

## ***Evaluation of the use of an Ask-the-expert e-consultation service for support on health-related requests***

N. Nijland<sup>1</sup>, J.E.W.C. van Gemert-Pijnen<sup>1</sup>, S.M. Kelders<sup>1</sup>, B.J. Brandenburg<sup>2</sup>, E.R. Seydel<sup>1</sup>

<sup>1</sup>University of Twente, Enschede, The Netherlands

<sup>2</sup>Medicinfo, Tilburg, The Netherlands

**Abstract**– E-consultation in health care can be used to respond to an increasing demand for care by offering support on health-related requests. In this study we evaluated the use of an *Ask-the-expert* e-consultation service in order to assess whether the service is efficient and useful. A content analysis of e-mail exchange between clients and online health professionals was performed to gain insight in the purposes of use of the service. Our findings show that the service was used for e-mails requests on not urgent, minor ailments. Clients asked for health information to increase knowledge on the cause of their injury or disease, its consequences, self-care solutions and treatment options. Decision support on assessing the necessity to visit a doctor for a certain health problem was another important reason to use the service. We believe that web-based triage systems could be used to more easily assess whether certain symptoms need to be investigated.

**Keywords:** Internet, e-mail, e-consultation, online patient-provider communication, primary care

### I. INTRODUCTION

Due to demographic and socio-economic trends, a substantial increase in the use of health care facilities is expected in the years to come. This poses a huge burden on human resources. The use of e-consultation in health care (online asynchronous patient-caregiver communication) may be part of the solution of this future problem because these services have the potential to save unnecessary visits to the general practice by offering self-care solutions [1-4]. These services are particularly useful for certain patient groups such as the elderly and patients with a chronic disease because of their greater need for care and their willingness to use e-consultation [5].

These days, a growing number of websites offer e-consultation services where patients can consult health professionals via secured e-mail. These services can be used to direct patients to the most appropriate source of care and away from using unnecessary and ultimately more expensive services [5-14]. Despite these potentials, the use of e-consultation is not yet widespread in primary care. In order to foster the use of e-consultation, we believe that more research is needed on which type of patients actually use e-consultation services, how do they use it and the purposes of use of the service.

In this study we evaluated an *Ask-the-expert* e-consultation service with so-called type-A interactions; these are encounters in which a pre-existing patient-physician relationship is absent [6,7]. Aim of the study was to assess whether the service is beneficial and efficient for giving support on health-related requests. This paper presents the preliminary results of a content analysis of e-mail exchange between clients and online health professionals. We also described the users of the service, the purposes of use and the efficiency (response time) and usefulness of the service (fulfilment of requests).

### II. METHODS

#### *A. Description of the e-consultation service*

Since 2001 Medicinfo (<http://www.medicinfo.nl>) provides an *Ask-the-expert* service for medical advice by telephone. The service is offered free of charge to members and clients of homecare organizations and health care insurers. From 2003 the service also provided the possibility to consult health profession online.

Before entering their e-mail request via free-text, users have to create a secured personal account for which they have to provide initials, family name, birth date, gender and e-mail address. After agreeing with a disclaimer, clients are asked to fill out the purpose of their request on a form:

- (1) I am looking for general information about a disease or complaint / a treatment or medical examination / the address of a caregiver or institution;
- (2) A diagnosis has been established and now I want to know more about the cause / the consequences / the treatment / heredity / possible self care;
- (3) I want to know if I need to see a doctor for my complaint;
- (4) My question is about something else.

This classification was based on a content analysis of the *Ask-the-expert* service for medical advice by telephone.

The incoming e-mail requests were handled by trained nurses and authorized by a physician. Some questions are referred to a physician or other caregiver for advice. When answering, one of 4 possible protocols, as presented in textbox 1, are used. Answer 1 is given for a well-defined health-subject such as “*What is a trigger finger?*” For these “subject requests” general health information is given with

links to specific web pages for further information about the subject. If the request is about the personal health situation of the client e.g., “I have these symptoms/complaints; what is wrong with me?” no advice can be given because a reliable diagnosis can usually not be established online. For these “personal requests” clients are advised to contact their regular physician, see answer 3. In some cases the request embraces two aspects: a personal request of a well-defined subject, for example: “*I have psoriasis, what can I do about it? I heard that psoriasis can be treated with injections, could you tell me more about it?*” In these cases answer 2 is given. In case of non-health related requests, such as questions about the reimbursement of a treatment, answer 4 is given.

#### Textbox 1. Standard answers

##### *Answer 1: (information or advice)*

We received your message of (date). In this message you ask information / advice about ...  
Please find the information you requested below ... AND/OR  
We have found information about this subject on the following website...  
If you have remaining questions after reading this information we are pleased to answer them. If this is the case, please contact us again via the website or by telephone.

##### *Answer 2: (information or advice AND see regular physician)*

We received your message of (date). In this message you ask information / advice about ...  
We can only answer health-related questions if this can be done safely and reliably. After all it concerns your health! To be able to answer your question properly we need extra information that can only be obtained through personal contact with a physician or other caregiver. Therefore, we recommend contacting your own physician to get an answer for this question.  
However we did find general information about this subject. Please find it below... AND/OR  
However we did find general information about this subject on the following website...  
If you have remaining questions after reading this information we are pleased to answer them. If this is the case you can contact us again via the website or by telephone.

##### *Answer 3: (no information or advice, see regular physician)*

We received your message of (date). In this message you ask information / advice about ...  
We can only answer health-related questions if this can be done safely and reliably. After all it concerns your health! To be able to answer your question properly we need extra information that can only be obtained through personal contact with a physician or other caregiver. Therefore, we recommend contacting your own physician to get an answer for this question.  
If you have remaining questions after reading this information we are pleased to answer them. If this is the case you can contact us again via the website or by telephone.

##### *Answer 4: (no information or advice, request not health-related)*

We received your message of (date). Unfortunately we are not able to answer your question. We only answer questions that are related to diseases, health, wellness and lifestyle. For answers on policy and health insurance related questions we advice you to contact the customer service of your health insurance company.

Some requests are difficult for nurses to answer, for these requests a GP is consulted. Specific requests are forward to one out of 25 other health professionals among which are a physiotherapist, psychologist, diabetes nurse, dietician, obstetrician, school doctor, pharmacist, dentist, speech therapist, pedagogue, vaccination expert, and more. All requests are handled within 2 working days. No log-in procedure is required.

#### *B. Research instruments*

Log files were used to store patient-physician e-mail exchange during the period of September 2008 until September 2009. A content analysis was performed using the taxonomy of Sittig [15] and Eysenbach and Diepgen [16]. We analyzed 222 e-mail requests handled by nurses in the period of September 2008 and December 2008. To assess the type of health-related requests, Units of analysis were: a *request-and-reply* exchange which formed a pair of emails.

### III. RESULTS

#### *A. Users of the service*

Users of the e-consultation service were predominantly women (68%, 151/222). Mean age was 44 years ( $SD=14.1$ , minimum age: 14, max. age: 77,  $n=166$ ). 8 Percent (18/222) of the e-mail requests were submitted for other persons such as children or the partner.

#### *B. Reasons to use the service*

The main reasons to use the service were: acquiring more information after a given diagnosis and decision support on whether it is necessary to visit a doctor (see Table 1). Most requests however were categorized by clients as *something else* (33.2%). Of these requests, most could nevertheless be classified by the researcher in one of the standard categories (see Table 1). The requests were probably categorized by clients as *something else* because the request was aimed at getting a personal advice instead of obtaining general health information.

#### *C. Type of e-mail requests*

Most e-mail requests submitted to the service ( $n=153$ ) were about physical complaints, diseases or symptoms (see Table 2). Some examples:

*“I would like to know how and where I can be treated for definitive depilation of unwanted facial hair”.*

*“I’m a woman of X years. My mother has recently been diagnosed with breast cancer for the second time. Her sister has also breast cancer and my grandfather deceased from intestinal cancer. I would like to know whether I should be tested on heredity of (breast) cancer”.*

A substantial amount of requests contained insurance and reimbursement issues. These questions could not be handled, because the service is only meant for health-related questions.

TABLE 1. Reasons to use the service (total reasons  $n=247$ )

	<i>n</i>	%
<b>(1) I am searching for general information about...</b>	<b>39</b>	<b>15.7</b>
a. a disease or complaint	23	9.3
b. a treatment or medical examination	9	3.6
c. the address of a caregiver or institution	7	2.8
<b>(2) A diagnosis is given and now I want to know more about...</b>	<b>73</b>	<b>29.6</b>
a. the cause of the ailment	15	6.1
b. the consequences of the ailment	12	4.9
c. the treatment of the ailment	28	11.3
d. heredity of the ailment	3	1.2
e. possible self care	15	6.1
<b>(3) I want to know if I need to see a doctor</b>	<b>53</b>	<b>21.5</b>
<b>(4) My question is about something else</b>	<b>82</b>	<b>33.2</b>
1a. a disease or complaint	33	13.4
1b. a treatment or medical examination	7	2.8
1c. the address of a caregiver or institution	2	0.8
2b. the consequences of the ailment	1	0.4
2c. the treatment of the ailment	2	0.8
2e. possible self care	1	0.4
4. not health-related (insurance questions)	36	14.6

TABLE 2. Categorization of e-mail requests ( $n=222$ )

Type of requests	<i>n</i>	%
Physical complaints, symptoms or diseases	153	68.9
Policy and insurance requests	27	12.2
Medication and treatment	22	9.9
Addresses of physicians or practices	9	4.1
Information on harmfulness of products	5	2.2
Travelers' advice	2	0.9
Lab results	2	0.9
Other	2	0.9

TABLE 3. Categorization of answers ( $n=222$ )

Type of answers	<i>n</i>	%
Answer 1: information or advice	78	35.1
Answer 2: information or advice and see physician	71	31.9
Answer 3: no information or advice, see physician	42	18.9
Answer 4: no information or advice, request not health-related	31	14.1

#### D. Type of answers and response time

The response time of the nurses was quick; 94% (209/222) of the e-mail requests were handled within 24 hours. Table 3 presents the type of answers given. In most cases (67%, 149/222) general health information or advice was given (textbox 1, answer 1 and 2). Health information and advice was provided (after a given diagnosis) on:

- the ailment itself e.g., Patellofemoral Pain Syndrome, Trigger finger, Tietze Syndrome, "Zurich virus";
- the cause of the ailment e.g., of a toe contusion, of Thrombocytosis;

- the consequences of the ailment e.g., of Paratyphoid fever, Pfeiffer's disease;
- the heredity of the ailment e.g., of breast cancer;
- self-care options e.g., for fatigue, high cholesterol;
- treatment options e.g., for snoring, excessive smoking, alcohol problems, excessive growth of hair, sleeping problems, weight problems, premature ejaculation, fungal infection of nails, anus pain, scabies, piles, cysts, retractile testis, ADHD, rheumatic disease, Dupuytren's contracture.

In about 20% of the cases (42/222) no information or advice could be given because of lack of adequate information to safely do so. In these cases clients were advised to contact their regular physician (answer 3). Most of these *answer-3* requests were about physical complaints and symptoms without a prior diagnosis given, for example: "*Lately, I've got itch during the night over my whole body and I am also thirsty. What could this be? Do I need to see my GP?*" In one of these cases the advice to contact the doctor was urgent: "*You are advised to see your regular physician today*".

Some e-mail requests of clients contained health symptoms that were difficult to evaluate. These requests were judged by a GP on whether a visit to a regular physician is necessary. The results are presented in textbox 2. Most cases were not urgent, but some were questionable. These results indicate that clients really need decision support on the necessity to see a physician.

#### Textbox 2. Assessment of urgency of complaints

##### Request 1:

"Recently, I've been using this medication X and I feel really tired and absent-minded because of the medication. The other day, I had a blood test which showed that I've got anemia. It also showed that my liver enzymes are not right. Here is my question: could it be that the medication X is causing this? I stopped using the medication, because I was frightened of the results of the blood test".

*The urgency of this health request is unsure. It depends on the degree of anemia and the abnormality of the liver values. Probably, the client already had phone contact with his or her regular physician (to hear the test results). This question has therefore more the character of a second opinion. Advice to call the regular physician today is appropriate in this case.*

##### Request 2:

"I woke up and calmly got out of bed. I fell down in the living room and for the rest I don't know anything about it. I've got a constant pain in my chest and heart. What could this be?"

*Could be innocent, but urgency nevertheless high because of insufficient information to prove the opposite. Also the client's age is unknown.*

##### Request 3:

"For weeks I have been dizzy and I have got a headache. Sometimes the dizziness so terrible that I have to go home from work. Everything around me seems to stir. What could this be?"

*The request is not urgent, because the health problem is there for several weeks. Nevertheless, the request is not appropriate for e-mail. Client should see doctor for physical exam.*

*Request 4:*

"I found my son of three and a half years old this morning weak and absent-minded in his bed. He reacted very slowly; hardly talked and very softly. He had trouble focusing his eyes. His temperature was 33.6 degrees Celsius (ear thermometer). After giving him dextrose, porridge and lemonade he returned to his normal self after 45 minutes. About one year ago he had the same. Apart from that, he is a healthy boy. I was thinking that this might be caused by a low blood sugar level. Do we have to visit the GP?"

*Given the quick recovery the health problem is now not very urgent anymore. Nevertheless, a regular visit to the GP is advised for this problem.*

#### IV. CONCLUSION AND DISCUSSION

In this study we evaluated the use of an online *Ask-the-expert* service for advice on health-related requests. We assessed whether the service was efficient and useful for providing health support. This study presented the preliminary results of a content analysis of 222 e-mail messages sent between clients and nurses.

Our results showed that the e-consultation service functioned efficiently; most (94%, 209/222) requests were handled within 24 hours by means of standard answer protocols. The service was also a useful means for providing advice on a broad range of health-related requests. The majority (69%, 153/247) of the e-mail messages sent by clients concerned requests about physical symptoms, complaints or diseases and could simply be fulfilled by providing general health advice (68%, 149/222). Another part of the e-mail messages (19%, 42/222) concerned personal consultation requests. Personal advice about physical symptoms, such as "*I have these complaints, what is wrong with me?*" could not be provided adequately because of lack of sufficient or reliable information.

We also found that the service was used for decision support on assessing the necessity to visit a doctor (22%, 53/247). We think that web-based triage systems can be a useful addition to the service to assess whether certain health complaints need to be investigated by a regular physician. Triage is the process of assessing an individual's health problem and identifying the level of need for clinical care [17]. We believe that adding systems for triage of health complaints could increase both the use and usefulness of the service because it facilitates the gatekeepers' function [18].

This paper presented the first results of a broader research on the use of an online *Ask-the-expert* service for support on health requests. Notwithstanding the small number of email requests analyzed which limits the external validity of the study, we believe that our study results contributed to the findings of prior studies on the appropriate use of e-consultation in primary care [6,13,16]. Our findings showed that clients made proper use of the e-consultation service by sending e-mails for non-urgent health-related requests on minor ailments. Nurses handled e-

mail requests according to the principles for giving Type A (absence of a pre-existing patient-physician) advice on the Internet [6]; no specific diagnoses were given, no medicines were prescribed and no general information was given in the guise of individualized information.

Currently, further content analysis is being performed of the e-mail messages handled by other online health professionals such as a GP, dentist, psychologist, etc. A survey is carried out to assess more detailed user characteristics (demographic and health-related), to get a more thorough understanding of the reasons for use of the service, to determine the level of client satisfaction with the service and to assess the impact of the service on visits to the general practice.

#### REFERENCES

- [1] A.J.G. van Rijen. *The Internet user and changes in health care*. Statistics Netherlands, 2005 ([http://www.rvz.net/data/download/van\\_weten\\_naar\\_doen\\_flycatcher.pdf](http://www.rvz.net/data/download/van_weten_naar_doen_flycatcher.pdf), last visited 16.4.2009).
- [2] E.B. Beckjord, L.J. Finney Rutten, L. Squiers, N.K. Arora, L. Volckmann, R.P. Moser, B.W. Hesse. Use of the Internet to communicate with health care providers in the United States: estimates from the 2003 and 2005 Health Information National Trends Surveys (HINTS). *J Med Internet Res* 2007;9(3):e20.
- [3] R.G. Brooks, N. Menachemi. Physician use of e-mail with patients: factors influencing electronic communication and adherence to best practices. *J Med Internet Res* 2006;8(1):e2.
- [4] Gaster B, Knight CL, DeWitt DE, Sheffield JV, Assefi NP, Buchwald D. Physicians' use of and attitudes toward electronic mail for patient communication. *J Gen Intern Med* 2003;18(5):385-389.
- [5] Nijland N, van Gemert-Pijnen JE, Boer H, Stehouder MF, Seydel ER. Increasing the use of e-consultation in primary care: results of an online survey among non-users of e-consultation. *Int J Med Inform* 2009;78(10):688-703.
- [6] Eysenbach G. Towards ethical guidelines for dealing with unsolicited patient emails and giving teleadvice in the absence of a pre-existing patient-physician relationship systematic review and expert survey. *J Med Internet Res*. 2000;2(1):E1.
- [7] G. Umeåfjord. *Internet consultation in medicine: studies of a text-based Ask the Doctor Service* [dissertation]. Umeå University, Umeå, Sweden, 2006.
- [8] N. Nijland, J. van Gemert-Pijnen, H. Boer, M.F. Stehouder, E.R. Seydel. Evaluation of Internet-based technology for supporting self-care: problems encountered by patients and caregivers when using self-care applications. *J Med Internet Res* 2008;10(2):e13.
- [9] Moore JD, Saywell RM, Thakker N, Jones TA. An analysis of patient compliance with nurse recommendations from an after-hours call center. *Am J Manag Care* 2002;8(4):343-51.
- [10] Flynn D, Gregory P, Makki H, Gabbay M. Expectations and experiences of eHealth in primary care: a qualitative practice-based investigation. *Int J Med Inform* 2009;78(9):588-604.
- [11] Hesse BW, Shneiderman B. eHealth research from the user's perspective. *Am J Prev Med* 2007 May;32(5 Suppl):S97-103.
- [12] Kern J. Evaluation of teleconsultation systems. *Intern J Med Inform* 2006;75:330-334.
- [13] Baker L, Wagner TH, Singer S, Bundorf MK. Use of the Internet and e-mail for health care information: results from a national survey. *JAMA* 2003;289(18):2400-6.
- [14] White CB, Moyer CA, Stern DT, Katz SJ. A content analysis of e-mail communication between patients and their providers: patients get the message. *J Am Med Inform Assoc* 2004;11(4):260-267.

- [15] Sittig DF. Results of a content analysis of electronic messages (email) sent between patients and their physicians. *BMC Med Inform Decis Mak* 2003;3:11.
- [16] Eysenbach G, Diepgen TL. Patients looking for information on the Internet and seeking teleadvice: motivation, expectations, and misconceptions as expressed in e-mails sent to physicians. *Arch Dermatol* 1999;135(2):151-156.
- [17] Derkx HP, Rethans JJ, Muijtjens AM, Maiburg BH, Winkens R, van Rooij HG, Knottnerus JA. Quality of clinical aspects of call handling at Dutch out of hours centres: cross sectional national study. *BMJ* 2008;337:a1264.
- [18] Nijland N, Cranen K, Verlinden SFF, Kelders SM, Boer H, Van Gemert-Pijnen JEWC. Computer generated self-care advice via web-based triage of complaints in primary care. *Etelemed* 2009, International Conference on eHealth, Telemedicine and Social Medicine, pp. 129-135.