

Computerized Healthcare Access and Management Project (CHAMP)

Proof of Concept Pilot:

Medical Assistant (MA) History Taking Using Medical Recording and Diagnosis Software

Peter Kohler MD
Tanya Page MD
Stephen Datena MD

Abstract

This pilot trial in 70 patients resulted in the successful demonstration of key technical milestones necessary for success in the primary multi-centered CHAMP re-engineering research program. The medical assistant was able to use the study software tool with minimal instruction (1 hr) and within reasonable time frames (mean 21 min.). The resultant assessments showed very strong concordance with MD evaluations and end diagnoses done on the same patients (Df/Dx: 91% match, 8% overlap, 1% Dx missing from system database). Preliminary testing of the ability of the software to recognize dangerous presentations was successful (100%). A subset of patients was identified who likely could be managed by non-physician providers (24%). These findings support continued research.

Trial Design

Patients at a walk-in primary care facility presenting with one of 4 symptom complexes (cough, headache, fever, or sore throat) were asked to voluntarily participate in this OHSU IRB reviewed study.

Volunteers identified only by a randomly generated ID number were initially interviewed by a Medical Assistant guided by the Lifecom-designed decision analysis software program. Once the MA completed the history taking, all patients received their standard assessment by an MD blinded to the computer findings. Computer results were not incorporated into medical care decisions. Case files from the MD assessment stripped of all identifying information by clinic personnel were compared to the MA / software assessment files. The MA was limited to collecting data from history of present illness (HPI), Past medical family and social history (PFSH), and review of symptoms (ROS) categories in accordance with applicable legal scope of practice restrictions. Long term follow-up or outcomes data was not available to the research team.

Questions posed by the CHAMP pilot:

1. Can a Medical Assistant (MA) use the decision analysis software?
2. How much time is required for a software guided interview?
3. Does the MA using the software collect a history of present illness (HPI) comparable to that collected by a physician?
4. Does the software program recognize dangerous patterns in the patient history and alert the MA?
5. Does the Differential Diagnosis generated by the software engine include the final Dx used by the assessing physician?
6. Based upon 1-5, should the project proceed to the next phase?

Study Summary

96 patients were assessed using the system. 70 records were able to be matched to the appropriate care record by the clinic staff and form the basis for this report.

Can a Medical Assistant (MA) use the decision analysis software?

- Yes. With 1 hour of system instruction and an hour of practice our MA participant was able to navigate and use the system.

How much time is required for a software guided interview?

- Mean interview time was 21 minutes. Interview times ranges from 12 minutes to 32 minutes and matched patient complexity.

Does the MA using the software collect a history of present illness (HPI) comparable to that collected by a physician?

- The history taken by the MA using the software typically contained 1.5 – 2.5 x more data points than the corresponding MD notes. In general, the physician assessment was a subset of the MA / software derived HPI.

Does the software program recognize dangerous patterns in the patient history and alert the MA?

- 76% of cases were triaged to a higher provider level. No cases were identified where triage should have been triggered but was not. Three diagnostic considerations dominated the triage triggers in this group of patients: potential Myocardial ischemia, chest pain, and meningitis.

Is the Differential Diagnosis generated by the software engine include the final Dx used by the assessing physician?

- Yes. The pilot demonstrated a 91% match to the final diagnosis. In 8% of cases with matching data sets, the final MD determination was within the Df/dx of the MA/software assessment. In one case the diagnostic engine's database did not include the final primary diagnosis selected by the MD. This case was assessed to be a complication of a medical therapy, which was not content supported by the test environment.

Project Discussion

Major technical factors that will determine the success of the proposed redesign of primary care practice include:

1. Training requirements for the MA's who will be required to use the software system.
2. The ability of the software system to direct the efforts of the medical assistant that is in concordance with a history taken by a physician.
3. The ability of the software system to identify the most likely cause or causes of the patient's complaint(s).
4. The ability of the software to recognize dangerous patterns or situations.
5. Safeguards to ensure that MA assessments are comprehensive enough to support #4 and reduce MD data capture time for referred cases.

These factors guided the design of the pilot study. Although the study is in a modest number of patients with a limited scope of symptom complexes, the results are very promising. The MA in the study collected a more comprehensive history than was collected by the MD's in the study which is highly desirable both from the standpoint of software diagnostic performance (richer data supports better discrimination) as well the utility of the assessment when passed on to a physician (if required). The fact that the MD assessments were essentially subsets of the MA assessments is an important finding as any significant deviation would call into question the safety of the MA assessment. These rich assessments appear to have allowed the diagnostic software engine to identify potentially dangerous symptom complexes for referral to the MD. These were the principle goals of the pilot study and they are well supported by the data.

Clinical diagnostic performance of the system could only be compared to physician impression since no outcomes measurements were included in the pilot design. Therefore diagnostic concordance between the system assessments and physician assessments is all that can be reliably measured. True assessment of diagnostic accuracy will require outcomes assessments including follow-up. These are key features of the primary research project to follow.

Based upon records concordance, the system did not fail to identify any danger signs based upon our comparisons to the MD records. The thresholds for triggering of these warnings were deliberately set to the lowest levels possible, but 24% of cases still would appear to not require a formal MD assessment. In conjunction with the high degree of agreement between the diagnostic engine and the MD assessments, this supports the basic premise of CHAMP that a percentage of patients can be diverted from a formal MD assessment IF the software system can provide the patient safety oversight required. Further research will test whether this performance can be repeated across a much broader spectrum of complaints.

The time required to do the assessments appears reasonable particularly in light of the almost complete absence of training provided to our MA participant. It varied in accordance with patient complexity

Finally, training requirements appear to be very modest. Clearly we will need to test the system with a larger cross-section of MA's but this pilot test deliberately limited training in order to gain a greater sense as to how intuitive is the software configuration. Our MA participant has provided excellent feedback recommendations which are being incorporated in the next versions of the software.

On the basis of these promising, albeit preliminary, results we feel justified in pursuing the more definitive research.