D4.4

Testing: health professional panels in the EU

2nd Reporting period
WP4 Agent Based Social Simulation

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TELL ME - Transparent communication in Epidemics: Learning Lessons from experience, delivering effective Messages, providing Evidence.
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D4.4 "Testing: health professional panels in the EU"

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EXECUTIVE SUMMARY

Background

The TELL ME simulation is a prototype computer model about the effect of communication on personal behaviour to protect against pandemic influenza. It is intended to help health authorities and other planning organizations to think through the connections between personal behaviour, epidemic progress and risk.

TELL ME Simulation Model

The objective of the TELL ME simulation model is to provide guidance for public health authorities about the effectiveness of different communication strategies before, during and after an influenza epidemic. As the objective of such communication is to limit the impact of the epidemic, the model must connect proposed strategies to epidemic progress.

Testing Methods

The TELL ME simulation model was tested within the framework of the UEMO meeting on November 21, 2014, Budapest (Hungary). Two test groups were conducted and at the end of the test groups, participants were asked to fill up a validation questionnaire

Recommendations of the working group members

- Inclusion of new determinant factors (inputs) into the model (e.g. travelling, migration, cross-border influence, families, health workers', GPs' and patient's (mis)perceptions, number of predicted deaths etc.)
- Differentiation (weighting) of certain factors like for e.g. health care professional groups, media channels, quality of the message
- Increase heterogeneity of the population (e.g. age groups and other characteristics)
- Provide more detailed explanation about where/how the epidemic has started
- To allow a user to choose where an epidemic starts would be useful
- Realistic model situations for every country
- Comparison between the outcome of the different communication activities (comparison to former results)
- GPs involvement in the planning
- Expand the number of potential users (a basic version for GPs and other health professionals)
- Provide (more) support for potential users (e.g. explanations, code definitions, more user-friendly interface, video support)

1. Introduction

1.1 Background

TELL ME project aims to develop an evidence-based communication package to respond to major epidemic outbreaks, notably flu pandemics. In the event of a flu outbreak, health agencies and other official bodies provide information about the progress of the epidemic and recommended actions to be undertaken by the public and particular groups who are exposed to greater risk.

In order to assist health agencies to develop strategies to communicate any infectious disease outbreak in an effective way, so as to encourage appropriate population behaviour and minimise the impact of an epidemic TELL ME project has developed:

- a communication kit and
- an agent-based model to assist with strategy design decisions.

(D4.1 Architecture Technical Specifications and Validation Criteria, University of Surrey, 2013)

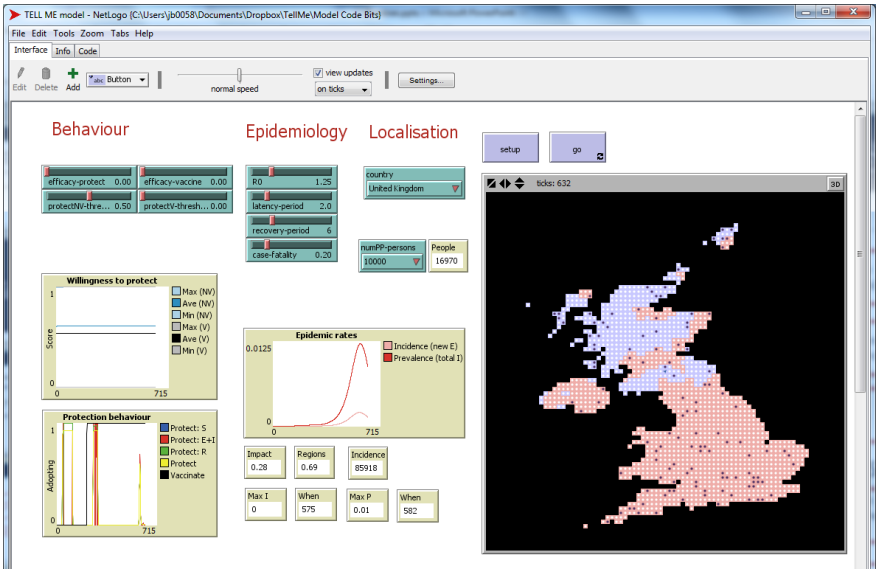
1.2 TELL ME Simulation Model

The objective of the TELL ME simulation model is to provide guidance for public health authorities about the effectiveness of different communication strategies before, during and after an influenza epidemic. As the objective of such communication is to limit the impact of the epidemic, the model must connect proposed strategies to epidemic progress.

The TELL ME project relies on the connection between protective behaviour and epidemic transmission. That is, personal voluntary decisions to be vaccinated or adopt hand hygiene and social distancing measures reduce the impact of an influenza outbreak. Without such a connection, there would be no value in communication encouraging such behaviour. That is, there is interdependence and feedback between the personal behaviour and the epidemic.

The simulation has been developed in NetLogo, a specialist agent-based modelling application. This will enable model users to input communication strategies and also to manipulate other parameters that are relevant for planning such as the country to be considered and the infectivity of the disease. (Figure 1) (D4.2 Software Design, University of Surrey, 2014)

Figure 1



2. Testing Methods

According to the requirements of the Description of Work (DoW), the TELL ME simulation model had to be assessed by panels of health professionals in both the EU and US. The panel membership proposed in the DoW includes a range of health professionals, which overlapped with the intended users of the model.

According to the requirements of the Description of Work and Report D4.1, a testing protocol has been compiled.

Report D4.1 identified four assessment criteria to be assessed by the health professionals' panel:

- Utility: communication strategies – Confirm whether predefined and new scenarios and communication strategies can be entered into the model.
- Utility: output content – Confirm whether the information provided by the model to the user is the right information to assist decision makers in understanding the impact of communication.
- Utility: output comprehensibility – Confirm whether the information provided by the model to the user is presented in a way that is understandable.
- Empirical: qualitative behaviour – Confirm whether the model results are qualitatively realistic; that is, changes in inputs lead to reasonable changes in outputs.

Based on these criteria, UEMO in collaboration with the University of Surrey developed the validation questionnaire. The

Testing in the EU was performed according to the membership of UEMO, so that the testing panel consisted of general practitioners/family doctors working in practices taking care of adults, children or both group of patients.

General Assembly meeting was a good opportunity to have organized the testing sessions having representation from many countries of the EU. The sessions were organized on the 21st November 2014 in Budapest, Hungary.

Two test groups were conducted:

- Test Group 1: having representation of 15 participants from Belgium, Hungary, Italy, Ireland, Portugal, Slovakia, the Netherlands, UK

- Test Group 2: having representation of 15 participants from: Austria, Czech Republic, Finland, Hungary, Malta, Norway, Portugal, the Netherlands, Turkey, UK, EMSA

Duration of the test groups were 1.5 hours. The structure of the testing sessions was demonstration, testing, discussion and filling up the validation questionnaire. The details of the of the two working groups were the same, see it bellow:

- Moderator opened the meeting and presented the agenda.
- Agenda was approved.
- The WG provided the opportunity to test and validate the simulation model software developed in the frame of the TELL ME project to facilitate planning of communication strategies in case of outbreaks.

- The simulation software was presented by Dr. Jennifer Badham (University of Surrey) who emphasized the two legged background of it: the agent-based model for protective behavior and the standard mathematical epidemic model (SEIR). These are in a two-way connection/influence: behavior to epidemic and epidemic to behavior. The interface of the software, which was uploaded to all testing laptops, was explained in details. The main topics of the slideshow was presented as follows:

  Context

  What is TELL ME? What is the TELL ME simulation model?
  Design process

  The Model: Description and Demonstration

  Implementation: Two connected models
  Broad model logic
  Demonstration model: main screen
  Prototype: multiple screens
  Communication plans and communication effect
  Demonstration (scenarios)

  Conclusion

  Summary: progress and potential uses

- Delegates tried the different scenarios incorporated in the software. A moderated discussion started about the feedback and questions of the audience.

Both focus group sessions were recorded for later analysis.

At the end of the test groups, participants were asked to fill up a validation questionnaire (see in the Appendix). The questionnaire included 15 questions divided between two sections. The first part focused on assessment of the qualitative behavior integrated in the software and the second one on the model usability. The average completion time was of about 10-15 minutes. The total number of respondents was 17.

This report summarizes the comments and ideas that the test groups' members shared and their responses to the validation questionnaire. The report also includes recommendations on changes that should be made and further inputs and features that the model should be covered.

3. Results

3.1 Outcomes of the discussion of the testing groups

This section summarizes the outcomes of the discussion started after the presentation of the software and testing procedure of the different scenarios. The topics and results of the discussion are presented as follows:

- Who is the target group of the software?

  - In both groups, this question came up. Delegates mentioned that the public health authorities are the main target of this software, but the involvement of the GPs is important. One of the reasons is that the expected outcome, the positive attitude of the patients is an important influencing factor of the workload of GPs in terms of communication need during consultations. GPs are part of the process of communication.

- Differentiation (weighting) of certain factors

  - Health care professional groups have different weights and the software does not address this.

  - Insight mass media the different channels have different effectiveness.

  - The influence of some negative groups who could have an enhanced negative impact on the attitude of the environment should be counted with a weighted factor.

  - The quality of the message could be an influencing factor as well, not only the media channel. The name could be an influencing factor as well (for ex. Hong Kong, Mexican-flu).

- Homogeneity / heterogeneity

  - Software does not consider heterogeneity (ethnic, socio-cultural) of the population in one country.

  - To use different age groups would be useful. Appear intuitive with flu.

  - To use age, or other characteristics, for target groups – more nuanced than just having one 'unspecified' target group.

- Travelling, migration, borders

  - Should look for data on local transport rates. Travel rates higher in cities than rural areas.

  - Should be include GIS data for Ireland – as the sudden border is unrealistic.

- There are some countries where the migrants' flow is significant, so would be a useful parameter to be included. The cross border influence has its impact as well on the attitude/behavior.

- Other inputs / features / opportunities suggested

- Should be incluced a message parameter for 'persuasiveness'/effectiveness of the specific message.

- Death rates may be useful for communication to users.

- More detailed explanation about where/how the epidemic is started.

- To allow a user to choose where an epidemic starts would be useful.

- The software itself could be made available to show off the importance of preventative activities in case of epidemics.

- Comparison between the outcome of the different communication strategies is important, the software is available to deliver.

- How flexible is the model in addressing the different communication needs during the stages of development of an epidemic.

- Planning and usage of the model

- Planning groups should be included GPs.

- Public engagement as a possible use of the model (the model could be used as a communication tool to public)

- Support the use of software

- The interface of the software should be more user-friendly.

- Video support (YouTube videos or Webinar) would be helpful for teaching people about the model remotely (easier than a long user document).

3.2 Results of Validation Questionnaires

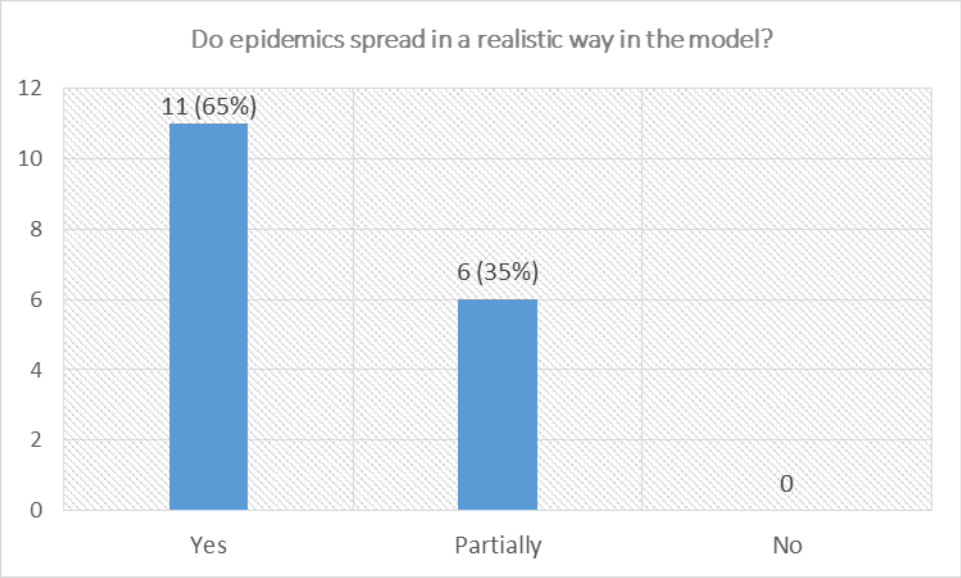
This section aims to present the analysis of the validation questionnaires fill-up at the end of the testing sessions.

The first four questions focused on assessment of the qualitative behavior and the next ten topics on the model usability.

Qestion1 Do epidemics spread in a realistic way in the model?

Two-thirds (65 percent) of participants consider that the epidemics spread in a realistic way in the model. One-third (35 percent) think that the model is only partially realistic in this regard. (Figure 2)

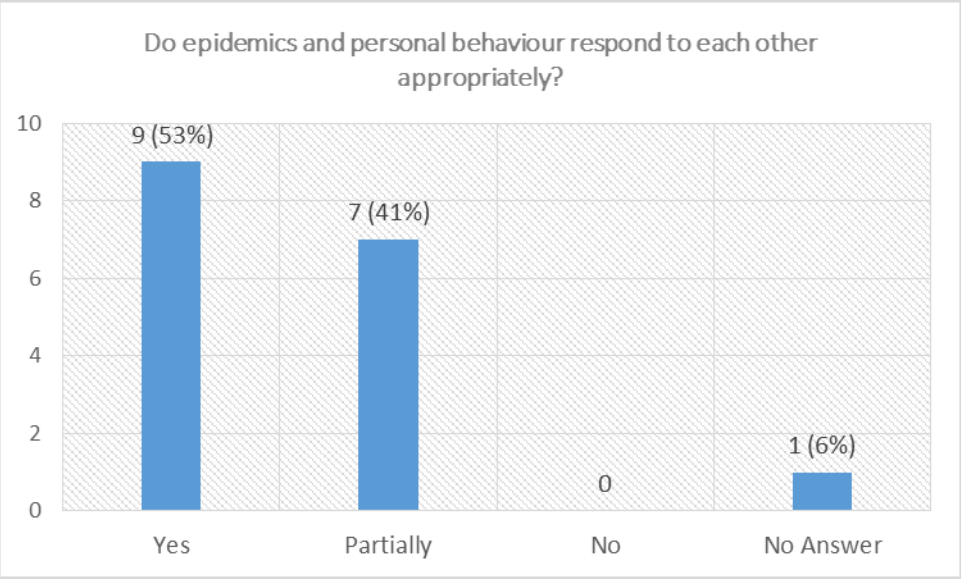
Figure 2



Qestion2 Do epidemics and personal behavior respond to each other appropriately?

53 percent of respondents totally and 35 percent of them partially agree that epidemics and personal behaviour respond to each other appropriately. (See Figure 3)

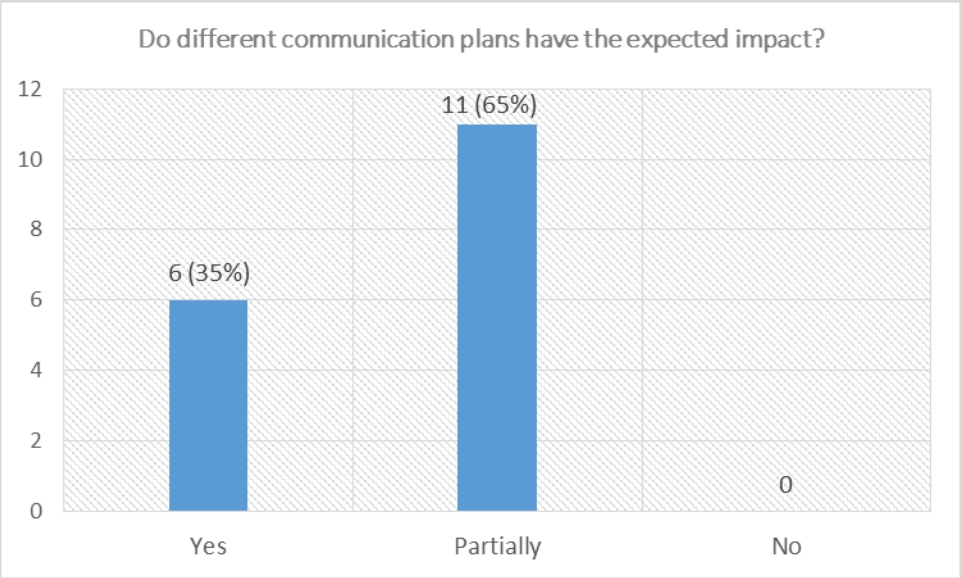
Figure 3



Qestion3 Do different communication plans have the expected impact?

As shown in the Figure 4, large majorities (65 percent) of the panel members partially agree that different communication plans have the expected impact. Six respondents consider fully realistic this relationship between communication plans and impacts.

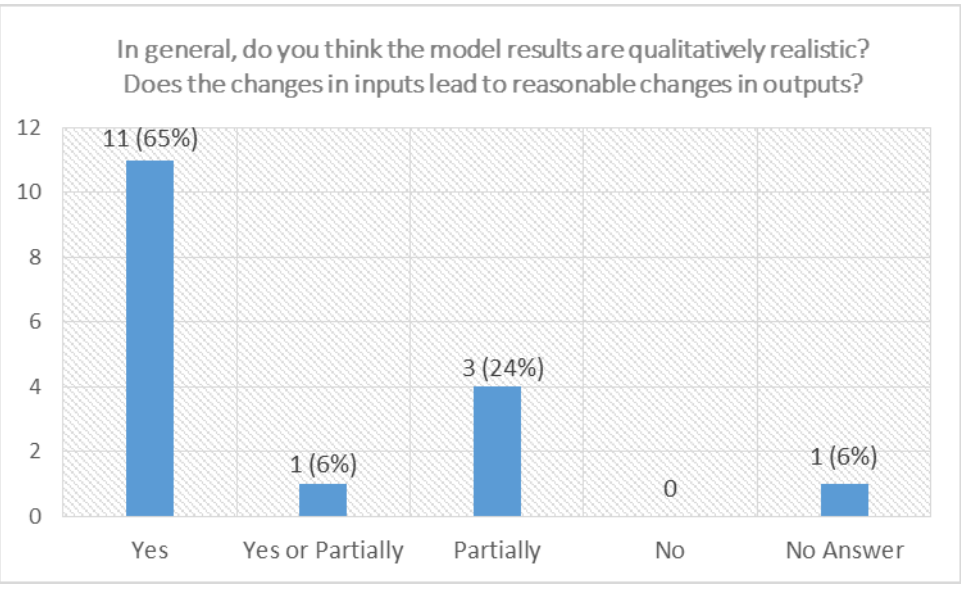
Figure 4



Qestion4 In general, do you think the model results are qualitatively realistic? Does the changes in inputs lead to reasonable changes in outputs?
Qestion5 Please explain.

The survey indicates that 11 out of 17 respondents agree that the model results are qualitatively realistic in general. Smaller part of the test groups' members (4 persons) consider that the changes in inputs lead to partially reasonable changes in outputs. (Figure 5)

Figure 5



To provide more detailed data, panel members were asked to answer an open ended question. Despite generally positive opinions, a number of concerns were raised e.g. other disease, cross-border effects. Detailed explanation are shown in the Table 1.

Table 1

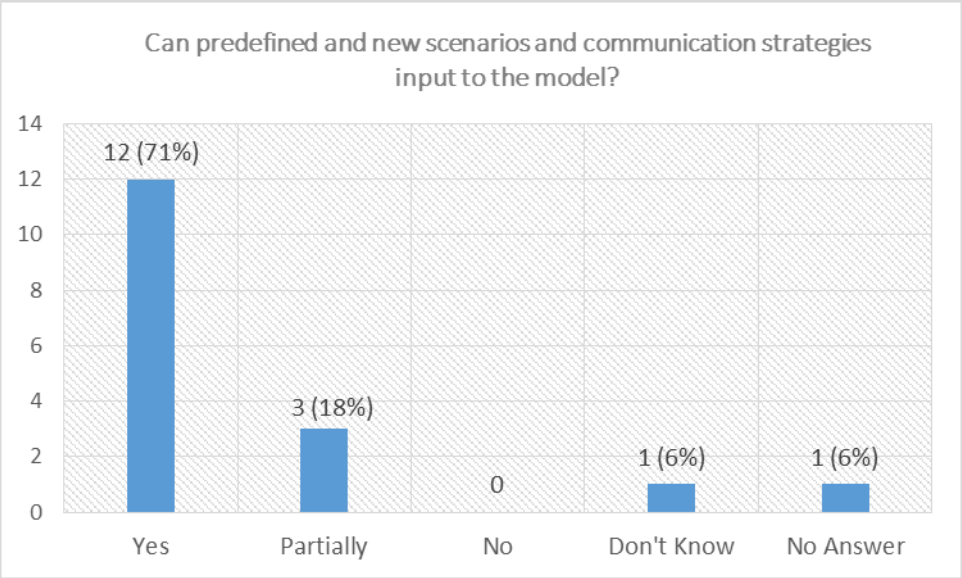
Answer	Explanation
'Yes'	For flu I have the impression that is good, for other disease not
	We don't have anything better yet. So yes. But: it is work in progress
	Higher RO=faster spreading (simple example)
	Yes, but the data must be correct. Other is about deductive reasoning
'Yes or Partially'	During practice/test it worked like realistic however there was no time to prove it in real time
'Partially'	I have some doubts that this theoretical model really represents reality. Are there enough sensitive data to prove these measures are really helpful?
	I do not have the information need to insure property to this questions. I also cannot have conclusion because this model does not include my country. This model do not take in consideration no borders/no physical barriers to spread epidemic
	Transport is not factored into this model. Shropshire for instance has no direct line to London. It is odd to have Northern Ireland in isolation, when traffic to/from the Irish Republic is considerable

Second part of the questionnaire focused on model usability.

Qestion6 Can predefined and new scenarios and communication strategies input to the model?

Large majorities (12 out of 17) of participants answered that predefined and new scenarios, and communication strategies can input to the model. Three respondents (18 percent) believed that it is only partially possible.

Figure 6



Qestion7 What other inputs would be useful? List them please and explain why.

Many potential inputs were mentioned which would be useful to integrate into the model e.g. families, continents, information about public transport etc. Table 2 summarizes inputs and explanations listed by the participants.

Table 2

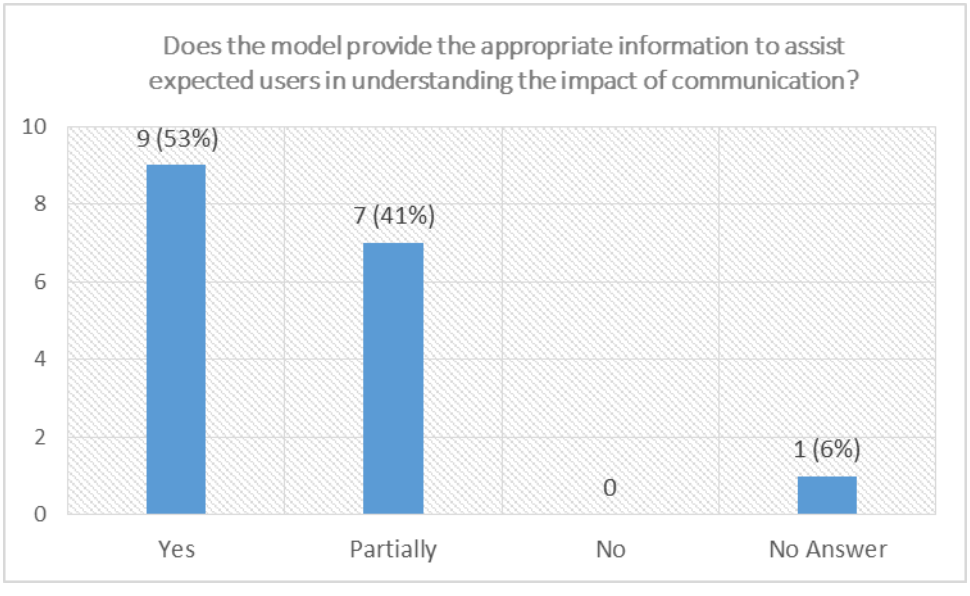
Input	Explanation
Families	Core decisions are done within families; is a significant part of societies
Example of high and low RO	Different viruses
Transport links	Good links encourage spread, poor public transport may be protective
The continent can be added	Affects between the continents
Organ donorship	Can model be transformed to other subjects such as influence on opt-in on organ donorship
Former results	Proving the quality of the model
Widely collect (mis)perceptions about epidemic and contributing factors from health workers', GPs' and patient's panels	To see if they come up with unexpected variables not yet included in your model
Number of predicted deaths in different scenarios	To use in media campaigns
The content and the way of work	-
Further comments: - Need more time to play to be certain - I'm not aware of the literature research that was made earlier to define which inputs should be included	

Qestion8 Does the model provide the appropriate information to assist expected users in understanding the impact of communication?

Qestion9 Please give reasons for your opinion.

More than half (53 percent) of the respondents totally and two-fifths (41 percent) of them partially agree that the model provide the appropriate information to assist expected users in understanding the impact of communication.

Figure 7



Despite the mostly positive assessments panel members expressed some doubts regarding the target group, impacts etc. (See Table 3)

Table 3

Answers	Explanations
'Yes'	There is immediate output result, it can help in understanding definitely
	Depends on how you define "users"! Governments? Public health authorities? GPs?
	If this theoretical model really represents reality, I believe it is pretty clear about the inputs of attitude changes have in the epidemic evolution.
	Code-definitions would be helpful
	Awareness of the influence is helpful
	The time for testing was limited
'Partially'	Some doubt about the update of the software
	Defined for health care workers involved in planning communication in outbreaks
	It is clear that different communication strategies have different impact, but not clear in comparison to each other
	Availability/frequency/cost of transport
	You have to be aware of the quaternary prevention concept! The absolutism of a mathematical model cannot be the one way to consider medical acts

Qestion10 Do you think the software helps the users to understand the different choices for communication plans?

Qestion11 Why? Please explain.

12 out of 17 respondents think that the software helps the users to understand the different choices for communication plans. (Figure 8)

On the positive side was mentioned the possibility for experiment and development awareness and attitude. Others believe that the usefulness depends on the 'type' of potential users. The importance of training also incurred. (Table 4)

Figure 8

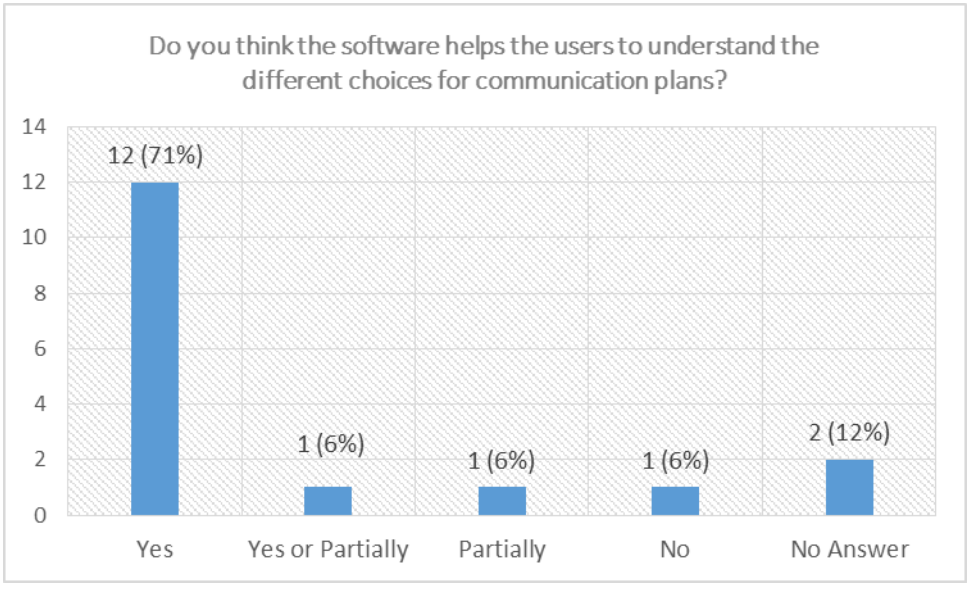


Table 4

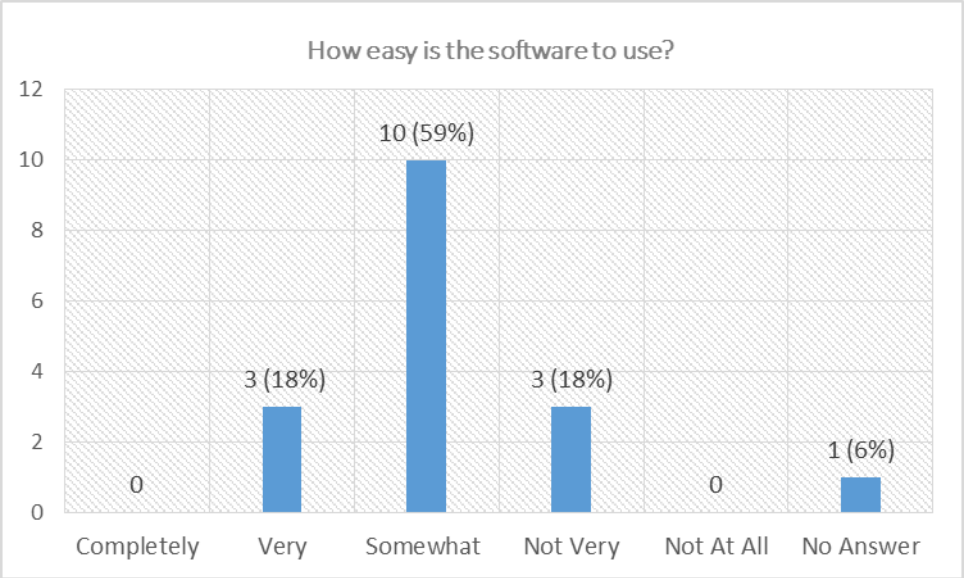
Answers	Explanations
'Yes'	It's complete but need for more training for the users
	By showing the effect of communication changes, their awareness and attitude might "develop".
	(Same as at the previous question) If this theoretical model really represents reality, I believe it is pretty clear about the inputs of attitude changes have in the epidemic evolution.
	Because it gives ability to experiment + see for yourself.
	The variables are available
'Yes' or 'Partially'	Yes vs. Partially: it depends on the type of users: e.g. professionals or non-professional group of people / society
'Partially'	*(Same as at the previous question)* Defined for health care workers involved in planning communication in outbreaks.
'No'	You have not to be aware of all definition/criteria used in this model
-	More applicable to Public Health or Department of Health

Qestion12 How easy is the software to use?

The panel members considered that the software is moderately easy to use. 10 respondents answered 'Somewhat' (59 percent), 3-3 answered 'Very' and 'Not Very' (18-18 percent).

On the scale of 1 ('Not At All') to 5 ('Completely') the rating average is 3.0.

Figure 9

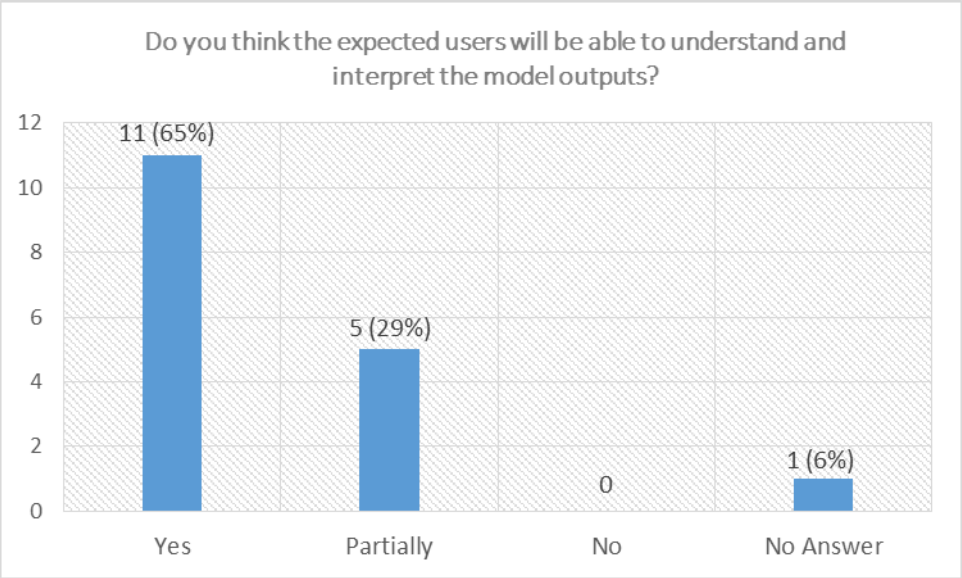


Qestion13 Do you think the expected users will be able to understand and interpret the model outputs?

Qestion14 Please give reasons for your opinion.

Two-thirds of respondents (65 percent) believe and 5 of them 'Partially' believe that the expected users will be able to understand and interpret the model outputs. (Figure 10)

Figure 10



Respondents believe that the potential users possess the necessary knowledge and experience to understand and interpret the model outputs, but more detailed explanation and trainings would be useful for them.

Table 5

Answers	Explanations
'Yes'	After a training
	Depends again on how you define "users".
	I believe this software should be used by policy makers public health doctors/technicians, which are people used to work with this kind of data
	For the expected users the terms are not new, they can easily adopt the model this way.
	If can be explained easily
	If public Health/ Real Authorities can be persuaded to use it
'Partially'	Depends on the targeting doctors and their knowledge on argument
	To have labels before changing the content
	You have to communicate this to users that are a little bit more difference (in terms of knowledge)
	Explanation needed
	More applicable to Public Health or Department of Health

Qestion15 What other features would be useful? List them please and explain why.

Panel members listed a number of other features what would be useful to include the model e.g. different groups of health workers, type of mass media, migration, travelling habits. Other useful suggestions also was mentioned e.g. expand the number of program users, provide a basic version and some technical support (short video).

Table 6

Features	Explanations
Type of health workers	GPs, nurses etc.
Type of mass media	Different patterns of media consumption; different effect of official and tabloid media
Migration, travelling habits	-
Planning	Help developing simple plan what to act on - flowchart
Consensus of the other operators	All must believe on utilities of the system - it is impossible to impose to person trust nor believe in IT
Expand the number of program users	Both into the various organizations (ex GPs) involved in the management of influenza control and vaccination programs (ex SNPG in the Netherlands)
Use of observations	For users for whom English is not the first language
Simplicity (a basic version for professionals)	Less variables probably could be helpful for beginners and/or for professionals too.
Produce a short video as a teaching mechanism	-
-	It would be good to have some realistic optimal model situations for every country

CONCLUSIONS AND RECOMMENDATIONS

This section summarizes the key results using a SWOT analysis. The list of 'opportunities' contains recommendations of work group members. Software developers should consider reality and (dis)advantages of these recommendations.

Strengths

The epidemics spread in a realistic way in the model
Epidemics and personal behaviour respond to each other appropriately
In general, the model results are qualitatively realistic (the changes in inputs lead to partially reasonable changes in outputs)
Predefined and new scenarios, and communication strategies can input to the model
The model provides the appropriate information to assist expected users in understanding the impact of communication
The software helps the users to understand the different choices for communication plans
Potential users will be able to understand and interpret the model outputs
Here is immediate output result, it can help in understanding definitely
The software gives ability to experiment
Defined for healthcare workers involved in planning communication in outbreaks

Weaknesses

Different communication plans only partially have the expected impact
There are some doubts that this theoretical model really represents reality (the data must be correct but the other is about deductive reasoning)
The absolutism of a mathematical model cannot be the one way to consider medical acts
Some important factors are not included into this model
It is questionable whether there are enough sensitive data to prove these measures are really helpful
You have not to be aware of all definition/criteria used in this model
It is clear that different communication strategies have different impact, but not clear in comparison to each other
The model for flu is good, for other disease not
The software is moderately easy to use
Some doubt about the update of the software

Opportunities

Inclusion of new factors (inputs) into the model (e.g. travelling, migration, cross-border influence, families, health workers', GPs' and patient's (mis)perceptions, number of predicted deaths etc.)
Differentiation (weighting) of certain factors (health care professional groups, media channels, quality of the message)
Increase heterogeneity of the population (e.g. age groups and other characteristics)
Provide more detailed explanation about where/how the epidemic is started
To allow a user to choose where an epidemic starts would be useful
Realistic model situations for every country
Comparison between the outcome of the different communication activities (comparison to former results)
GPs early involvement in the planning
Expand the number of potential users (a basic version for GPs and other health professionals)
To allow a user to choose where an epidemic starts would be useful.
Provide (more) support for potential users (e.g. explanations, code definitions, more user-friendly interface, video support)

Threats

Lack of interest from public health authorities to use the software
Potential users find the software difficult to use

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TELL ME - WP4 Agent Based Social Simulation
Responsible Partner: SURREY (2013)

D4.2 Software Design
TELL ME - WP4 Agent Based Social Simulation
Responsible Partner: SURREY (2014)

Testing Protocol for TELL ME Simulation Model
Badham, J (SURREY), Papp, R (EUMO), James, J (NDSLF)

APPENDIX

Validation questionnaire

The TELL ME simulation is a prototype computer model about the effect of communication on personal behaviour to protect against pandemic influenza. It is intended to help health authorities and other planning organizations to think through the connections between personal behaviour, epidemic progress and risk.

Qualitative Behaviour

1. Do epidemics spread in a realistic way in the model?

1. Yes 2. Partially 3. No

2. Do epidemics and personal behaviour respond to each other appropriately?

1. Yes 2. Partially 3. No

3. Do different communication plans have the expected impact?

1. Yes 2. Partially 3. No

4. In general, do you think the model results are qualitatively realistic? Does the changes in inputs lead to reasonable changes in outputs?

1. Yes 2. Partially 3. No

5. Please explain.

……

……

Model Usability

6. Can predefined and new scenarios and communication strategies input to the model?

1. Yes 2. Partially 3. No

7. What other inputs would be useful? List them please and explain why.

Input	*Explanation*
……	……
……	……
……	……

8. Does the model provide the appropriate information to assist expected users in understanding the impact of communication?

1. Yes 2. Partially 3. No

9. Please give reasons for your opinion.

……

……

10. Do you think the software helps the users to understand the different choices for communication plans?

1. Yes 2. Partially 3. No

11. Why? Please explain.

……

……

12. How easy is the software to use?

5. Completely 4. Very 3. Somewhat 2. Not Very 1. Not At All

13. Do you think the expected users will be able to understand and interpret the model outputs?

1. Yes 2. Partially 3. No

14. Please give reasons for your opinion.

……

……

15. What other features would be useful? List them please and explain why.

Feature	*Explanation*
……	……
……	……
……	……

Thank you!