The Future Demands Complex Leadership

By Russell S. Gonnering, MD, MMM, FACS, CPHQ

In this article...

In order to maximize effectiveness and productivity, the physician executive must understand the differences between simple, complicated, complex and chaotic systems.

Health care reform. The words immediately grab attention.

As the country dissects our health care system and debates which direction to follow in the coming months and years, the health care executive no doubt wonders what the future will bring.

Will we have a system with many different stakeholders struggling to adapt to each other? Most likely we will. Is it hard to predict the future and how best to prepare for it? Absolutely!

It is precisely this situation that Robert Axelrod and Michael Cohen describe in the preface of their 1999 book, Harnessing Complexity: Organizational Implications of a Scientific Frontier:

In a world where many players are all adapting to each other and where the emerging future is extremely hard to predict, what actions should you take?

We call such worlds Complex Adaptive Systems. In Complex Adaptive Systems there are often many participants, perhaps even many kinds of participants. They interact in intricate ways that continually reshape their collective future.

New ways of doing things—even new kinds of participants—may arise, and old ways—or old participants—may vanish. Such systems challenge understanding as well as prediction.

These difficulties are familiar to anyone who has seen small changes unleash major consequences. Conversely, they are familiar to anyone who has been surprised when large changes in policies or tools produce no long-run change in people’s behavior. 1

Health care in general and medicine in particular operate as a complex adaptive system (CAS). 2-5 In such a system, multiple self-selecting and self-organizing agents (which can be individuals, organizations or even ideas) constantly interact with each other and the system, co-evolve in irreversible ways and produce through these interactions qualities and attributes that are more than the sum of the parts.

These interactions follow relatively simple rules, and yet are capable of producing sophisticated and highly creative outcomes. These systems operate “on the edge of chaos,” creating nimbleness, adaptability, resilience and resistance to perturbation by outside forces.

Very large, non-linear returns on effort can be seen when that effort is directed at an inflection point in the system. 6-8 Recently, Sturmberg and Martin cited numerous examples of complexity in both clinical conditions and health care dynamics.9

For example, nonlinearity is demonstrated in such things as the paradoxical increase of mortality with tighter glucose control in the ICU and the lack of significant improvement in quality due to pay for performance despite the large investment of time and capital.

No order here

A CAS is essentially “unordered.” 10 That is not to say it is “disordered.” In a CAS, the system and the agents constrain each other, whereas the agents are constrained by a simple or complicated system. Moreover, cause and effect are present in a CAS, but can only be seen in hindsight (retrospective coherence). 11

In addition, hindsight is only translated into minimal foresight, as in a CAS the outcome is a product of the starting
The total is indeed more than the sum of the parts, and the new entity assumes the effectiveness, creativity and resilience that operating on the edge of chaos produces. The authors indicate that the mechanism of producing this emergence is the articulation and recognition of the shared vision of core values.

Finally, and most pressing to the problem at hand of the direction of health care reform, is the question of value broached by Porter and Teisberg in their series of articles and seminal 2006 work, *Redefining Health Care: Creating Value-Based Competition on Results*.15-17 “Value” is itself an emergent property. It will best be created by a thriving organization operating at the edge of chaos.

Complexity theory provides an overarching explanation of the reasons and methods for achieving success in health care. The physician executive must actively foster the development of an organizational culture capable of those in health care.3 It is ultimately of vital importance for the physician executive to understand how health care functions as a CAS because that is the key to maximizing productivity.

Organizations that function at the “edge of chaos” will deliver the most creativity to the marketplace, and will maximize their own resilience in dealing with challenges in the future.

Logan, King and Fischer-Wright have also approached this productivity question in their pivotal 2008 work on organizational culture, *Tribal Leadership: Leveraging Natural Groups to Build a Thriving Organization*.14

As the dominant culture of an organization changes from Level 3 (“I’m great—and you’re not”) to Level 4 (“We’re great—and they’re not”), productivity increases in a non-linear and significant fashion. Complexity theory explains what happens: the interaction of the agents, the organization and the system in which they interact produces “emergence.”

Unfortunately:

The fact remains that the majority of organizations are still being managed as if they were simple, linear, equilibrium-seeking, and isolated systems, whereas complexity research has decidedly demonstrated that thriving organizations are better understood as complex, nonlinear, far-from-equilibrium and in vital contact with multiple environments.12

If business management has been slow to recognize the importance of complexity theory, it has been even more remote from the field of view of health care.13 It is ultimately of vital importance for the physician executive to understand how health care functions as a CAS because that is the key to maximizing productivity.

Organizations that function at the “edge of chaos” will deliver the most creativity to the marketplace, and will maximize their own resilience in dealing with challenges in the future.

Logan, King and Fischer-Wright have also approached this productivity question in their pivotal 2008 work on organizational culture, *Tribal Leadership: Leveraging Natural Groups to Build a Thriving Organization*.14

As the dominant culture of an organization changes from Level 3 (“I’m great—and you’re not”) to Level 4 (“We’re great—and they’re not”), productivity increases in a non-linear and significant fashion. Complexity theory explains what happens: the interaction of the agents, the organization and the system in which they interact produces “emergence.”

Point and the process of interaction. While patterns can be ascertained, small, possibly minimally perceptible changes in the starting point or process can lead to vast differences in the outcome.

Unfortunately:

The fact remains that the majority of organizations are still being managed as if they were simple, linear, equilibrium-seeking, and isolated systems, whereas complexity research has decidedly demonstrated that thriving organizations are better understood as complex, nonlinear, far-from-equilibrium and in vital contact with multiple environments.12

If business management has been slow to recognize the importance of complexity theory, it has been even more remote from the field of view of health care.13 It is ultimately of vital importance for the physician executive to understand how health care functions as a CAS because that is the key to maximizing productivity.

Organizations that function at the “edge of chaos” will deliver the most creativity to the marketplace.
operating at the edge of chaos, maximizing the creation of value for all stakeholders while at the same time retaining the resilience and nimbleness to recognize changes in opportunity.

In so doing, the successful physician executive will operate in that “blue ocean of opportunity” as described by Kim and Mauborgne in Blue Ocean Strategy: How to Create Uncontested Market Space and Make the Competition Irrelevant.\(^\text{18}\)

With this in mind, what specific steps should the physician executive take to maximize his or her effectiveness in the coming uncertainty?

1. First should be a firm grasp of the potential future harm that could be caused by the very traits and skills that have brought the physician executive success in the past.

   We must stop thinking like an engineer, and begin to think like a farmer, as Paul Plsek urged in Appendix B of Crossing the Quality Chasm: A New Health System for the 21st Century.\(^\text{19}\) Our training has been rooted in reductionist thinking.

   While such thinking was immensely successful in the early part of the last century when medicine was primarily dealing with simple and complicated problems, it has proven to be a profound limitation when attempting to solve the complex problems we now face.

2. Second, the physician executive must undertake a course of self-directed study on the subject of complexity theory in general. This will entail a considerable wandering outside the bounds of the “usual” journals and books. Hopefully, the references in this work will be a starting point.

3. Third, the temptation to think of everything as complex must be resisted!\(^\text{10, 20}\)

   The physician executive will still encounter problems that are simple,
complicated and chaotic. It is imperative that these be recognized as such, and appropriate tools used to manage them.

The first tool, a Stacey Diagram (Figure 1), plots certainty and agreement on an issue. For example, there is high agreement and certainty that a “time out” will cut down on wrong-site surgery, yet less agreement and certainty on the best course of treatment of diabetes or even medical education.

Ralph Stacey himself was concerned that the overuse of this tool could be counterproductive, as it could tend to a reductionist analysis of what is in essence an irreducible problem.

The second useful tool is the Cynefin Framework developed by David Snowden and his coworkers (Figure 2). In this framework, events and problems are grouped by their cause/effect operations. The cause/effect relationship in simple systems is easily seen by everyone. There is one best answer, standard operating procedures work, the process is paramount and the starting point has minimal importance. The leader’s job is to sense what is happening, categorize it and respond.

In complicated systems, cause and effect may be separated in space and time, but order is still supplied by the system. This is the domain of expert consultants and systems thinking. There are numerous correct answers to complicated problems. A complicated problem can be broken into its component parts, those parts optimized and the problem itself will be solved, much in the way that the Apollo Program was solved through the process of reductionism and optimization of the various subsystems.

The leader’s task is to sense, analyze (with the help of the experts) and respond. Unfortunately, this is the fall-back position of most physician executives. Our training has forced a reductionist mentality upon us, and our response to failure is to further reduce the problem, looking for the magic insight that a “smarter” expert consultant can provide.

In reality, many of the vexing problems faced by the physician executive fall into the complex domain, where cause and effect can only be seen in hindsight, and past hindsight only leads to minimal foresight. The starting point is extremely important, as it is the combination of the starting point and the process that produces the outcome.

For example, the treatment of diabetes may be significantly different among various cultures in society. Success will depend upon a sensitivity to the starting point and the appropriate modification of the process.

The leader should probe the situation with multiple “safe-fail” (as opposed to “fail-safe”) solutions, likely seen by everyone. There is one best answer, standard operating procedures work, the process is paramount and the starting point has minimal importance. The leader’s job is to sense what is happening, categorize it and respond.

In complicated systems, cause and effect may be separated in space and time, but order is still supplied by the system. This is the domain of expert consultants and systems thinking. There are numerous correct answers to complicated problems. A complicated problem can be broken into its component parts, those parts optimized and the problem itself will be solved, much in the way that the Apollo Program was solved through the process of reductionism and optimization of the various subsystems.

The leader’s task is to sense, analyze (with the help of the experts) and respond. Unfortunately, this is the fall-back position of most physician executives. Our training has forced a reductionist mentality upon us, and our response to failure is to further reduce the problem, looking for the magic insight that a “smarter” expert consultant can provide.

In reality, many of the vexing problems faced by the physician executive fall into the complex domain, where cause and effect can only be seen in hindsight, and past hindsight only leads to minimal foresight. The starting point is extremely important, as it is the combination of the starting point and the process that produces the outcome.

For example, the treatment of diabetes may be significantly different among various cultures in society. Success will depend upon a sensitivity to the starting point and the appropriate modification of the process.

The leader should probe the situation with multiple “safe-fail” (as opposed to “fail-safe”) solutions,
strengthening those that work and dampening those that do not.

In chaos, cause and effect have no relationship whatsoever. Attempting to solve complex problems with simple or complicated solutions will only throw the CAS into chaos. In such a system, the leader must first act to stop the chaos, sense the result of the action and then respond.

One can argue that this indeed is the root cause of the current problem faced in American health care. Multiple well-intentioned approaches over the past two decades have resulted in a monumental worsening of the problem, such as what has occurred with the attempt at using the concept of “sustainable growth rate” to limit costs.

4. The fourth step is to maximize value in one’s individual practice, department or organization. Value may often be the consequence of the proper understanding of emergence, and the role that multiple safe-fail projects can play in its formulation.

5. Finally, the successful physician executive must spend as much time advancing the culture of the organization as he or she spends on developing and implementing strategy. This advancement of culture cannot be done according to a formulaic approach, no matter how tempting this “complicated” approach to a “complex” situation may be.

The future will bring exciting new challenges and opportunities to the physician executive who is able to harness the power and dynamics of complexity theory, expand upon value innovation and advance the culture of his or her organization.

Effectiveness will depend to a large degree on the ability of the physician executive to follow Paul Plsek’s advice, and act more like a farmer than an engineer.

**Russell S. Gonnering**
MD, MMM, FACS, CPHQ
is a clinical professor of ophthalmology and visual science at the University of Wisconsin School of Medicine and Public Health. Elm Grove, Wis. rsggonnering@hotmail.com

**References**