

tional spectrum will be critical to ensure production of primary care and family physicians. There is a need to facilitate student involvement in specific clinical activities that address the social responsibility of medicine for medically vulnerable local, national and international patient populations to demonstrate the broader scope of family medicine. An appreciation of the diversity of family medicine professional activities and the impact that this career decision has on the health and welfare of society is needed to facilitate student interest in family medicine at this critical time when their numbers are increasing rapidly.

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## COMPLEXITY SCIENCE AND ITS RELEVANCE FOR PRIMARY HEALTH CARE RESEARCH

Concepts from complexity science are familiar experiences for those working in primary health care. We work with people, each one different from every other. We have the privilege of knowing our patients over long periods of time, and this helps us understand them better. We are not surprised by how differently patients respond to a particular treatment. We witness the influence of family and community on our patient's experience of health and illness and the opportunities and constraints of health care provision within our organizational and policy context.<sup>1</sup> As clinicians, we may work within organizations comprised of many individuals and experience the effect of the quality of communication on the organization.<sup>2</sup> When we visit a different primary care practice, even though they may have similar objectives and resources and work in a similar way to our own, the difference in the character of the practice is often striking.<sup>3</sup>

Complexity sciences seek to understand complex systems. People and primary care organizations are examples of complex systems. They have emergent properties that are not explainable using linear models

of interaction or causality. Seemingly similar complex systems such as people or organizations become diverse as small differences become amplified through interaction and feedback. The history of a complex system influences its current properties and these constantly evolve. The system is engaged within its context, changing it and being changed.<sup>4</sup>

Despite the apparent fit between complexity sciences and primary health care, what complexity sciences have to offer primary care research is still an open question. As a novel approach to research, complexity science challenges us to think clearly about the nature of reality and how we come to understand it, questions of ontology and epistemology, and challenges our understanding of causation and how we detect it. Where we are stuck on a particular problem, complexity sciences may offer an innovative way of thinking about it without necessarily needing new research methods. Studying interaction and its dynamics, and studying emergence may be of particular importance for primary care research and require learning or developing new research methods.

Arguably the most robust current research in complexity sciences looks inside complex inanimate or cellular systems. Examples include energy networks, computer networks, moving fluids, and cellular enzyme systems. Large volume longitudinal data is collected and analyzed using data mining techniques. Computer simulation of the system can be compared with real life. Mathematics succinctly describes the structure and dynamics of the system. These research approaches require data that capture interaction. We have data about information exchange within our primary care organizations that can be analyzed in terms of network structure and dynamics. Similarly, patient interaction with health care may be explored through case by case longitudinal analysis of our patient data. However, our patients interact with their social and environmental context, and this influences their health.<sup>5</sup> This dynamic interaction is poorly documented within available health care data. Linkage of large data sets from social surveys, census, and health care may provide future opportunities for analysis of this dynamic interaction; however, smaller scale mixed-method longitudinal research is likely to be more productive in the short term.

Although medical science can claim many successes, there are health problems, for example low back pain and depression, where it can be argued traditional research approaches seem to be stuck. A complexity sciences approach may consider such health problems emergent phenomenon arising from the interaction of many different factors, biological, psychological, technological, social, and environmental. Emergence cannot be tracked back to

a particular cause. Similarly, interactions between patients and physicians have emergent properties that are not determined by the patient or the doctor, but develop through their interchange. The function of a primary care practice emerges from the interaction of those who work there, the patients and context. Understanding emergence is a challenge for complexity science, not just for primary care, and is receiving attention from many research disciplines. NAPCRG will continue to serve as a forum for complexity science researchers to learn from one another and to create new, practical insights that will improve the design and delivery of primary health care.

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## MEDICAL HOME CONCEPT GAINS PROMINENCE THANKS TO ACADEMY'S EFFORTS

The AAFP has been promulgating the idea of a medical home for patients since the Future of Family Medicine report was published in 2004. To those ends, the Academy has partnered with a number of organizations to get its message heard.

Some of the more successful ventures have been with IBM, which is working with the AAFP on taking the medical home message to employers, and collaboration with the American Academy of Pediatrics, the American College of Physicians, and the American Osteopathic Association to develop the Joint Principles of the Patient-Centered Medical Home.

The principles were recently used in legislation

passed in Colorado that calls on the state to ensure medical homes for children enrolled in the Colorado medical assistance program or basic health plan. The new law specifically says, "The best medical care for infants, children and adolescents is provided through a medical home ... that is consistent with the Joint Principles of a Patient-Centered Medical Home."

## Primary Care Collaboration

With these principles, the nation's primary care physicians have provided a universal definition for the personal medical home on which legislators, regulators and private sector payers can base their policies. But the Academy isn't stopping there. The AAFP also played a key role in the formation of the Patient-Centered Primary Care Collaborative.

Members of the collaborative—which include the AAFP and other physician groups, health care organizations, employers, and consumer groups—agree that placing primary care and the patient-centered medical home "center stage" in the health care debate will help put America's ailing health care system back on the road to recovery.

During the coming months, the collaborative, which represents close to 50 million American workers and nearly 330,000 physicians, will encourage adoption of the patient-centered medical home concept through an aggressive legislative agenda and by enlisting the support of additional employers, employer groups, and health care stakeholders.

AAFP leaders, however, are already speaking out on the importance of the medical home. Testifying before the House Ways and Means Committee's Subcommittee on Health in Washington on May 10, AAFP President Rick Kellerman, MD, of Wichita, Kan, urged Congress to adopt a Medicare physician payment system that reimburses physician practices for providing a patient-centered medical home to manage and coordinate care.

Kellerman said such a medical home would improve health care quality and cost effectiveness while better integrating patient care into the overall health care system and increasing patient satisfaction.

"More than 20 years of evidence shows that having a health care system based on primary care reduces costs and benefits the patient's health," said Kellerman. "By using a system of health care that is not predicated on primary care physicians coordinating patients' care, the US health care system pays a steep economic price, and our Medicare beneficiaries pay a steeper price in terms of their quality of care."

## The Cost of Care

The message about primary care, the medical home, and the importance of establishing fair payment rates