

Making Sense of Health Care Transformation as Adaptive-Renewal Cycles

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Around the world, growing pressures are raising apprehension about the sustainability of the health care enterprise. These pressures include aging populations; increasing illness and multimorbidity mediated by behavioral, social, and environmental factors; and glaring and subtle inequities. These factors and advancing technologies are increasing the cost of health care faster than they are resulting in improved health. Indeed, rising health care costs not only divert funds from other business, government, community, and individual pursuits, but the health care sector is stealing so many resources from the environmental and social determinants of health that US children today may be the first in generations not to exceed the life expectancy of their parents.¹

METAPHORS FOR CHANGE

Amidst these pressures, change is inevitable. How we think about change can have a big effect on how we influence and adapt to it. Our metaphors for change reveal underlying mental models. We say that the pendulum will swing back. Things will come full circle. The feces are about to hit the fan. Market forces will bring cost and value into alignment. The populace will rise up to demand change. Health care will get better from advancing technology, or from humanity or government or competition or communication, or from market or political or natural forces. Things will get worse until we hit bottom or rebound or change direction. It's not over until the sun sets, the jester jests, the coyote howls, the butterfly flaps its wings, or the fat lady sings.

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The mental models underlying these and other metaphors are not so much incorrect as they are incomplete. As we use these shortcuts to make sense of change, it can be helpful to recognize that the underlying models typically relate to only part of the problem, one side of the coin, or a moment in time (to use a few more metaphors).

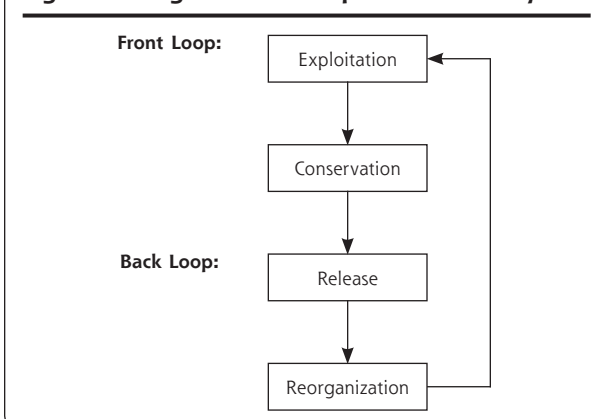
ADAPTIVE-RENEWAL CYCLES

Recent empirically grounded investigations across the ecological, economic, and social sciences have discovered that systems operate in cycles of adaptation and renewal.²⁻⁶ The resulting model provides a lens with which to view the complex interactions of change and stability at different levels and different scales affecting the current health care situation and the possibilities for transformative change.

This model, called *panarchy* (after Pan, the Greek god of nature), describes evolving hierarchical systems with multiple interrelated elements. The panarchy model evolved in part from observing that so-called expert attempts to manage complex ecosystems which used linear approaches focusing on a small number of variables often made things worse.² The model shows how complex natural and human systems are linked in evolving adaptive cycles of growth, accumulation, restructuring, and renewal.⁷

The cycle contains a slow front loop and a more rapid back loop. The front loop represents the dominant paradigm or current bioscape; the back loop involves creative change. These front and back loops represent 4 stages in a cycle, as shown in Figure 1.

The front loop begins with an *exploitation* phase of rapid expansion into a newly disturbed and fertile

Figure 1. Stages of the Adaptive-Renewal Cycle

environment (such as the post World War II US health care market). It moves to a *conservation* phase of slower growth, specialization with loss of diversity, and accumulation and storage of energy (such as a bureaucratized health care system).

The back loop begins when a sudden stress to the conservation phase launches a rapid *release* phase of creative destruction in which the accumulation of tightly bound resources becomes increasingly fragile, and potential energy is released by sudden events (such as an economic or environmental crisis or changing conditions). In a final phase of *reorganization*, depleted resources become available for the next phase of exploitation and as certain members are selected for their ability to survive in the changed environment. Part of this reorganization involves the transient appearance or expansion of pioneer organisms that begin to capture opportunity through innovation and restructuring.

The 4 stages of the adaptive-renewal cycle have been described as analogous to birth, growth and maturation, death, and renewal. The 3 elements below influence the dynamics of each cycle:

- The *potential* available for change, which determines the range of options. Potential increases slightly from release to reorganization and to an even greater degree from exploitation to conservation.
- The degree of *connectedness* between systems controlling variables and processes, which determines the degree to which a system can control its own destiny through internal controls rather than being influenced primarily by external factors. Connectedness increases during the exploitation and conservation phases.
- *Resilience*, which is a measure of a system's vulnerability to unexpected disturbances. Resilience shrinks as the cycle moves toward the conservation phase, where the system becomes more brittle. Resilience expands as the cycle shifts rapidly into a back loop to reorganize accumulated resources for a new initiation of the cycle.

CONNECTIONS BETWEEN CYCLES

Panarchies consist of multiple interacting adaptive-renewal cycles of different scales and time frames. Large, slow cycles set the conditions for smaller, faster cycles. Small, fast cycles, however, also can have an impact on larger, slower cycles.

Fast cycles invent, experiment, and test. Slower cycles stabilize and conserve accumulated memory of past, successful experiments. Sustainability requires the ability to create and maintain adaptive capacity. Development is the process of creating, testing, and maintaining opportunity.⁷

There are 2 important types of connections between cycles of different scales: *revolt* connections in which a critical change in a smaller and faster cycle cascades up to a vulnerable stage in a larger and slower one, and *remember* connections that facilitate renewal on smaller scales by drawing on the potential that has been accumulated in a larger, slower cycle.

Revolt connections tend to serve as instigators for kindling the rapid end of the front loop conservation phase and the beginning of the disruptive release and reorganization phases. Remember, connections often provide a legacy that supports the reorganization phase of faster cycles.

THE CYCLIC PHASE OF (US) HEALTH CARE

We believe that health care in the United States is nearing the end of a phase of exploitation and conservation, in which the rapid growth, specialization, and institutionalization were fueled by advances in science and related economic and social cycles. With the diminished resilience of the current conservation phase, the US health care system is poised to experience the strong turbulence of creative destruction from an impending release phase in which rapid environmental changes, perhaps in related rapid economic or other cycles, overwhelm old ways of operating, and a new reorganization phase ensues.

Within health care, separate but tightly linked cycles are evolving together. These cycles include primary care, which, on the front lines of the overall system dysfunction, is increasingly recognized to be in an untenable position.^{8,9} The current phase of the cycles is beginning to foster disruptive innovations,¹⁰⁻¹⁵ such as minute clinics, low-overhead practice models, and whole-systems solutions,¹⁶⁻¹⁹ as well as to attempts to consolidate diverse ideals around the idea of the patient-centered medical home.²⁰⁻²³ Cycles of reinvention in academic medical centers,²⁴⁻²⁶ consolidation in health markets,²⁷ and growth and recent problems within the pharmaceutical industry²⁸⁻³⁰ represent important interacting cycles.

Cycles affecting health include not only health care, but the social determinants of health.³¹ Health care cycles are heavily affected by economic cycles, and the explosion in health care costs is dramatically affecting the global competitiveness of US industry. The recent world economic downturn is cascading into the pressure on health care, with a resulting decrease in system resilience and increasing susceptibility to a cascade toward back-loop release and reorganization.

SENSEMAKING AND STRATEGIES

Understanding the robust nature of adaptive-renewal cycles can help to make sense of the current situation and can help us to envision strategies for acting synchronously with the cycles. We believe that the panarchy model, developed from observations across diverse ecological, social, and economic systems, can be useful in understanding the nature of the health care cycle. It can help us to consider the potential revolt and remember connections to related fast and slow cycles, and it can help policy makers, health care workers, patients, and citizens to minimize panic, instead observing, making sense of the situation, and planning and acting strategically when the turbulent phase of release and renewal begins.

The current and impending health care system disruption already appears to be setting in motion a period of exploration and innovation from which may emerge new strategies that are better adapted to a changed environment. Attempting to avoid the pain of disruption is likely only to further the dysfunction of the current system and to increase the probability and intensity of a subsequent crash. The fallacy of attempting to avoid the natural adaptive-renewal cycle is shown by the related financial cycle, in which sustaining growth by artificially lowering interest rates did prolong financial growth, but then also intensified the magnitude of the ensuing disruption. Many have speculated that the economic stimulus packages enacted by governments worldwide have softened the blow of the current economic release phase, only to make the next phases shorter and harsher. Similar examples from ecological cycles abound.^{2,4,5}

In preparation for the hypothesized impending rapid release from the end of the current conservation phase in health care, it is vital to learn from current creative innovators and to understand the environments that nurture them. From these innovators will emerge the pioneers for who will drive the subsequent reorganization phase. Understanding the contextual factors necessary for these innovations to develop and evolve is important in order to avoid naive dissemination strategies that are not sensitive to the important enabling environmental factors and related cycles.

Several other strategies are suggested by understanding health care as adaptive-renewal cycles. Organizations should develop the capacity to sow many seeds to maximize the chance that some will sprout and flourish in a new environment. Larger organizations should consider encapsulated units with shorter cycles devoted to generating and exploring new ideas on small scales. Large or small organizations can develop portfolios of possible approaches, looking for windows of opportunity in which to deploy them. It also makes sense to work to strengthen resilience through developing relationships outside traditional partnerships, bringing more diverse information about local and far-reaching systems and related cycles into decision making—functioning more like an improvisational jazz group than a command and control organization.³² Additional strategies for managing for resilience in health care are included in a Supplemental Appendix, available at <http://annfammed.org/cgi/content/full/7/6/484/DC1>.



Now is a time to foster connections within health care and across other sectors affecting health. It is a time to develop diverse delivery models, and to work to meet the population's fundamental health care and health needs, focusing on fostering health rather than continuing to build health care. Strategies of connection, diversification, and focusing on the fundamental will strengthen resilience during the coming turbulent times.

Many questions also are suggested by the model:

- Is health care near the end of a conservation phase, as we have hypothesized, or are we mired in a rigidity trap that may yet persist for quite some time?
- What other short cycles with revolt connections are likely to be important to the evolution of the health care cycle? Economic cycles in which Medicare expenses are forecast to be unsustainable within a decade, or that already are diminishing the global competitiveness of US business? Cycles of student interest in primary care? Short cycles of economic investment, such as physician-owned imaging and hospitals (which are bad for sustainability)? Emerging evidence on cost savings from careful coordination of care for high-cost patients and other patient-centered medical home innovations?
- What other long cycles with remember connections are likely to be important to the evolution of the health care cycle? The long-remembered role of the relationship-centered healer that currently is largely relegated to complementary and alternative clinicians? The solidarity component of the pioneer/individualist free-market-oriented American psyche? Recently forgotten ways of listening, reflecting, and engaging in respectful interaction? Reliance on large

health insurers, professional associations' influence, profit-seeking?

The panarchy model, as have all systems models of interacting complex adaptive systems, has limited linear predictive utility. It does not say exactly what will happen when. The panarchy model does show how complex systems operate and interact, and thus it provides a potentially useful framework for understanding, living through, and strategically working in a changing health care cycle that is influenced by other related cycles. It may be a useful source of testable hypotheses and actionable strategies. It is grounded in the ecological, economic, and social sciences and ready for reflective use in making sense of the current and future state of health care.

We believe that understanding adaptive renewal cycles calls us to develop a broader awareness about how health care is connected to other aspects of society, to establish broader and more flexible connections, and to travel, with hope, toward a future in which the anticipation of a revolt connection to rapid cycles affecting health care will cause us to rejoin remembered connections from long cycles that are sources of deeper meaning about healing and health.

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