Crossing the EDC Chasm

The emergence of comprehensive eCDM solutions that can seamlessly link together traditional and electronic data management may be the technology that sponsors are still seeking.

IN AN EXCLUSIVE INTERVIEW WITH PHARMAVOICE, PAUL BLEICHER, M.D., PH.D., FOUNDER, CHAIRMAN, AND CHIEF SCIENTIFIC OFFICER AT PHASE FORWARD INC., DISCUSSES THE INDUSTRY'S ADOPTION OF COMPREHENSIVE ELECTRONIC CLINICAL-DATA MANAGEMENT TOOLS WITHIN THE CONTEXT OF A MODEL KNOWN AS "CROSSING THE CHASM."

In popular jargon, the first meaningful champions of any new technology are sometimes referred to as "early adopters."

"By their very nature, early adopters understand technology concepts, and they instinctively see the value that technology can bring to operational processes," Dr. Bleicher says. "One could argue that if early adopters ran clinical development at pharmaceutical companies, the clinical trials world would have transitioned from paper-based to electronic data capture (EDC) long ago. But key business decisions influencing the adoption of new technologies in clinical development are not made by technology champions alone. Rather, they are typically the result of deliberations by multidisciplinary committees of operational strategists, many with limited enthusiasm for information technology."

According to Dr. Bleicher, he is not making a case for turning over enterprise-wide technology decision making in pharmaceutical companies to its early adopters, but says instead there is a need to examine the industry's adoption of comprehensive electronic clinical-data management tools within the context of a model known as Crossing the Chasm, a business theory that explains how people and companies adopt technology.

"While today's electronic data capture (EDC) works very well for some pharmaceutical and biotechnology companies, it falls short of the complete solution that some sponsors are still seeking," he says. "A fully integrated electronic clinical-data management (eCDM) strategy is the complete solution that will lead to rapidly accelerating, or tornado-like adoption of EDC."

Dr. Paul Bleicher

A fully integrated **electronic clinical-data management** (eCDM) strategy is the complete solution that will lead to rapidly accelerating, or tornado-like, adoption of EDC.

CURRENT STATUS OF EDC

While other industries have experienced dramatic increases in the use of systemwide electronic technologies, the clinical-trials sector remains overwhelmingly paper driven.

"To this day, source documents, data collection in case report forms, query resolution, and entries into duplicate databases are largely accom-

The road to 2005 will be traveled only by proven EDC solutions that demonstrate value to sponsors and users. Specifically, industry insiders agree that EDC providers will need to address the demands of both clinical-trial sponsors and technology users.

Winning EDC solutions will increase the efficiency of trials, integrate flawlessly with existing technology investments, and employ technologies that are secure and user friendly.

An overwhelming amount of time-consuming, paper-laden (yet trusted) processes are entrenched in pharmaceutical drug development and commercialization. Because of this, process reengineering is top of mind with executives of many of today's leading global pharma organizations.

plished with paper documents," Dr. Bleicher says. "Various surveys attest to this reality. As recently as 2001, respondents to several surveys report conducting paper-based trials at least 90% of the time."

According to Dr. Bleicher, paper works, but it's slow, costly, awkward to store in accordance with regulatory guidelines, and there's no denying the errors inherent in running clinical trials with paper and pen. These include illegible entries, skipped entries, numbers transposed, data entered on the wrong line, data from one patient accidentally entered into the CRF of another, and lost documents.

Despite the drawbacks to using paper-based systems, the industry hasn't been quick to convert to a completely electronic alternative. Dr. Bleicher believes the perceived benefit people find in paper-based trials is comfort with their established processes.

"The benefit to paper-based trials is that people are comfortable with the process — with the adoption of anything new, one of the key issues is comfort."

But, the drawbacks of paper and the benefits of EDC are hard to ignore and pharmaceutical sponsors and service providers are motivated to seek improvements through the use of electronic solutions.

As a first step, various forms of EDC have emerged, Dr. Bleicher explains, with attention turning to Internet strategies to speed data collection, entry, and transmission. These techniques allow sponsors to see data in real time and make proactive decisions based on them.

"Fewer mistakes in managing millions of data points translates into better patient safety, and less time spent on data cleaning, a step that currently accounts for 32% of the clinical development timeline," he says.

Dr. Bleicher says EDC facilitates the development of valuable metadata, or "data about data" — for example, when the data were entered, by whom, and if they were modified, what was the reason. Metadata also can be used for benchmarking and for building data warehouses that are repositories of clinical information useful for optimizing critical decision-making.

"With so much to gain from electronic improvements to data collection, and with regulatory acceptance in place through the advent of 21 Code of Federal Regulations (CFR) Part 11, the industry has begun to broadly embrace EDC," he says.

Industry sources suggest that from 1999 to 2001, the size of the EDC market doubled to $130 million. In addition, the use of EDC in all phases of clinical trials is slated for strong double-digit growth annually through 2006. Triple-digit growth in EDC usage is projected for Phase III clinical trials.

There is further evidence of EDC acceptance in a 2002 survey of biopharmaceutical companies, CRO/service providers, investigative sites, and technology providers, conducted by the Clinical Data Interchange Standards Consortium (CDISC) and CenterWatch. This survey shows that 75% to 85% of the 750 respondents cite EDC as a key strategic initiative to shorten cycle time and improve data quality and safety, and 39% of CROs and technology providers reported that sponsors are routinely requesting EDC as the data collection tool, up from 24% in 2000.

But when asked to evaluate their experiences in using EDC to date, many reported reservations, stating that the current functionality does not meet their needs. While some of this discontent may reflect dissatisfaction with the state of the technology, much of it stems from general resistance to change from deeply entrenched processes.

All of which can be overcome, according to Dr. Bleicher, by providing sponsors with a solution that meets their entire needs.

"Many current EDC solutions are stand-alone solutions that meet the needs of early-adopters," he says. "Some people are waiting for the solution that meets all of their needs — they need a bridge between their traditional clinical-data management process and EDC itself."

The survey data offer insight into why paper-based systems are not completely abandoned for electronic options.

"These observations are telling," Dr. Bleicher says. "Despite the fact that the marketplace has heeded the call and now serves up some rather sophisticated clinical-data solutions with good functionality, several obstacles stand in the way of widespread adoption."

MOVING TO A COMPLETE SOLUTION

Dr. Bleicher cites two popular business books — "Crossing the Chasm" and "Inside the Tornado" — to explain why some innovative technology, with the ability to create paradigm shifts, languishes, while other technologies jump ahead and become the new business standard.

"A quick overview of author Geoffrey Moore's theory reveals that much of what he says parallels the adoption of EDC by the pharmaceutical sector," he says. "The industry's adoption of clinical development technology could be a textbook example."

Mr. Moore theorizes that the adoption of innovative technology occurs in a life cycle starting with intense interest displayed by technology-savvy enthusiasts. According to the author, these individuals quickly recognize how smart new technology can bring much needed

improvements to the processes in question. They are often its first customers.

Their enthusiasm spreads to the early adopters who are visionaries sometimes able to provide financial backing for the new technology. Similar to the technology enthusiasts, new adopters like to do things first and are excited about being part of a promising solution that meets most, but not all, of their needs.

"This can make for heady times for technology providers, because orders start trickling in from the early adopters who create the early market," Dr. Bleicher says. "Problems arise when the use of the technology begins to transition beyond the limited early market into the broader mainstream."

Mr. Moore suggests that the broader market is composed of the early and late majority users and laggards with varying levels of interests and appreciation of the innovation. Pragmatic types in the early majority tend to withhold purchasing until a fully developed technology with a proven track record for yielding significant productivity improvements becomes available from a market leader. Referrals from technology-enthusiasts and early adopters generally hold no sway in persuading pragmatic types to buy. Until a product is complete and is shaping up as the market leader, it is likely to struggle with limited adoption and fall into what Mr. Moore refers to as "the chasm."

"Crossing the chasm and entering the tornado of accelerated adoption is a perfect analogy for what is likely to happen with the advent of end-to-end clinical-data management solutions — a scenario that encompasses the entire process from EDC through traditional paper-based or electronic clinical-data management," Dr. Bleicher says.

"To achieve the benefits of EDC within a pharmaceutical company requires significant process realignment — without this some 'early and late majority' clinical teams may not be able to see a complete clinical-data management solution with EDC alone," he says.

According to Dr. Bleicher, electronic clinical-data management is a new concept that represents the 100% solution necessary to bring the industry across the chasm.

"In practical terms, eCDM combines EDC with a traditional paper-based, clinical-trial, data-management system in a single integrated technology, allowing the adoption of fully electronic processes while still providing a complete back-end, traditional clinical-trial data-management environment," he says. "eCDM provides clinical-data managers with all of the tools that they are accustomed to in the management of clinical-trial data. It also means that EDC technology can be added to traditional CDM solutions at an ongoing, comfortable pace. An eCDM approach allows the established libraries, case report forms, edit checks, back-end processes of safety and adverse event reporting systems, and drug logistics systems of the traditional CDM process to be used in the design of both traditional and EDC trials."

Dr. Bleicher says one or two complete eCDM systems now are emerging in the marketplace, promising to provide for the early majority exactly what they seek.

For a company involved in clinical trials, there are hundreds of people managing clinical data involving paper-based case record forms. Dr. Bleicher says for companies that are unwilling to completely convert to EDC, eCDM allows them to link the EDC directly into those systems.

"They can use their internal libraries developed with years of past labor, they can use their process and their system for managing the paper-based trials along with and in combination with the EDC trials to be able to essentially use one system to manage both types of trials," he says. "Then they can slowly increase the number of EDC trials until EDC is 100% of their clinical trials."

SLOW ADOPTION OF ELECTRONIC SOLUTIONS

- In 2000, between **5% AND 10% OF ALL CLINICAL TRIALS CONDUCTED EMPLOYED THE USE OF ELECTRONIC DATA CAPTURE** and/or management solutions (Datamonitor, November 2001).
- A survey of 400 clinical-trials professionals showed that in 2001, **54% REPORTED USING NO EDC, AND 37% REPORTED USING EDC IN JUST 10% TO 20% OF TRIALS** (The Forrester Report, July 2001).
- A survey of 10 of the top 15 pharmaceutical companies reveals that on average, a **MERE 4% OF THEIR CLINICAL TRIALS ARE USING SOME FORM OF ELECTRONIC DATA CAPTURE** (Waife and Associates EDC Survey 2001).

DATA CONNECTIONS

Eventually, the linking together of data throughout the drug-development process will require the application of data standards, Dr. Bleicher says. This is starting to happen, largely through the efforts of CDISC. CDISC is a nonprofit organization committed to developing industry standards to support the electronic acquisition, exchange, submission, and archiving of clinical-trials data and metadata to accelerate medical and biopharmaceutical product development.

Although the CDISC standard is not yet in production in pharmaceutical companies, technology provider leaders should be beginning to incorporate these standards into their products and assembling core competencies to support those offerings, Dr. Bleicher says. In addition, they should be structuring products that function through the use of Web services, an approach that facilitates communication between different types of software and is growing in popularity. Web services tools, coupled with the CDISC data models and data standards, provide a significant opportunity for the linking together of EDC with other clinical-data management processes.

"One simple way to understand the power of this connection is to envision the CDISC standards as the language and Web services as the tool to apply that language to the interoperability and seamless integration of the many types of software currently used to operate all aspects of clinical development," he says. "It's this powerful combination that will help lead EDC and eCDM across the chasm."

Changes of this magnitude will make data management more efficient and effective at all stages of clinical development and will have far reaching ramifications for sponsors.

"One of the most significant by-products would be earlier identification of strong and weak drug candidates," Dr. Bleicher says. "Faster weeding out of weak candidates would enable sponsors to make quicker go/no go decisions so they can redirect wasted resources toward more winners. Doing this consistently will expand the capacity of sponsors to push more products through their pipelines. Additionally, greater capacity facilitates use of parallel developmental steps, instead of a slower serial approach."

Citing Mr. Moore once again, Dr. Bleicher points out that pragmatists are convinced to accept a new methodology once they see a compelling reason to buy, namely it resolves pressing needs that cannot be handled with currently available technology. Furthermore, once they purchase and start spreading the word, other pragmatists suddenly jump aboard. And so, the tornado, or stampede, to the new technology begins.

"If Mr. Moore's theory applies to EDC adoption, as it has to almost every technology adoption, we are poised at that cusp where the market transitions from the old paper-based methodology to the new fully integrated electronic solution standard," Dr. Bleicher says. ✦

PharmaVoice welcomes comments about this article. E-mail us at feedback@pharmavoice.com.