Benny Eklund	Senior Advisor	County Council Uppsala	Sweden	<a href="mailto:benny@eklund.nu">benny@eklund.nu</a>
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Juni Kristin Bratberg Melting	Research Coordinator	The Norwegian Directorate of eHealth	Norway	Juni.Kristin.Bratberg.Melting@helsedir.no
Judith Mølgaard	Director	Odense University Hospital	DK	Judith.Moelgaard@rsyd.dk
Jonas Tyle Petersen	Senior Manager	Danish Regions	DK	<a href="mailto:JTP@regioner.dk">JTP@regioner.dk</a>
Guido Iaccarino	Associate Professor of Internal Medicine	University of Salerno	Italy	giaccarino@unisa.it
Marlene Harkis	Service Development Manager	NHS24	Scotland	Marlene.Harkis@nhs24.scot.nhs.uk
Debbie Keeling	Reader in Consumer Psychology	Loughborough University	UK	d.i.keeling@lboro.ac.uk
Lars Botin	Associate Professor	Aalborg University	DK	botin@plan.aau.dk

Name	Title	Organisation	Country	E-mail
Teresa Gallelli	Coordinator of EU research projects	CUP2000 SEA	Italy	teresa.gallelli@cup2000.it

## Appendix B: Delphi questionnaire

### Workshop - MAST Integrated Care

#### Background information

1. Please state your name: \_\_\_\_\_
2. Please state your title: \_\_\_\_\_
3. Please state your country: \_\_\_\_\_
4. Please state your organisation: \_\_\_\_\_
5. Please state your job title: \_\_\_\_\_
6. What is your educational background? \_\_\_\_\_
7. Do you take part in making decisions on buying or implementing integrated care services/solutions in your organisation?
  - a. Yes
  - b. No
8. Do you have any prior knowledge of MAST (Model for Assessment of Telemedicine)?
  - a. Yes
  - b. No
    - i. If yes, how did you learn about MAST?  
\_\_\_\_\_
9. Have you ever participated in a project which was evaluated by means of MAST?
  - a. Yes
  - b. No
    - i. If yes, what was your role?  
\_\_\_\_\_

### Delphi Questionnaire regarding the validity of MAST for ICT supported Integrated Care

In the following questions, we are asking for your perception of the importance of the different types of information included in an assessment of ICT supported integrated care services based on MAST.

The objective of the questions is to assess whether MAST includes the information about integrated care services that you find relevant when making decisions about investment or introduction of ICT supported integrated care in your local health and social 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 integrated care?

	Not important	Somewhat important	Moderately important	Highly important
<b>Domain 1: Health and social situation of the care recipients and characteristics of the service</b>	0	1	2	3
Health and social situation of the care recipients (e.g. burden of disease, current treatment)	0	1	2	3
Description of the service (e.g. what does the integrated care service include)	0	1	2	3
Technical characteristics (e.g. devices, IT-systems, need for integration, etc.)	0	1	2	3

Are there **other aspects**, or topics of integrated care that should be part of the basis for decisions on investment in integrated care in Domain 1?

Are there any aspects or topics of integrated care within Domain 1 that should **NOT** be part of the basis for decisions on investment in integrated care?

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 integrated care?	Not important	Somewhat important	Moderately important	Highly important
<b>Domain 2: Safety</b>	0	1	2	3
Clinical safety (e.g. impact on safety of care recipients and staff)	0	1	2	3
Technical safety (e.g. technical reliability of devices and IT systems)	0	1	2	3

<p>Are there <b>other aspects</b> or topics of integrated care that should be part of the basis for decisions on investment in integrated care in Domain 2?</p>	
<p>Are there any aspects or topics of integrated care within Domain 2 that should <b>NOT</b> be part of the basis for decisions on investment in integrated care?</p>	

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 integrated care?	Not important	Somewhat important	Moderately important	Highly important
<b>Domain 3: Clinical and care effectiveness</b>	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

<p>Are there <b>other aspects</b> or topics of integrated care that should be part of the basis for decisions on investment in integrated care in Domain 3?</p>	
<p>Are there any aspects or topics of integrated care within Domain 3 that should <b>NOT</b> be part of the basis for decisions on investment in integrated care?</p>	

<p>On a scale from 0 (not important) to 3 (highly important):</p> <p>How important is the following information as part of the basis for decisions on investment in integrated care?</p>	Not important	Somewhat important	Moderately important	Highly important
<b>Domain 4: Care recipient perspectives</b>	0	1	2	3
Care recipient satisfaction (e.g. effects on subscales for care recipients satisfaction)	0	1	2	3
Care recipients' understanding of information (e.g. understanding of information about the device)	0	1	2	3
Care recipient acceptance (e.g. proportion of care recipients accepting to use the device)	0	1	2	3
Care recipients' confidence in the integrated care service (e.g. effects on subscale for confidence)	0	1	2	3
Care recipients' ability to use the application (e.g. proportion of care recipients able to use a device)	0	1	2	3
Care recipients' access and accessibility (e.g. change in proportion of care recipients being treated by means of health and social services)	0	1	2	3
Care recipients' empowerment and self-efficacy (e.g. effects on scales for care recipient empowerment)	0	1	2	3

<p>Are there <b>other aspects</b> or topics of integrated care that should be part of the basis for decisions on investment in integrated care in Domain 4?</p>	
<p>Are there any aspects or topics of integrated care within Domain 4 that should <b>NOT</b> be part of the basis for decisions on investment in integrated care?</p>	

<p>On a scale from 0 (not important) to 3 (highly important):</p> <p>How important is the following information as part of the basis for decisions on investment in integrated care?</p>	Not important	Somewhat important	Moderately important	Highly important
<p><b>Domain 5: Economic aspects</b></p>	0	1	2	3
<p>Societal economic evaluation (e.g. cost-effectiveness analysis)</p>	0	1	2	3
<p>Business case (e.g. hospital expenditures and hospital revenue per care recipient)</p>	0	1	2	3

<p>Are there <b>other aspects</b> or topics of integrated care that should be part of the basis for decisions on investment in integrated care in Domain 5?</p>	
<p>Are there any aspects or topics of integrated care within Domain 5 that should <b>NOT</b> be part of the basis for decisions on investment in integrated care?</p>	

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 integrated care?	Not important	Somewhat important	Moderately important	Highly important
<b>Domain 6: Organisational aspects</b>	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

<p>Are there <b>other aspects</b> or topics of integrated care that should be part of the basis for decisions on investment in integrated care in Domain 6?</p>	
<p>Are there any aspects or topics of integrated care within Domain 6 that should <b>NOT</b> be part of the basis for decisions on investment in integrated care?</p>	

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 integrated care?	Not important	Somewhat important	Moderately important	Highly important
<b>Domain 7: Socio-cultural, ethics, legal aspects</b>	0	1	2	3
Ethical issues (e.g. impact on care recipient autonomy)	0	1	2	3
Legal issues (e.g. whether an integrated care service is in accordance with relevant laws)	0	1	2	3
Social issues (e.g. impact on care recipients' work life, gender issues)	0	1	2	3

<p>Are there <b>other aspects</b> or topics of integrated care that should be part of the basis for decisions on investment in integrated care in Domain 7?</p>	
<p>Are there any aspects or topics of integrated care within Domain 7 that should <b>NOT</b> be part of the basis for decisions on investment in integrated care?</p>	

**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 integrated care?	Not important	Somewhat important	Moderately important	Highly important
<b>Transferability of the described results to your local setting</b>	0	1	2	3
Transferability of information on safety	0	1	2	3
Transferability of information on clinical and care effectiveness	0	1	2	3
Transferability of information on care recipient perspectives	0	1	2	3
Transferability of information on economic aspects	0	1	2	3
Transferability of information on organisational aspects	0	1	2	3
Transferability of information on socio-cultural, ethical and legal aspects	0	1	2	3

**Additional questions about other aspects**

<p>Are there <b>other general aspects</b> or topics of integrated care that should be part of the basis for decisions on investment in integrated care?</p>	
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**Thank you for your answers. Please give your questionnaire to the organisers of the workshop.**

## Appendix C: Additional questions in second Delphi questionnaire

### Main points from workshop in Brussels

The following questions cover the overall points from the discussions during the workshop in Brussels. Please assess the importance of increasing the focus on the individual elements and add comments and if possible, comments on how this could be achieved.

#### Should there be more focus on the following information as part of the basis for decisions on investment in integrated care?

	Yes	No	Don't know	Comments
Assessment of the level of integration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Assessment of the technical solution	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Assessment of the medical aspects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Assessment of the social aspects (e.g. mental well-being, social services, home care and activities of daily living)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Assessment of the citizen perception	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Assessment of the citizen's needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Assessment of how the service changes care delivery (e.g. local context, structure, description of work flows across actors/sectors and relationships between actors and teams)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Assessment of the perspective of relatives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Assessment of the perspective of care givers (health, social and informal carers)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Assessment of the resource reallocation incl. implementation costs and reimbursement structures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Assessment of relevant legal aspects and potential necessary changes to these to accommodate integrated care	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Assessment of aspects related to data sharing, data protection and data ownership	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>