Exploring eye tracking as a method to study users' interactions with a hospital electronic prescribing system: pilot study

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Introduction

- Research in marketing psychology and behavioural science suggests user interface design to have a significant impact on interactions with online systems.[1]

- Eye tracking generally accepted as a useful method to study performance and cognition in areas such as interpretation of ECGs and medical imaging.[1]

- Little evidence of its use to study user interactions with electronic prescribing (EP) systems, an area in which failure to see and act on key information is particularly critical.

What was our aim?

- To explore the feasibility of using eye tracking to study EP users' visual attention and behaviour, with a focus on safe prescribing.

What did we do?

- The study took place at a London teaching hospital trust; prescriber participants were recruited via hospital intranet.

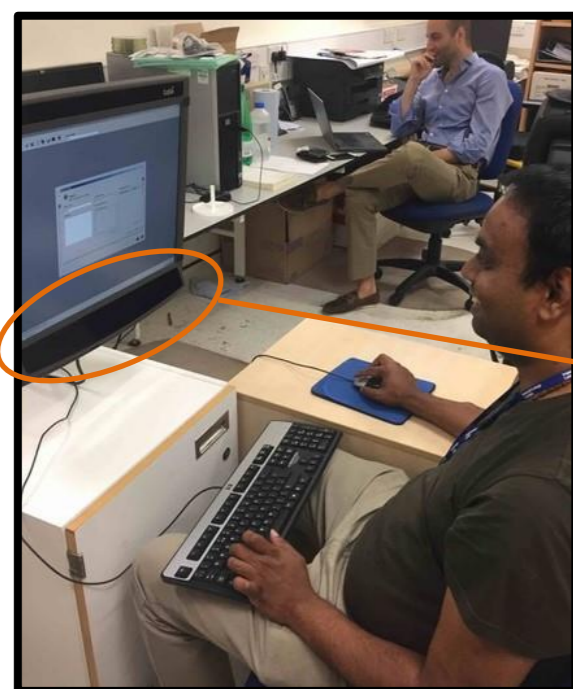- We used Tobii Pro X3-120 integrated screen monitor trackers in a simulation setting.


Figure 1: Eye tracking set-up

Eye tracking device

- Participants were asked to complete a prescribing task for a test patient on the EP system, included prescribing penicillin for an allergic patient.

- Data collected included screen videos of participants' scan paths (fig 1); descriptive analysis using "R".

- We segmented data when users switched screens, calculated percentage of time spent looking in each of the four quadrants of the screen for each segment, and extracted scan paths and numbers of fixation points. Participants completed 10-item System Usability Scale (SUS)[2] at end of session.

What did we find?

- Ten participants took part: five registrars, four foundation year 2 doctors and one foundation year 1 doctor (range 1-8 years' experience with EP system).

- The videos were each about one minute long.

- The highest percentages of fixation points were at the top left and right corners of the screen, where information is provided on allergies and patient information respectively. However, each prescriber initially prescribed penicillin and was stopped only by a pop-up alert.

Figure 2: Example of scan path when reviewing medication.
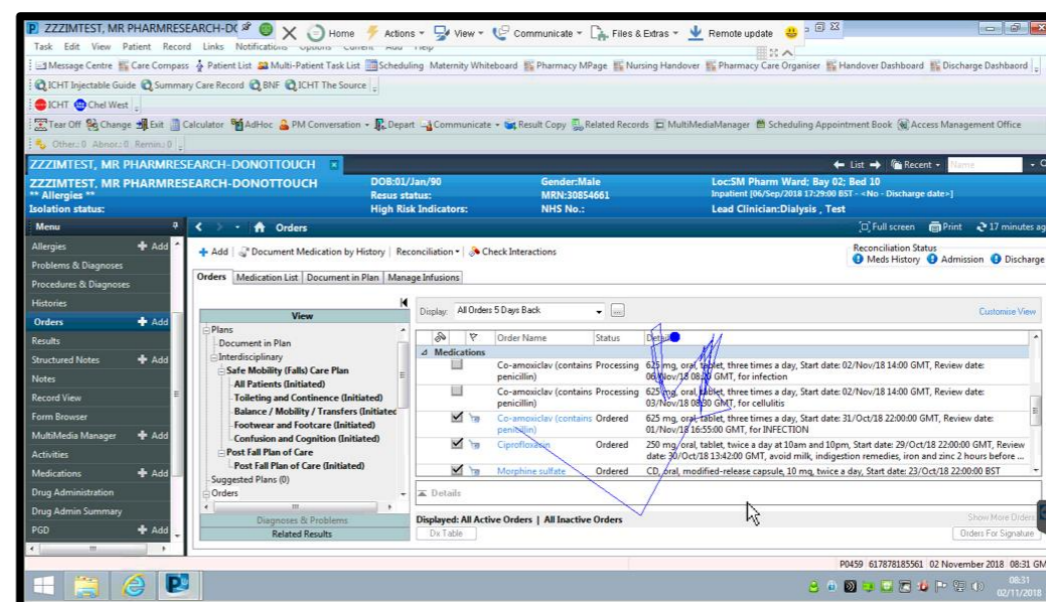
- Highest numbers of fixation points were observed during prescription review and final signature, followed by review of allergy pop-up alert, and the search for drug names and dosages.

- Mean SUS score was 39 of 100 ('below average' in terms of usability) with a standard deviation of 4.7 and a percentile score of 5% based on cross-industry comparison.

What does this mean?

- Eye tracking is a **feasible method** for studying user interactions with EP, although limitations include small sample size.

- Findings will now be used to plan a larger evaluation, with the aim of **understanding how screen design can help or hinder patient safety**, and how the type and positioning of decision support information influences the likelihood of it being acted on.

References:
1) Khachatryan H and Rihn A. Eye-Tracking Methodology and Applications in Consumer Research. Food & Resource Economics Department 2014.
2) Brooke J. SUS: A retrospective. *J. Usability Studies.* 2013;8(2): 29-40