Clinical workers (that is, doctors and nurses) have seen a marked loss of efficiency and increased distraction from patient care by currently implemented health IT software. Current products have been built for and sold to administrators, primarily to focus on issues of billing, coding and regulation. This has resulted in doctors and nurses parked In front of computers entering data at the expense of spending time 'at the bedside' where they belong.

Clinical computing can be divided into two fundamental workflows: (1) data digitization piece (that is, the 'anytime / anywhere' access to data) and the (2) data entry effort. The first piece is where health IT has been successful to date, but the second piece has fallen way short of what the clinical workers need. In our view, the biggest problem in health IT is the lack of an acceptable user interface for clinical data entry tasks. This is the problem we are trying to solve.

In our view, the solution to this problem is to minimize data entry tasks for clinicians and to develop a solution to permit completion of data entry tasks at the 'point of care' and 'time of care'. Furthermore, an acceptable solution is not a matter of 'removing a few clicks' from current products, but rather, what is needed is a new approach.

We need to start from the beginning, defining what is needed for safe, effective and efficient patient care. Our belief is in the following principles:

(1) Clinical workers need to maximize time at 'the bedside'. The more time spent interacting with the patient, the better.

(2) The caregiving clinical team needs to maximize their communication and collaboration on care.

(3) Distraction from patient care must be minimized.

Further we concluded that, to accomplish this:

(1) Clinical workers need to complete their work tasks in a mobile fashion (and thereby permit completion of work tasks at the 'point of care' and 'time of care').

(2) Work tasks that are not critical to direct patient care must be eliminated.

Solution description

It is our belief that the biggest barrier to adoption (and satisfaction with) of HIT by clinical workers is the lack of an effective user interface for data entry tasks.

We have chosen the tablet PC and its 'digital ink' as the mobile solution to achieve our goals. Mouse and keyboard data entry is one of the main things holding us back from the mobility needed for the job of taking care of patients. Think of what we are doing as a 'digital clipboard', where we create and share digital documents to support clinical workflow. It is our goal to create a user interface for all data entry tasks of clinicians. It is our feeling that if we can't use a (digital) pen to complete all work tasks, we are simply not mobile.

We have built / conceptualized our suite of apps in a modular arrangement to permit deployment in various clinical settings within and throughout the healthcare enterprise. Attached is a 'product sheet' that includes some screen shots from within the app Here are 5 brief videos demonstrating different 'pieces' of what we are doing

Physician documentation:

http://youtu.be/6my8iba9dy8

Physician admission order writing:

http://youtu.be/1YUDB4SOyHE?hd=1

Prescription writing:

http://screencast.com/t/D3ozgr5iHb

Nursing documentation:

https://www.youtube.com/watch?v=LdKDqHYhGmo&feature=youtu.be&hd=1

ER workflow pattern use:

http://youtu.be/L1WQlBeOqb0

Note on 'physician specialty specificity': One issue with current EHR offerings is that they are typically a 'one size fits all' solution and difficult to fit into the workflow of different specialty physician workflows. Because our systems are built from the standpoint of giving physicians a 'toolbox' to choose from to perform their data entry work tasks, they are especially flexible. Even within a certain specialty, there will be different preferred methods of performing work tasks. As an example, prior to electronic records, many ophthalmologists would document their patient visits by using primarily pen and ink diagrams (because of the speed and efficiency of doing so), which were basically only understood by them, but very adequate for the needs of patient care. We can duplicate (and enhance) this workflow by using our digital ink based tools combined with any existing or new paper based templates, and then enhancing this with speech recognition technology. If the clinician prefers 'straight dictation' (that is, not editing his dictation), a transcribed document may be added later as an attachment to the generated PDF file (which is our primary 'output').

'Architecture':

(1) Use FHIR to obtain patient ID information ----> (2) create and share digital documents within our system to support clinical work ----> (3) export PDF of completed documents ----> (4) Use NLP, IWR, ICR, etc. to extract structured data from our documents.

(see attached image: 'diagram 1')

HIPAA compliance: Initially we are expecting our app to run 'locally' within a provider's existing local HIPAA compliant infrastructure and compliance practices. We expect eventually to be completely cloud based. When this is achieved, we will use the HIPAA compliant cloud region of an appropriate vendor (such as AWS or Azure), accessed using their approved secured access methods under our BAA signed with the pilot site(s) and our BAA with this appropriate vendor.

In targeting only patient ID information for extraction using FHIR, we feel it is quite realistic to expect to able 'cast a wide net' at most existing EMR vendors. We will look to connect to the largest vendors first.

We aim to provide a new 'front end' for clinicians to interact with existing EMR systems, one that is simple and easy to learn. We want to have them JUST perform the essential tasks for patient care, rather than many new administrative, data collecting duties foisted upon them by existing systems.

The current view is that clinicians should be forced to produce 'structured data' for administrative reasons. Our view is that the clinician needs to perform his/her work in whatever way that streamlines essential patient care tasks. Needed structured data should be extracted from documents that have been created. We have seen great strides recently in this direction with 'natural language processing' (NLP). For our purposes and interests, there have also been great advances in related technology of 'intelligent word recognition' (IWR) and 'intelligent character recognition' (ICR) which involve turning cursive handwriting and printing into text. Also, we feel that LOINC codes will be very valuable to name the documents that we create as 'output' from our system.

Financial estimates

Our plan is to sell the product, on a monthly subscription per user basis. We are striving for a 'user interface layer' that can be used in any HIT system/environment. Our biggest need at this point is a pilot site to understand our costs involved in deploying our products, from which we will then work backward to determine our pricing strategy. One of our biggest efforts has been to develop a strong relationship with a successful web-based speech recognition vendor, whose product we feel is a perfect match for what we are trying to accomplish. We plan on bundling our product with theirs as one offering. We have other partnerships in mind in which we think we can catalyze sales for these potential partners. It may even be possible for us to pursue a 'freemium model' deployment, depending on results of our pilots and relationships we may develop with other partners.

Engagement plan

Our goal is a clinical user interface for clinical workers throughout the enterprise. Because of our extremely simple 'architecture', there are a number of potential entry points; one simple example would be deployment of a 'checklist' of any type within an organization.

Partnership

Our biggest need is finding a pilot site. We have found this to be virtually impossible during the 'meaningful use' campaign. We have, however, developed relationships with 2 key business partners that we feel are very important for our success.

---- nVoq (www.nvoq.com), a cloud based speech recognition vendor. We have done significant work integrating their offering into our application suite. We feel that (digital) pen and voice have great promise to support clinical computing. Here, from nVoq's website, is a demonstration of our collaboration:

(tap the rectangular image just above 'See SayIt in Action' on the right side of the screen)

https://sayit.nvoq.com/health-care/

Also, here is a recent webinar that nVoq asked us to present at with them:

https://nvoq.app.box.com/s/irxu47gbwq72a42jkvlw81lr7ctsifc1

---- Logicoy (www.logicoy.com), is an experienced system integrator, and in fact has already done significant successful work with FHIR, being hired by a major University hospital system to build a FHIR gateway for bidirectional data exchange with one of the major HIS vendors. We are very familiar with Logicoy because the principals of our effort have worked with Logicoy on other HIT development / integration projects

'letters of intent' will be coming from above 2 partners