Evaluating A Decision Support System Using the Web

Hamish S. F. Fraser MRCP MSc[1,2], William J. Long PhD[2], Shapur Naimi MD FRCP[1]
Tufts-New England Medical Center[1] and the Massachusetts Institute of Technology[2]

Introduction

Since 1996 a version of the Heart Disease Program[1] has been accessible to users over the World Wide Web. The program takes standard clinical data on patient history, vital signs, physical examination and investigations. The output is a differential diagnosis with explanations. The Web Interface was designed to allow physicians in a major hospital to participate in an evaluation study[2].

Methods

The program is available to users outside the study from our department Web site [3]. They are required to login and give an email address. Once they have finished entering the case they are asked for their own diagnoses (prior to seeing the program's diagnoses). After viewing the program's diagnoses they are asked for a critique.

Results

80 cases were entered over the 30-month period that the program has been available. Recently the program was made more easily accessible and case entry rate has risen markedly, with 21 cases entered since January 1st 1999. 65 cases had gender recorded, 46 male and 19 female. 62 different users participated, 52 claimed to be physicians and 10 medical students. The users gave their own diagnoses in 42 cases, and critiqued the program's diagnoses in 32 cases.

The chief complaints entered by the users were: chest pain 36, arm pain 3, dyspnoea 16 and syncope or fainting 4. There was one case each of cough, palpitations, headache and lethargy.

The program ran successfully in almost all cases though if the user had left before the diagnosis was returned (normally < 3 minutes) the results were emailed to the user. A wide range of different information was entered, with most cases containing a fairly complete clinical summary but in some cases just one or two symptoms were entered. Users came form a wide variety countries, it is likely that in many cases their first language was not English.

Discussion

In this poster we will describe the types of cases entered and analyze and the program's performance compared to the diagnoses entered by the physician. We will also review the many interesting examples that have tested the program and encouraged us to review aspects of the interface and knowledge base. While there are many aspects of clinical evaluation that must be carried out in a controlled situation, our experience has been that users over the Web can provide valuable additional examples and feedback.

This study was supported by the National Heart Lung and Blood Institute grant R01-HL33041.

References

1. Long, W.J., H. Fraser, and S. Naimi, *Reasoning requirements for diagnosis of heart disease.* Artif Intell Med, 1997. **10**(1): p. 5-24.
2. Fraser, H., W. Long, and S. Naimi. *Differential diagnoses of the Heart Disease Program have better sensitivity than resident physicians*. in *Proc AMIA Annu Fall Symp*. 1998.
3. http://medg.lcs.mit.edu/projects/hdp/