

# Designing User Interfaces for Personal Health Assessment Questionnaires

## A Report From a Pilot Study

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**Abstract**—The cancellation of elective surgeries wastes valuable hospital resources. Our site of research has identified inadequate planning due to lack of information as a main cause for cancellations. It is anticipated that the pre-operative planning process may be improved if adequate patient information is gathered at an earlier stage, before the patient is admitted at the hospital. The aim of our research is to determine how an electronic personal health assessment questionnaire interface to the patient should be designed. Participants were asked to complete the electronic personal health assessment questionnaire in the two versions of the interface. The results indicate that, contrarily to literature, in a pre-operative setting, patients prefer to be presented various questions at a time when completing personal health assessment questionnaires.

**Keywords**—cancellations; surgery department; electronic communication; electronic health record; patient interfaces.

### I. INTRODUCTION

The cancellation of elective surgeries wastes valuable hospital resources [1][2][3][4]. It is also reported that cancellations negatively affect the patient [5][6][7]. Accordingly, cancellations are stressful and costly, with a high level of emotional involvement before surgery [2]. However, it is reported that between 10 and 40 % of elective surgeries are cancelled [8][9][10]. Furthermore, it has been reported that 50 % of these cancellations might be avoided [2][7][11].

The eTeam-Surgery project is studying the cancelation of elective surgeries problem at the University Hospital of North Norway (UNN). At UNN, inadequate planning due to lack of information was identified as the main cause for cancellations [12]. It is anticipated that the pre-operative planning process may be improved if adequate patient information is gathered at an earlier stage, before the patient is admitted at the hospital. It has been reported previously that such patient information may be included in a personal health assessment questionnaire, and requested from the patient at an earlier stage and while the patient is still at home [12]. Such document refers to the patient medical history and includes questions on previous diseases (e.g.,

heart disease, high blood pressure, and diabetes), previous surgeries, general information (e.g., allergies, and smoking habits), woman specific (e.g., maternity), and use of medication, as shown in Figure 1.

Do you have or had any of the following diseases:				
	Example	No	Yes	If yes, please specify
1. Heart disease	Chest pain, myocardial infarction, irregular pulse, heavy breathing triggered by effort			Year?
2. High blood pressure				
3. Bleeding disorders	Blood clots, haemophilia, easy bruising / nose bleeding			
4. Neurological disease	Stroke, ischemia, brain haemorrhage, epilepsy			Year?
5. Pulmonary or respiratory diseases	Asthma, COPD (Chronic Obstructive Pulmonary Disease), snoring with apnoea			
6. Diabetes	Broadly controlled, insulin, treated by medication			
7. Thyroid disease				
8. Kidney disease				
9. Liver disease				
10. Stomach problems	Peptic ulcer, heartburn, acid reflux, oesophageal hernia			
11. Infectious diseases	Hepatitis, HIV, tuberculosis or other serious infectious diseases			
12. Psychological problems that the hospital should know				
13. Rheumatic disease	Impaired mobility or neck instability			
14. Mobility limitations				
15. Other diseases / conditions				

Figure 1. Sample of the paper version of the personal health assessment questionnaire, which provided the basis to the eTeam-Surgery electronic questionnaire.

The eTeam-Surgery project gathered the information required from the patient in a structured document, and developed a web-based tool to make it available to the patient. When designing the interface of the web-based tool the doubt arises: “How a Personal Health Assessment questionnaire should be graphically presented to the user to promote his/her participation?”

Adamson and Bachman [13], at the Mayo Clinic, reported on a pilot study of using structured histories for patient. The authors suggested that questionnaires should be

presented to the patient one question at a time [13]. Considering that both studies refer to patient reported history, it was decided to try the configuration suggested by the Adamson and Bachman study [13], despite it had been carried out in a primary care setting.

The aim of our research is to determine how an electronic personal health assessment questionnaire interface to the patient should be designed. We will explore if, in a pre-operative setting, patients prefer to be presented with one question at the time, or various questions simultaneously, when completing an electronic personal health assessment questionnaire.

This paper is divided in four sections. In the first section, the problem with surgical cancellations is introduced, and the aim of the study is described. In the second section, the data collection methodology is presented and explained. The results are disclosed and interpreted in section three. In the last section, the authors discuss the study configuration, and suggest improvements to it based on the feedback of participants.

## II. METHOD

Two prototypes of the electronic personal health assessment questionnaire were built, each one featuring a different version of presenting the questionnaire. In Version 1, various questions were presented to the participant, grouped by subject. In Version 2, participants were presented one question at a time, following the suggestion in Adamson and Bachman's study.

Participants were asked to complete the electronic personal health assessment questionnaire in the two versions of the interface. A cross over methodology was used to ensure that the participants' choice was not influenced by the version completed first. Thus, for each participant the starting version was randomly selected.

## III. RESULTS

The fieldwork was carried out through a period of two days, in February 2014. Participants were randomly approached on the street, and a total of 11 persons agreed to participate. The sample consisted of six women and five men. Participants were given documentation where it was provided information related to the eTeam-Surgery project, and the context of their participation, and their consent to participate in the study was requested. Subsequently, the participants were given a tablet and asked to complete both versions of the electronic personal health assessment questionnaire. Upon completion the participants were asked to choose their preferred version. The results are presented in Figure 2.

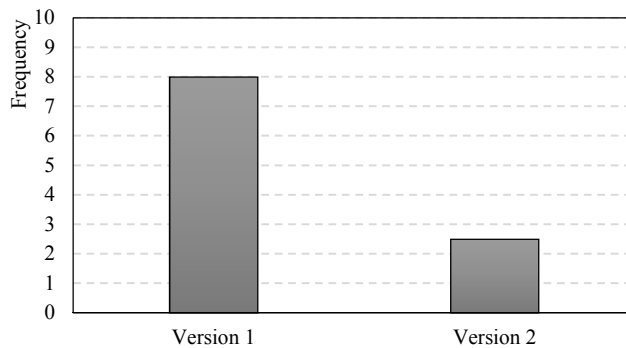


Figure 2. Frequency of the participants' preferred interface version.

## IV. CONCLUSIONS AND DISCUSSION

The work presented herein was collected through the period of two days. After this period the authors' decided to terminate the study due to the low adherence, and evaluate possible measurements to improve the participation in the study.

The size of the sample achieved in this study did not meet the required statistical significance and, therefore, no conclusions may be drawn based on the results. However, the results indicate a probability that, in a pre-operative setting, patients prefer to be presented various questions at a time, that the authors wish to further explore in a future study. Following, the authors explore on the reasons provided to refuse the participation in the study, as a basis to improve the configuration of future studies.

The study presents herein was terminated after two days of fieldwork by authors' decision, since the participation fell short on the expectations. The two main reasons provided by the possible participants to not take part in the study were:

### A. Being uncomfortable in providing their information

It was explicit in the consent form that it was not required from the participants to provide their true medical history. This was further emphasized when approaching the participants. Nevertheless, it was still used as a reason to not take part in the study.

### B. Did not want to complain on the hospital.

The authors' affiliation with the hospital lead possible participants to believe that opinions on the hospital's services quality was being collected. This could not be clarified since, once this was presented as a reason to not take part in the study participants did not want to engage in a conversation.

These behaviors lead the authors' to consider that future studies require a less constraining context. This implies that the participants should participate, e.g., from home, without the presence of the researchers, mimicking the real context of the web-based tool application. Furthermore, it is required to emphasize the main interest (i.e. the choice on the interface version), and anonymous nature of the study. This may be achieved by making it explicit in the consent form that the data on the answers was not stored, and providing non-participant related login data to the tool.

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