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EDITOR'S PERSPECTIVE: MANAGING THE INFORMATION BOUNDARY OF AN ORGANIZATION: A KEY ASPECT OF TRANSLATING RESEARCH INTO PRACTICE

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The central feature of learning health care systems is the capability to rapidly become aware of new, actionable patient-centered outcomes research (PCOR) evidence and to appropriately adopt it into delivery practices with high reliability.¹ To achieve this, health systems must manage the boundary between knowledge that is generated outside the organization and the practices that occur within it. New external information is generated daily; however, in most cases, this information permeates an organization in an *ad hoc* manner, meaning that its influence on clinical care is not always maximized. In order to realize the full potential of new PCOR evidence, we must foster the development of processes that help health systems to systematically identify actionable knowledge and ensure that it is properly incorporated into their operations.

The challenge to this approach is the lack of pressure on health systems to adapt to new clinical knowledge. In his seminal work, *On the Origin of Species*, Charles Darwin put forth the theory of natural selection that argues that the interaction of species with their environment drives adaptation.² Species that adapt to changes in the environment are able to more effectively compete for resources and proliferate, while those that fail to adapt are often driven to extinction. In health care, financial forces, rather than clinical quality, have driven natural selection. However, with improvements in quality measurement, increasing transparency in clinical performance, and the growing linkage between quality and financials, the pressure to adapt by better incorporating new knowledge and improving outcomes is becoming significant.

Although a focus on translating research findings into practice is not new in medicine, an adequate appreciation of the organizational dynamics needed to foster the adoption of new information is lacking. Historically, we have depended, in most cases, on the

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Disclosures

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professionalism of individual doctors to keep up with the literature to ensure contemporary care – the *ad hoc* approach. As expected, there was much variation in the rate at which new evidence was adopted across physicians.^{3, 4}

Now, physicians are part of a team that works within and across health systems.⁵ There should be little tolerance for the idea that physicians within health systems can adopt new information at varying speed. Moreover, the idea that new information could be effectively adopted by individual physicians in the absence of organizational support systems seems antiquated because new evidence can sometimes necessitate re-engineering of an entire process of care. Unfortunately, real-world practice often fails to adopt new evidence, and the definition of best practice is often far from clear for medical organizations grappling with an overload of external information.

The transformation of door-to-balloon (D2B) time practices across the country was a notable exception in which implementation science was used to identify best practices and disseminate them widely. We studied what made the translation of the implementation science successful through a national campaign with the American College of Cardiology.⁶ We found that what hospitals perceived as important was the credibility and perceived simplicity of the recommendations, alignment with hospitals' strategic goals, practical implementation tools, and breadth of the network of peer hospitals in the D2B Alliance.⁷

Ask yourself how American institutions have handled specific situations as new information became available. In recent years, we have seen the arrival of the novel oral anticoagulants, substantial changes to hypertension and lipid guidelines, and the publication of several important clinical trials.^{8–13} How did the health care systems respond to support the uptake of the new information? How rapidly did they respond? What did your organization do?

We need research that builds links with the social sciences and helps us to optimize the organizational response to new external knowledge. This type of inquiry is not new, but has been inadequately pursued in health care systems. The evaluation and adoption of new knowledge in medicine requires expertise not only in clinical research, but also in fields including psychology, sociology, management sciences, informatics, and economics. This research is non-traditional for medical schools and research organizations, but other discoveries from these institutions will lie fallow unless there is a way to facilitate the incorporation of new information into clinical practice. These organizations, and the health care professionals that provide care within them, need additional support if they are to fulfill the promise of our research enterprise and deliver exemplary outcomes.

In our own institutions we used to have committees meet regularly to develop and refine clinical pathways. The groups reviewed the guidelines and the literature, using the information to define idealized algorithms for patient care in particular areas, such as ST-segment elevation myocardial infarction. The pathways would be disseminated among the doctors and nurses to encourage changes in practice, and used for education.

While these groups were dedicated to monitoring the world external to the organization and determining what information should be internalized and adopted into practice, we still lacked knowledge about how to ensure that such structures were promoting best outcomes.

In a study of critical pathways in Connecticut from our research group, led by Eric Holmboe, we found that “hospitals that instituted critical pathways did not have increased use of proven medical therapies, shorter lengths of stay, or reductions in mortality compared with other hospitals that commonly used alternative approaches to quality improvement among Medicare patients with myocardial infarction.”¹⁴ We concluded that it was not the mere presence of these pathways that ensured superior performance. In retrospect, more could have been done to describe the heterogeneity of implementation and assess whether this might have been linked with performance, as the implementation of a clinical pathway is ultimately complex interventions that involve numerous stakeholders.

The larger point is that we are at a moment in which this type of research is critically important. Poor implementation of new knowledge is a choke point for yielding better outcomes as a result of research, and it undermines the value of the clinical research enterprise. Recognizing the importance of this issue, the Agency for Healthcare Research and Quality recently released a Request for Applications for Centers of Excellence that would focus on evidence uptake in healthcare systems.¹⁵ Other funders, including the National Institutes of Health and the Patient-Centered Outcomes Research Institute, are similarly focused on evidence uptake and knowledge dissemination. Such work is likely to require mixed methods, combining insights from qualitative as well as quantitative methods.^{16–19}

It is imperative that outcomes researchers embrace this challenge. Cross-discipline collaborations will enable us to better manage the incorporation of new knowledge across the internal/external boundary of health care organizations using a systematic and comprehensive approach, rather than one that is selective and *ad hoc*. The best practices need to be identified and disseminated. Only then can patients, regardless of the healthcare system in which they receive care, be confident that the most recent, actionable knowledge will be available for their use.

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