

## Data Input Challenges for EMR Systems: Keep the Paper-Interface

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Gautham Pandiyan  
Director of Sales & Marketing  
Health Solutions  
Mi-Co



A paradigm shift is occurring in healthcare today with the advent of the EMR era. When we visit our doctor's offices and are checked in by office personnel, triaged by nurses or seen by doctors, the computer and EMR are an integral part of that visit. However, this change has not come without resistance and difficulty with a major example being the \$30 million EMR system that Cedars-Sinai Medical Center in Los Angeles put in place, and had to discard to revert to paper, due to clinical staff resistance<sup>1</sup>. The holy grail of technology is that it fits into the workflow of the user, rather than the opposite.

A significant proportion of doctors see EMR systems as an impediment to their workflow rather than an aid. Take Dr. Tom Long, Emergency Room Physician in Seattle, WA: *"Essentially, yes. What I saw was that the workflow of scribbling a note on a scrap of paper WAS the learned, accepted, and practiced workflow for most doctors, and that "digital ink" as used on the tablet computer was the only thing which could match handwritten notes for speed and natural, reflexive workflow (...).But the stumbling block—inputting the documentation of the normal tasks of a doctor—just cannot be comfortably handled with a mouse and keyboard. Too slow. Too distracting."*<sup>2</sup>

More efficient collection of patient encounter information by clinical staff remains a critical element for providing timely and effective care of patients. Traditionally accomplished via handwritten notes with pen and paper, in recent years a variety of EHR and EMR systems have been introduced in an attempt to achieve fully electronic records from the point of patient contact onwards. However these systems have been relatively unsuccessful in offering effective capabilities for patient progress note capture and thus have seen low acceptance by physicians. In one example study of twenty one clinics affiliated with two large US hospitals major barriers to the use of EHRs for documentation during patient visits included loss of eye contact with patients, computer entry being too slow, the inability to type quickly enough, and a preference for writing long textual notes (Linder et al, 2006)<sup>3</sup>.

Why do clinicians continue to use paper first in both clinical research and patient care? Quite simply, it conforms to their traditional workflow. They are usually not sitting behind a PC and monitor, but rather moving around the facility and working with patients. Web-based portals and standard EMR/EHR systems are not convenient to use during patient care. Clinical staff are more comfortable with and find it more convenient to use paper and dictation as the first means of data collection, finding them easier to handle and less distracting for their patients.

What is a good solution that will still allow doctors to harness the many strong benefits of EMR systems, while avoiding the data-entry challenge of getting information into such systems? One method could be the use of an electronic "paper-like" interface using devices such as Tablet PCs, Digital Pens, and others, to get data into EMR systems. In a scientific study conducted by the Radiology department at the University of North Carolina-Chapel

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<sup>1</sup> "Can Technology Cure Healthcare?" Jacob Goldstein. *Wall Street Journal*, Online. April 13, 2010.

<sup>2</sup> Dr. Tom Lang (Enterprise Tracker) – EMR for the ER – the data entry gap. [www.emrupdate.com](http://www.emrupdate.com)

<sup>3</sup> Linder JA et al (2006). Barriers to electronic health record use during patient visits. *AMIA Annu Symp Proc*.

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Hill, it was found that the use of such devices are equivalent to the use of paper-charts in terms of speed of use and result in much higher user satisfaction (see figures below)<sup>4</sup>.

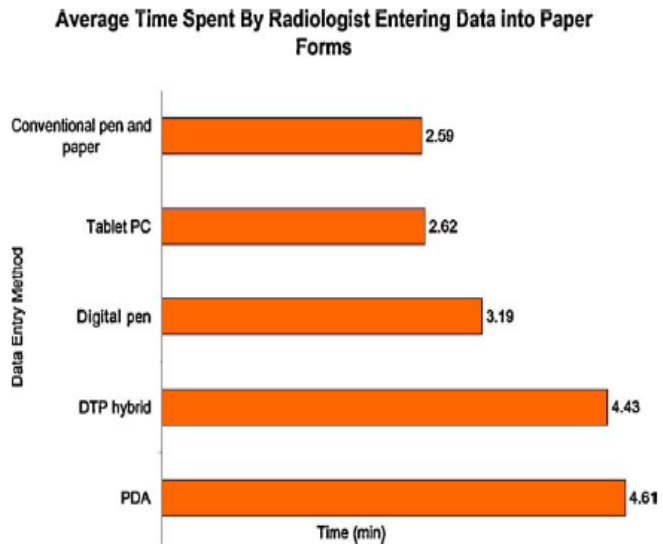


Fig. 6 – The average time spent by radiologist entering data for each data entry method.

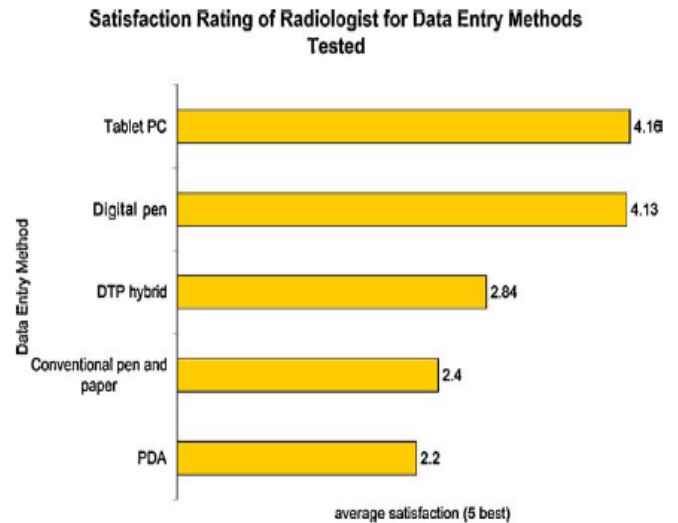


Fig. 7 – Average satisfaction rating of each data entry method.

Dr. Amy Abernethy, Duke University medical oncologist, says, “A better system that allows codification of some data while writing text for other data will allow us to capture specific data elements that need to be tracked or databased, while retaining the necessary prose that is so important and meaningful for clinical communication. Doctors aren’t typers – they are writers – so your technology [Mi-Forms electronic paper-interface technology] meets us where we are and forms a bridge to discrete data collection for elements that need to be discrete. We have tried EMRs, access databases, etc. Every one of these requires doctors to type to get the data in. So we don’t do it. Instead, we still dictate prose for everything and therefore none of what we do gets into discrete fields [for research]. Some health systems are using EMRs that require doctors to type, and doctors are doing it – true; but, for the most part, there is a growing unrest that our ability to communicate is reliant on typing skills and that the computer is coming in between doctor and patient. Your approach puts only a pen between doctor and patient – back to the way it feels most comfortable.”

With meaningful use of EMR criteria being finalized, several hospital customers of Mi-Co have indicated that paper-interface electronic technology such as this could help providers considerably in meeting Meaningful use of EMR criteria. Kyle Smith, Cardiovascular Information Systems Manager at Sutter Health, has indicated that functional requirements like Medication Reconciliation at the point of encounter, pre-population of patient demographic information and emailing/printing PDF documents for patients could be much easier accomplished with such handwriting-oriented paper-interface electronic technology that also allows for discrete data

<sup>4</sup> Cole E et al (2005). A comparative study of mobile electronic data entry systems for clinical trials data collection. *International Journal of Medical Informatics*.

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gathering and deposition into back-end databases. Using such technology, Sutter Health saw a significant reduction in time and accuracy to record quality measures for national registries compared to web-based systems<sup>5</sup>.

Therefore as the use of EMR systems accelerates and the challenges in workflow are encountered, perhaps vendors, physicians and others should consider the adoption of paper-like electronic interfaces as a user-friendly bridge to get data into EMR systems. This could not only truly increase EMR adoption, utilization and help meet Meaningful Use criteria but also create a truly mobile way to get data into the EMR that relies on the workflow preferred by healthcare professionals.

### About Mi-Co:

*Mi-Co is the developer of Mi-Forms Digital Ink handwriting recognition and data cleaning technology and provides solutions for smart e-Forms data collection in a variety of industries including clinical research. Mi-Co's end-to-end enterprise Mi-Forms Software System enables flexible forms design and the capture, handwriting recognition, validation and automatic communication of forms-based data from handwritten source documents. Mi-Forms supports enterprise data capture using Tablet PCs, the Digital Pen, Pocket PC, and signature capture devices, and has been validated for 21 CFR Part 11 compliance and is HIPAA compliant. Mi-Co is headquartered in Research Triangle Park, North Carolina. For more information on Mi-Co, please visit [www.mi-corporation.com](http://www.mi-corporation.com) and [www.beyondedc.com](http://www.beyondedc.com).*

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<sup>5</sup> Shaw, RE. Development of a 'Mobile Web' for Healthcare Data Collection Using Tablet PC and Mi-Forms Technology. *Healthcare Technology*, Vol.4.