

## Part II: Synthesis of Concepts from the Complexity Sciences

# Complexity & Healthcare



Bill Rouse discussed key elements of his work relating to complexity and healthcare, and discussed key aspects of leadership in complex systems undergoing rapid change.

We will talk about two things – what makes a system complex and what would you do to manage a system that is complex.

There are a lot of definitions of complexity. The commonality is that complexity is all about representations of systems. A complex system is one that is perceived to have complicated behaviors. It is all about who is looking at the system and why they are looking. Perception is the key.

We have looked primarily at complexity as autonomous agents, but there are also other views of such a system – hierarchical mapping, state equations (control), nonlinear mechanisms. We use these different views to accomplish different objectives. Your view should depend on your intention for using the system.

Let's look at healthcare. Different players have different roles. How you allocate resources in the system will depend on what everyone else is doing. If you want to improve disease detection, you have to do many things, not just develop better diagnosing technologies. One piece is developing competent physicians, and there is a complex network of organizations involved.

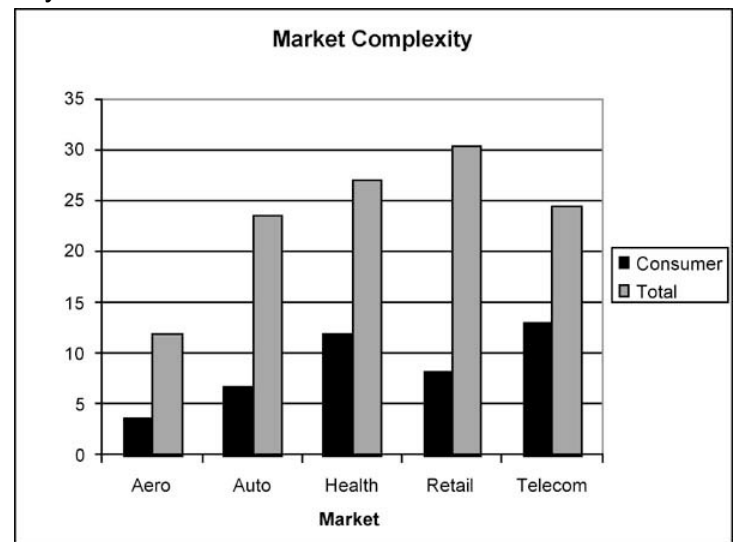
Complex adaptive systems are nonlinear and dynamic. They are made up of independent agents whose goals and behaviors are likely to conflict. There is no locus of control for the system.

The best strategy is to increase the complexity of the overall system in order to reduce the complexity for the consumer – in this case the physicians.

We compared healthcare to four other industries. How many different nodes in the healthcare system are involved in a patient transaction? Healthcare has 27 – it would take 27 bits to understand what other nodes are involved in the transaction, which means more than 1 billion questions.

Now, while retail is the most complex industry, it is

simpler. Healthcare is already complex for consumers, and it is only getting more complex. This is a recipe for failure – consumers do not want more complexity. Very few consumers choose patient-directed healthcare plans – they don't want to have to understand how all of the pieces of the system works.



The best strategy is to increase the complexity of the overall system in order to reduce the complexity for the consumer – in this case the physicians. The effort of creating this National Alliance is an example of increasing the overall complexity of the system because we are increasing the inter-connectivity and information flows in the systems.

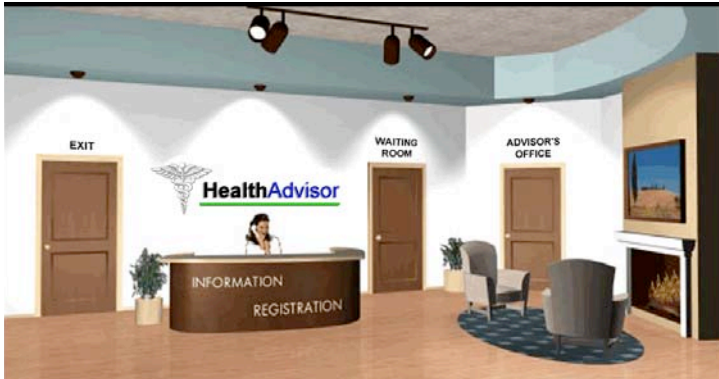
Many the participants here have engaged in a simulation of the healthcare system called Health Advisor. The objective is to increase people's health at minimum cost. My son recommended that we just leave people alone – they would live a while and it would cost nothing. This is not a socially acceptable strategy, but it is interesting. This simulation is a different way to search for interesting strategies in healthcare. We we are improving the simulation based on user feedback.

If you accept that healthcare is a complex system, what do you do? How do you make sense of this

Part II: Synthesis of Concepts from the Complexity Sciences

# Complexity & Healthcare

continued



focus on outcomes, not inputs (like a budget). Value relates to the benefits of the outcomes (e.g. health) rather than the outcomes themselves (e.g. number of colonoscopies).

How does the organization behave differently in a complex system? We need to shift from management to leadership. We need to shift from command & control to incentives and inhibitions – we are only concerned with what they produce. Focus on outcomes, not activities.

	Traditional System	Complex System
Roles	Management	Leadership
Methods	Command & Control	Incentives & Inhibitions
Measurement	Activities	Outcomes
Focus	Efficiency	Agility
Relationships	Contractual	Personal Commitments
Network	Hierarchy	Heterarchy
Design	Organizational Design	Self Organization

Focus on agility, not efficiency – if you are optimized within particular boundaries and the environment changes, you will be helpless. Relationships will be based on personal commitments rather than contracts. Your network will be a heterarchy, not

a hierarchy – you need to be able to work across the organization or network. The organization will tend to be self-organized. The best strategy for organizing the National Alliance is to let it happen – you cannot predict the environment well enough to construct an organizational model that will be foolproof.

How do we know what’s going on in our system? We need to map the system state – how is value flowing today and what problems do we foresee? What is the current cost structure, and what options are available for contingencies? How is each stakeholder involved?

How does leadership emerge in a complex system? People tend to respond pretty well when they understand that the leaders are not interested in managing their daily activities. The concept of a leader could actually hinder the development of the Alliance.

What is the role of leadership in a complex system? There do not seem to be any leaders among the ants. Leadership could be embedded in a set of shared values. The concept of a leader could actually hinder the development of the Alliance. It is possible that leadership becomes a function, not a role or a position for an individual.

The Alliance could provide this network with leadership, perhaps precisely because it is providing no management to all of the other organizations. We might be looking for leadership through facilitation. We tend to equate management and leadership, and we should be very clear about the distinctions between them. This matrix frames very well the kind of shift in language necessary for the success of the Alliance.

Some organizations like ours have largely rejected the concept of an org chart. We think of ourselves as a portfolio of projects. This might be a good model for the Alliance. Why expend all of your energy creating an organization and marketing materials, etc. when you should be spending that