Closing the loop on information

IBM's life sciences manager has some words of advice.

BY DAVID FILMORE

What the pharmaceutical industry really needs are "closed-loop feedback systems." At least that is how Carol Kovac, a research executive at IBM, puts it.

Who else but someone from Big Blue would try representing the unwieldy drug development process in computer programming jargon? The phrase, however, provides a good image of the more machinelike model she envisions. She pictures genotypic and phenotypic data seamlessly flowing and informing back and forth to various stages of R&D and patient care throughout (and between) organizations. This model, Kovac says, will underlie an efficient system—which she and her IBM colleagues refer to as information-based medicine—where large interconnected databases support the development of more individually targeted therapies.

To be sure, Kovac is not providing this advice as a disinterested observer. She is the general manager of IBM's fastest-growing business, its Healthcare and Life Sciences unit, which is focused on using data management tools to enable this transition to personalized health care. A major barrier to this transformation, Kovac acknowledges, is resistance from industry to abandoning the blockbuster model of development in which drugs are made for as many people as possible. But, she warns, in the long term, this is going to be a lost cause.

"The blockbuster drug is the pharmaceutical industry's mainframe," she says, evoking a lesson from IBM's past.

In the 1980s, market and technology forces pressured IBM to adjust from mainframe computing, where it dominated the market, to the distributed computing architecture that prevails today.

It was not an easy transition, Kovac admits. "If we could have kept it there, we probably would have, but we had no choice."

And now, she says, neither do the large pharmaceutical companies when it comes to shifting focus from creating blockbusters to a more fragmented personalized medicine approach. "With people warning on profits, empty pipelines, and mergers that haven't produced the synergies shareholders wanted, the angst and agita in industry are palpable," Kovac observes. "We really have to recognize that the whole model is changing."

"Take a lesson from someone who has been there," she pleads to the industry. In addition to sitting down and talking with *Modern Drug Discovery*, Kovac appeared on the Industry Visionaries plenary session panel at BIO 2004, the recent Biotechnology Industry Organization annual meeting in San Francisco.

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"The blockbuster drug is the pharmaceutical industry's mainframe," Kovac says, calling to mind a lesson from IBM's past.

Kovac says the IT tools needed to support large-scale biomedical data integration are already available, and biological platforms, such as the Affymetrix GeneChip, exist to provide economies-of-scale data generation. IBM announced a broad collaboration with Affymetrix in March to facilitate cross-organizational and cross-disciplinary integration of patient information and genomic research.

The big challenges, Kovac says, are in implementation and "putting the pieces together."

Broader use of electronic data capture in clinical trials, for instance, as well as electronic medical records in general, will be vital, she says, for creating "large mineable repositories of data."

However, the "closed loop" will only be formed when this data is so readily accessible that it can be adapted in an ongoing clinical trial or used to inform preclinical or discovery activities that can then inform clinical development.

"You can only do that if you are willing to structure the universe in a very different way," Kovac says. Drug firms have already begun to create "translational medicine groups" to try to bridge discovery and development information, but, she thinks, "There is a gap in terms of what translational medicine is going to prove and how we will implement changes in our business processes to create more efficiencies and innovations."

It will be the ability to quantitatively measure efficiencies, Kovac believes, in later-stage clinical development that will hasten adoption of a more integrated information-based approach. Being able to perform a genomics-supported trial with a thousand fewer patients or in three months' less time will allow the scientist "to go to the senior VP and say, 'If we do this, then we will have the following return on investment in three years,'" she says.

An even stronger case for change, Kovac believes, will be when "the sunk costs are already sunk." If a company has made massive investments in a drug only to have it not show efficacy in Phase III trials, the company can either shelve the drug or profile patients to find a biomarker indicative of high responders, she explains. Getting the drug approved, albeit for a more limited market, will still do a lot to offset the substantial costs already incurred.

"That is the beginning of the erosion of the blockbuster market," she predicts.

"The more successful you have been, the harder it is to abandon the old model and start to move to the new model," she says. "But that is what the industry has to do. It is about really profound change." ■

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