Using Real-Time Simulations to Make Medical Technology Decisions

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Study how one health care organization evaluated various vendors of evidence-based content for making clinical decisions.

With the rapid increase in the amount of medical information available, caregivers have increasing difficulty delivering the latest treatment recommendations without computerized assistance

Physician executives are now being challenged to deliver the best support tools to their clinical network to solve this problem. It is possible to review the vendor options using a virtual, metric-determined, participatory approach—leveraging the collective intelligence of a clinical network

Physician executives are aware that their clinicians need to address real-time patient care issues such as:

- What are the best practice treatment options?
- Whether or not a particular therapeutic is appropriate given patients' risk factors or comorbidities.
- What is the most appropriate diagnosis based on the symptom complex?

With the variety of patients, their symptoms, associated conditions and comorbidities, physician executives should provide their clinicians with a ready source of clinically relevant information at their fingertips. However, the current emphasis on evidence-based medicine combined with the sheer volume of information available to clinicians can leave busy health care providers feeling overwhelmed.

Those same clinicians are unsure of which reference would be most helpful and easiest to access.[1] Organizations are looking to their physician leaders for solutions. A computerized evidence-based information retrieval system can be of great help.

An editorial by David Sackett and colleagues[2] defines evidence-based medicine as "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients."

To practice evidence-based medicine, clinicians must integrate their individual clinical expertise with external evidence. The sheer volume of information available in medicine makes fast searches difficult in many situations, especially at the point of care.

Evidence-based content vendors typically provide an easy way to find, evaluate, and use information at the point of care which the clinician can use to augment his or her clinical expertise. A major benefit of using an evidence-based content application is that it presents prefiltered information often scored according to relevancy and validity.[3-5]

While studies examining the impact of these various forms of computerized information retrieval systems on medical practice are limited, those that exist show promise.[4,6-7]

For instance, one randomized controlled trial of medical students found that those who used an online evidence-based content provider showed significant gains in self-perceived confidence in clinical decision making when compared to the comparison group provided with a printed pocket card and their usual sources of information.[8,9]

Similarly, two case studies found that computerized information retrieval systems had a positive impact on family practice physicians in areas such as practice improvement, reassurance, learning, confirmation and recall.[4,10]

Based on the promise of these findings, the researchers involved in this study set out to find which evidence-based content provider would best meet the needs of the clinicians within their organization.

Deciding on clinical content technology is a difficult task at best and one not typically taught in medical and other health care provider educational programs. Because of this physician executives may turn to their information technology (IT) partners for assistance.

IT professionals are trained in selecting computer products based on technical requirements but they often do not understand the particular needs of clinicians. Specifically, they have no clinical expertise to be able to judge the validity/value of the content. This creates a situation where either physician executives must make decisions that can be difficult, time-consuming, and may not fit the existing technology infrastructure or IT professionals making decisions that may not fit clinical needs.

Neither is a good option and can result in frustration, wasted time and, sometimes, money spent on services that are not a good fit for the organization. Like most technology options, costs for these services vary considerably and there are several vendors on the market, each with its own way of presenting, grading and synthesizing clinical content.

Methods and results

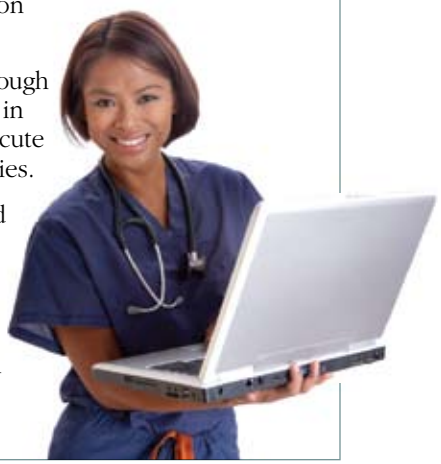
CHD Meridian Healthcare (CHDM) is one of the nation's leading providers of workplace health centers and integrated health and productivity management solutions. CHD provides medical care at over 215 large employer locations nationwide and employs approximately 1,400 clinicians.

Many health center locations look much like a typical group practice with multiple physicians, physician assistants, nurse practitioners, pharmacists, and other clinical staff in one location but the vast majority of health centers are much smaller, often employing one or two clinicians and their support staff.

TABLE 1

Evidence-Based Content Provider Criteria

- Content must be clinically relevant and evidence-based (integrates the best current evidence with clinical expertise and patient values).
- Application must be easy to use.
- Application must return answers to questions quickly so that a clinician can obtain the needed information while the patient is in the health center.
- Breadth of topics covered must be wide enough to encompass the needs of our clinicians in Primary Care, Occupational Health and Acute Health settings as well as in our Pharmacies.
- Vendor must be esteemed and recognized by the medical community.
- Costs must be reasonable.
- Continuing medical education credits for all clinicians for accessing information must be available.



The diversity in size, location and access to other clinicians for consultation prompted our physician leaders to look for a web-based solution that would provide relevant, readily accessible evidence-based medical content to clinicians at the point of care. The intent is to provide clinicians with the best tools available so that with minimal time and effort they can access the most current evidence-based answers to their medical questions.

A critical step in selecting a vendor is to decide what is important. In this case, a small group acting as evaluation coordinators decided on the criteria with the assistance of input from others in the organization. It is very important to decide in advance what criteria you will use to judge a comparable set of products. This reduces the potential for bias or being swayed by a particularly persuasive sales person or single feature.

The criteria are likely to differ for each product or organization but our criteria for this process are shown in Table 1. After the minimum criteria were agreed upon, a product search was done to discover the potential providers of this service. This was accomplished by our clinical and IT support staff members using the Internet and an evaluation against the criteria was made. Together they narrowed the field to three potential vendors who appeared to meet the criteria. For the purposes of this article the vendors will not be identified by name. Rather the vendors will be indicated as vendors A, B, and C.

The next step involved inviting a representative sample of clinicians and support staff to participate in the selection process. Invitations were sent to 36 clinical personnel, one clinical researcher, and two IT staff members. Having IT involved helped ensure the operability of the application in our current technical environment and provided another viewpoint on the options from staff experienced in selecting technology vendors.

Clinical staff included physicians, physician assistants, family nurse practitioners, nurses, and pharmacists representing various company health center locations,

TABLE 2

Evidence-Based Content Provider Evaluation Results

	1st Session (n=11)	2nd Session (n=14)	Composite Score (n=25)	Preferred Vendor Rank(1=highest)
Vendor A				**2**
Ease of Use	7.6	7.9	7.8	
Clinical Content	8.7	8.6	8.7	
Overall	7.8	8.1	8.0	
Vendor B				**1**
Ease of Use	9.1	9.1	9.1	
Clinical Content	9.2	9.1	9.2	
Overall	9.1	9.1	9.1	
Vendor C				**3**
Ease of Use	8.5	7.0	7.6	
Clinical Content	9.2	7.9	8.4	
Overall	8.8	7.5	8.0	

sizes and breadth of services. The invited participants were divided into two groups. Each group was scheduled for one of two evaluation sessions held on two different dates within a three-week period.

The three vendors were scheduled back-to-back over a 90-minute period with each vendor being allotted 30 minutes. This not only minimized the time commitment required by each participant but also provided the additional bonus of reducing memory errors that can occur when vendors are evaluated over several days or weeks.

After accepting the invitation to participate, the clinicians were asked to keep a log of questions that occurred during the normal course of providing patient care over a week's time. They were instructed to submit these questions to the evaluation coordinators prior to the date of the first evaluation session. The questions were then compiled and a final list was sent out to CHDM clinician participants just prior to the evaluation session. The participating vendors were not privy to the questions. Examples of the questions include:

- What is the correct dose of Levaquin in a 60 pound adult patient with cerebral palsy with pneumonia?
- 32-year-old with tick bite. Tick pulled off by patient 24 hours ago has the characteristics of deer tick. The patient lives in a Lyme endemic area. What are the indications for Lyme disease prophylaxis?
- 50-year-old presents with Herpes Zoster. The lesions have been present for 48 hours without pain. In addition to an antiviral are oral steroids indicated? Is Gabapentin indicated?

Participants were provided a vendor evaluation form prior to the evaluation. This simple form was designed by the evaluation coordinators and provided an easy way to quantify the preferences of the participants as well as to collect qualitative information in the form of comments about the advantages and disadvantages of each vendor's product.

Each participant was asked to fill out the form during or immediately after each vendor presentation and return the form by e-mail or fax to the evaluation coordinators. The form is shown as Figure 1.

Because the clinicians involved in the evaluation were located in multiple locations across the continental United States, the actual evaluation took place using a Web-based conferencing service which only required the participants to have broadband Internet access and

FIGURE 1

Evaluation Form

Vendor	A
Have you used or do you already use this product? ☐Yes ☐No	
Advantages:	
Disadvantages:	
Ease of Use: <<Excellent 10:☐ 9:☐ 8:☐ 7:☐ 6:☐ 5:☐ 4:☐ 3:☐ 2:☐ 1:☐ Poor>>	
Use of Clinical Content: <<Excellent 10:☐ 9:☐ 8:☐ 7:☐ 6:☐ 5:☐ 4:☐ 3:☐ 2:☐ 1:☐ Poor>>	
Overall Ranking: <<Excellent 10:☐ 9:☐ 8:☐ 7:☐ 6:☐ 5:☐ 4:☐ 3:☐ 2:☐ 1:☐ Poor>>	

Vendor	B
Have you used or do you already use this product? ☐Yes ☐No	
Advantages:	
Disadvantages:	
Ease of Use: <<Excellent 10:☐ 9:☐ 8:☐ 7:☐ 6:☐ 5:☐ 4:☐ 3:☐ 2:☐ 1:☐ Poor>>	
Use of Clinical Content: <<Excellent 10:☐ 9:☐ 8:☐ 7:☐ 6:☐ 5:☐ 4:☐ 3:☐ 2:☐ 1:☐ Poor>>	
Overall Ranking: <<Excellent 10:☐ 9:☐ 8:☐ 7:☐ 6:☐ 5:☐ 4:☐ 3:☐ 2:☐ 1:☐ Poor>>	

Vendor	C
Have you used or do you already use this product? ☐Yes ☐No	
Advantages:	
Disadvantages:	
Ease of Use: <<Excellent 10:☐ 9:☐ 8:☐ 7:☐ 6:☐ 5:☐ 4:☐ 3:☐ 2:☐ 1:☐ Poor>>	
Use of Clinical Content: <<Excellent 10:☐ 9:☐ 8:☐ 7:☐ 6:☐ 5:☐ 4:☐ 3:☐ 2:☐ 1:☐ Poor>>	
Overall Ranking: <<Excellent 10:☐ 9:☐ 8:☐ 7:☐ 6:☐ 5:☐ 4:☐ 3:☐ 2:☐ 1:☐ Poor>>	

Evaluation Summary

Select the best, second best and third best application for your needs:

1st:	
2nd:	
3rd:	

a telephone. The clinicians simply clicked on a link sent to them via their e-mail invitation to join the meeting and dialed into a conference number for the voice portion of the evaluation.

The three vendors were scheduled to join the web conference at 30-minute intervals and were given approximately five minutes each to provide some background on themselves and their respective companies. The remaining 25 minutes of each vendor's time was spent actually demonstrating the application in a manner that a clinician would actually use during the course of a typical day.

Questions were asked at random from the compiled list by a clinician member of the evaluation team. The vendor then went through the process of finding answers to the questions as the participants watched them in real-time. The process was very interactive with participants asking questions about various aspects of the application and its benefits during the evaluation session.

Twenty-five clinicians were able to attend an entire session of the three vendor presentations. There were two participants who, due to patient emergencies, were unable to participate in the entire 90-minute process so their evaluations were excluded from the results. All participating clinicians returned their evaluation forms to the evaluation coordinators, typically within 24 hours by either e-mail or fax. The results of these were compiled and analyzed. The results for each vendor are shown in Table 2.

There was a clear choice. vendor B received the highest scores for each session when taken individually and collectively. This pattern held for ease of use, clinical content and overall score.

In addition, when asked to rank order the three vendors according to which one best met their needs, vendor B was ranked highest overall with 72 percent of the evaluators ranking this vendor as best meeting their needs. All participants were provided with this information along with a thank you for their assistance in the evaluation process soon after the results were available.

Discussion

The diversity of the types of clinicians and the arenas in which they care for patients at CHD Meridian provided a unique opportunity to develop a methodology and capture the collective intelligence of a clinical selection committee in a virtual setting.

The method presented for choosing the best clinical content support vendor is applicable to other health care settings from small physicians' offices to large hospital systems and to the selection of other health care support tools

For physician leaders considering following this or a similar

process to evaluate content tools we have several recommendations based on our experience.

First, they should review the literature and establish minimum requirements, clearly defining those criteria in writing for easy reference.

Second, they should develop some way to quantify the participants' opinions, such as the evaluation form provided. This will make scoring the vendors much easier and provide comparable scores. We recommend having participants score each vendor during or immediately after their presentation as it is very easy to confuse features of one vendor with those of another if participants wait until after all vendors present to evaluate them. Many of the participants commented when submitting the evaluation forms how difficult it was to rank vendors since they all had good products. Having a numeric scale for the main criteria provided a way to quantify preferences for the group to make a clear decision.

Lastly, physician executives should provide an advisor knowledgeable about the types of technology available to the selection committee of clinicians during the process. This can help ensure a smooth evaluation and the eventual implementation of a clinical tool.

Physician executives would benefit from more research on the quantifiable impact of technologies such as these in clinical practice, particularly in office-based settings where clinicians have limited time, often limited computer technology skills and few colleagues to turn to for immediate consultation.

It is our plan to do a follow up study after the implementation of the selected vendor's product with our clinicians to measure the effect on evidence-based patient care.

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