Individual Attitudes Are No Match for Complex Systems

Benjamin F. Crabtree, PhD
Omaha, Nebraska

The elusive quest to increase levels of preventive services delivery has taken on new dimensions as more and more studies dispel widely held beliefs. It is increasingly clear that changing provider behavior is much more complex than previously thought, and that shifts in the overall office system may be just as critical as changing the individuals within the system. The article in this issue of the *Journal* by Solberg, Brekke, and Kottke[1] adds further refutation to the once cherished hope that traditional continuing medical education (CME) and changes in attitudes will result in transformation of clinical practice.

The finding that the knowledge and attitudes of individual clinicians and nurses alone fail to translate directly into practice level delivery of clinical preventive services argues against the prevailing view that knowledge, attitudes, and beliefs are strongly predictive of behavior. This prevailing view stems largely from survey studies in which knowledge, attitudes, and beliefs are associated with self-reported behavior. These associations from prior research are biased by the likelihood that those with favorable attitudes are more likely to report favorable behavior as well. The lack of association found by Solberg and associates may partly result from their elimination of self-report bias seen when measuring preventive services delivery by medical record review. On the other hand, the study may underreport the association of attitudes with preventive behavior because attitudes of nurses and physicians are summed to create group scores. This summation is likely to be an oversimplification of the complex interaction of attitudes and related factors among the multiple physicians, nurses, and staff members of different practice sites.

Past efforts such as CME[2] and clinical guidelines[3,4] have shown limited effectiveness in increasing rates of preventive services delivery. Other approaches to change have recognized that individuals are part of a larger system and focus on system level innovations. Unfortunately, office system protocols such as the American Academy of Family Physicians smoking cessation kit, computerized reminder systems, and the "Put Prevention Into Practice" (PPIP) program have yet to live up to hopes and expectations. There are often short-term successes, but these are generally hard to sustain, and the level of assistance required to get programs up and running prevents widespread application.

There are also a number of organizational change approaches that might be tried in primary care practices. One approach often cited in the business literature is the continuous quality improvement (CQI) process as suggested by Solberg and colleagues in this issue of the *Journal*[1] and elsewhere.[5] While CQI has been shown to work in some settings, the approach may be more intensive than most small practices are going to attempt. It may be feasible in an HMO or hospital setting; however, CQI requires outside training, and in a small practice, may require involvement of a large percentage of the office staff. The GAPS approach introduced by Dietrich and colleagues[6] has also been used with some success and is less intensive than CQI. It is not clear at this time whether it will successfully account for all the complexity of practice systems.

Why have these well-placed and seemingly well-conceived efforts failed to meet expectations despite a general acceptance of the importance of prevention by academics, private practice physicians, policy makers, and patients? Part of the explanation may be found in the observation that "one-size-fits-all" systems appear to have limited effectiveness, and that what works in one practice often does not work in another.[7,8] This would argue for viewing primary care practices as complex systems in which simple linear change models are inadequate for fostering system-wide change.

Complex Adaptive Systems

The complexity of primary care practice systems helps to interpret why both individual provider and office system interventions have not lived up to expectations. A compelling explanation comes from the expanding literature about business organizations, where it is proposed that nonlinear complexity models may better describe the processes of orga-

From the Department of Family Medicine, University of Nebraska Medical Center, 600 S 42nd St, Omaha, NE 68198-3075. E-mail: bcrabtre@mail.unmc.edu

nizational change.[9,10] These models, based on chaos theory, offer insight into why it has been difficult to transform primary care practice into models of preventive services delivery. As stated by Margaret Wheatley: "The challenge for us is to see beyond the innumerable fragments to the whole, stepping back far enough to appreciate how things move and change as a coherent entity."[10]

Even a partial list of potential physician and practice characteristics that may affect preventive services delivery provides a sense of the complexity of the office environment. For example, physician characteristics include physician philosophy (eg, problem vs person focused), physician interactional style, the place of prevention in encounters (eg, integrated, using windows of opportunity, scheduling separate visits, and so forth), physician sense of time pressure, physician readiness to change, and any special motivation for some particular aspect of medicine. Practices like organizations clearly vary on their stability and stage of growth, practice philosophy, organizational cohesiveness, communication patterns, levels of continuity of care for patients, office staff involvement and empowerment, and the characteristics of the patient population that is being served. There also appear to be some features of practices that seem to shape how readily they adopt new systems. It is clear that practices have different degrees of innovativeness; some are constantly looking for and adopting new ideas, others are rooted in tradition. Practices also have different levels of readiness to change that may or may not be directly related to that of the individual physicians within the practice.

How does one make sense of the complexity of the real world of practice? What are the implications for efforts to increase the delivery of preventive services? First and foremost, practices need to be understood as the complex systems they are. Much of the knowledge learned about family systems and how to facilitate healthy change in them may be applicable to practice systems.[11] We need to commit to research that allows us to describe in detail how practices are organized and where potential "levers" for change exist. These can be used to adapt systems to the reality of physician and practice diversity. At a minimum, there are two considerations for practice system change: (1) What is the nature of the program or system that makes it adaptable to multiple physician and practice characteristics? and (2) How is the program or system going to be introduced into practices that vary in their ability to respond to change?

An Emerging Research Agenda

These are turbulent times, and practice systems are already changing and diversifying. This is a uniquely and critically important moment to be studying how different practice systems respond to the multiple forces of change. Some practices are withering; some are persisting in pain; some are thriving. Why? What are the differences in practice systems? The answers may well point to innovative avenues for approaching improvement in preventive services delivery.

More in-depth studies of primary care practices are needed, with an emphasis on more explicitly studying the practice as complex adaptive systems. In order to do so, it will be important for practicing physicians to open their practices in more collaborative and participative ways than they may have been used to in the past. In doing so, researchers may help the physicians to better understand themselves, the culture of their practice, and the possible consequences of the many changes confronting them. The researchers will also be humbled by the complexity and relationships of real life practice. The collaborative research process itself may prove to be the most powerful tool for changing provider and researcher behavior and for improving preventive services delivery.

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