Delivering Health Care in Complex Adaptive Systems III: The Diverse Challenges

Jeremy Fish, M.D. and William Bergquist, Ph.D.

In this third essay, we are ready to turn in more detail to mid-21st Century health care and the way in which our understanding and appreciation of complex adaptive systems might assist in addressing the elusive contemporary problems that exist in American (and most other) health care system. Our attention turns first to the matter of understanding health care. This understanding starts with recognition of the distinctive issues facing mid-21st Century health care is also required.

This means identifying, living with and acting in an environment of volatility, uncertainty, complexity, and ambiguity (VUCA) – as well as turbulence and contradiction (VUCA-Plus). In this essay and our previous essay, we have focused on complexity—but recognized that the other environmental characteristics of VUCA-Plus are closely associated with and amplified by the conditions of complexity.

Given VUCA-Plus, we must then recognize that we are facing issues that are problems, dilemmas, paradox and mysteries – and not just readily solvable puzzles. We have previously summarized the distinctive features of these different types of challenging issues (Fish and Bergquist, 2022). We will now begin to address these three challenges & identify some of the tools that are available in seeking to understand them. We turn next to ways in which predictions and forecasts might best be made given the complexity (and hoped-for adaptivity) of contemporary health care systems--as well as the VUCA-Plus environment in which these systems are operating. We turn finally to the value inherent in high-performance teams as sources of guidance in navigating health care systems that are saturated with VUCA-Plus challenges. Specifically, it is in the promotion of teamwork and the assembly of diverse, collective wisdom that these complex systems are best navigated.

Understanding

The first step in any basic understanding of the challenges facing a health care team is discernment regarding the nature of the issue(s) being addressed. Are these issues simple and readily solved? They might be assigned Stacey's label of "simple" and identified as what Snowden calls part of a "clear" system (see our previous essay: Fish and Bergquist, 2023). They might even be considered "complicated" with several elements under consideration. These puzzles and simple problems can usually be solved by a single person with appropriate expertise. The more complicated the issue being addressed--the more diverse expertise is required. This is especially the case when the issue become complex. There are not just many elements and agents (as is the case with complicated issues). When an issue is complex, each of the elements and agents associated with the issue are intertwined and inter-dependent (Miller and Page, xxxx). They are related through mutual local and distant feedback, and relevant information comes from multiple sources.

Complexity and Teams with Diversity

Teams may not be the right approach to addressing simple puzzles and problems. When we are faced with complex challenges (where dilemmas, and paradox are abundant), we find ourselves needing many people involved in solving and resolving the challenges. It is in the realm of complexity that the rising value of teamwork emerges---in some ways like what chaos and complexity scientists call a "strange attractor." When our challenges flow into full levels of complexity then the team becomes essential to success navigation. We are no longer solving or even resolving---we are navigating in the realm of complexity. The diversity of perspectives and experiences to be found in a carefully constructed and effectively functioning team are essential in addressing complex health care problems, dilemmas and polarities.

In rapid and dynamic shifts between states, often Mystery emerges, where even effective navigation can become impossible no matter how well functioning the team. Given the matter of life and death that is abundant in health care systems, it is particularly important for any team to acknowledge those elements in the operation of their system that are beyond their control—or even predictive power. Thus, teams must become facile at recognizing when complexity blurs into mystery and chaos---and recognize the limits even of teams to successfully navigate through mystery.

A key example of a massive mystery in US healthcare is the annual process of identifying nearly $1 trillion in "unnecessary care and waste", what is also called "low-value care" without any substantial progress in reducing this apparent waste. How is it we can clearly identify a massive source of low-value spending, while facing mounting poverty, hunger, those living without a house, climate challenges, educational challenges and mounting student debt? A 20% reduction in waste in healthcare could launch massive new public health, educational and environmental initiatives that could profoundly impact the health and well-being of Americans. Yet, year-after-year we remark on the massive nature of waste and remain mystified on how to begin to move healthcare toward becoming a less wasteful industry.

Why does that happen? VUCA-Plus, particularly through being likely the most complex human system in the world, with payment & health delivery systems that baffle even the most expert physicians, nurse, administrators, and financial people across the nation. Even massive new legislation, like the Affordable Care Act have generally failed to reduce unnecessary and low-value aspects of healthcare spending. Many states are in the midst of attempting to begin to constrain total cost of healthcare in their states---led by Massachusetts, which is over 10 years into the effort, yet experiencing rather limited results in cost containment.

California has recently entered the arena of total cost of care containment, taking lessons from many other states in creating a new Office of Healthcare Affordability with an expansive mandate to constrain the rate of inflation in total healthcare spending and re-directing investments toward higher-value care such as primary care, behavioral health, and health equity. Impactful results will likely require broad inter-professional teams that address healthcare spending through the lens of complexity, rather than hoping single-lever solutions will produce needed results of improved health outcomes with more equitable and responsible spending patterns.

Any effectively operating team will be thoughtful of the difficult and often emotionally difficult discernment to be made regarding those issues that they can (at least in part) control and those which are outside their control. The latter issues require a realistic assessment of what can be done to align

with and (if necessary) buffer the impact of an external force and circumstance—such as are found in many VUCA-Plus environments.

Flocking and Feedback

Healthcare teams, like sophisticated flocks of geese, can adapt and flourish through a multitude of dynamic conditions and threats---through local and distant feedback loops, streamlining movements that reduce energy consumption, and collaborative leadership with simple, adaptable rules that save not just the individual goose from the hawk, but the entire flock in an instant. Collective intelligence emerges in high-performance teams---the whole becomes greater than the sum of the parts. The rag-tag collection of novices with a computer and high-levels of teamwork outperforms the most talented, expert on the most complex challenges facing his or her industry.

Yet, the science of Complex Adaptive Systems in healthcare remains scant, though compelling. It is not surprising, then, that a complex spectrum of approaches to Complex Adaptive Systems in healthcare have emerged. In their own way, the articles we have published (Fish and Bergquist, 2022; Fish and Bergquist, 2023; Bergquist and Fish, 2023) represent emergent phenomena within the broader complex adaptive system. A simple basic rule in healthcare literature is "we will publish our best sense of the current state of things in a peer-review way to evolve our learning." Thus, publishing on CAS within the context of healthcare is in itself, complex, emergent, and our brief overview of some of the prominent examples in the healthcare literature is an attempt to find patterns and attractors to pull us and healthcare toward a better understanding of and navigation within CAS.

Complex Adaptive Systems likely represent the highest order of evidentiary framework within the realm of VUCA Plus. There are some early signs of attempting to integrate CAS into healthcare organizational dynamics, in particular within Primary Healthcare---a high-value component of healthcare systems that is often neglected, under-resourced, and misunderstood. Widespread variability in resource allocation and centrality across nations is also all too common. In Europe, most countries invest heavily in primary healthcare, approaching 15-20% of all healthcare spending, while in the United States, less than 5% of total spending is on primary healthcare. Primary Healthcare may be suffering from the machine-thinking model of healthcare in the United States, where Fee-for-Service payment models favor procedural actions by clinicians far more than cognitive engagement by clinicians and healthcare teams.

The Meikirch Model

Bircher and Hahn (2016, F1000Research) take us on a wild exploration of Meikirch Model of health in the broader context of complexity and how it may apply to the field of primary healthcare. The Meikirch Model describes health in this fashion:

1. Health is a dynamic state of wellbeing emergent from conducive interactions between individual's potentials, life demands, and social and environmental determinants.
2. Health results throughout the life course when an individual's potentials and social and environmental determinants suffice to respond satisfactorily to the demands of life.
3. Life's demands can be physiological, psychosocial, and environmental and vary across individuals and contexts, but in every case unsatisfactory responses lead to disease.

This model draws us away from a simplified, linear cause-and-effect definition of disease as being caused by a single intrusion into the person's body that causes a specific disease. The reductionistic

single cause, single disease, single cure (by reversing the action of the single-cause) model of healthcare can only explain about 20% of the conditions in any typical primary healthcare setting---yet it remains the dominant model for the mind-set of most physicians and health systems.

In stark contrast, 80% of people eventually develop chronic, complex conditions, often with multiple contributing factors across biology, psychology, sociology, the environment, that may improve with complex treatments yet are not curable. This, then, is the domain of chronic, complexity and primary healthcare---which only receives 5% of the overall healthcare resources in the United States yet faces the most complex challenges in healthcare. It appears we Americans favor paying for complicated chances for immediate fixes and cures, while under-paying for complex chances for improved quality and quantity of life.

And our methods for assessing the efficacy of treatments relies solely on the single-cause, single disease, single treatment model with the overreliance on Randomized Controlled Trials, which become highly challenging when causes are not certain and when treatments are highly complex—as is true with most chronic, complex conditions. The authors point out a combination of traditional, Newtonian natural science (causal) and a broader Meikirchian complexity science definition of health is necessary to advance our ability to improve the lives of those seeking out healthcare.

Complexity and Relationships

Complexity also draws our attention from the individuals toward the interactions and relationships between individuals---thus allowing us to recognize the centrality of the primary healthcare physician relationship with the broader healthcare team, patient and family. In single cause, single disease, single cure medicine it is only the individual's biology that matters and is addressed. In the broader context of complexity, we must focus on the interactions and relationships across the many people involved in the care of the patient. Bircher and Hahn (2016, F1000Research) conclude their article with this moving description of critical nature of the physician-patient relationship to pursuing complexity-engaging health:

> For this purpose [of patient-derived, bottom-up insights and health] mutually trusting patient-physician interactions are critical for a successful future; the physician must believe in the patient's abilities to evolve to a new state and must accompany and support him with loving wisdom in this endeavor.

In this new complexity context, the physician shifts from one of being an objective scientific observer who is directing patients to consume treatments in a prescribed fashion to a being a coach or Sherpa, accompanying the patient on his or her adventure toward a healthier, more satisfying life. Yes, medications and other treatments may be necessary along the way---yet the focus is on that partnership relationship, bringing in many other experts and non-physician professionals to assure all aspects of the person's health are addressed in a timely and effective fashion by the patient him or herself. Physicians must share this vital relationship with other professionals, providing the team care that is necessary to achieve health.

We must move from the traditional confessional model of an isolated doctor and an isolated patient meeting privately in an exam room, toward a broader engagement across time and space between an effective primary healthcare team and the community they serve together. Newer specialty fields in

medicine like Family Medicine, Lifestyle Medicine, Palliative Medicine and Integrative Medicine provide that essential relationship-focused, team-based, complex care.

And the evidence is clear, family & primary care teams save lives, decrease disease burden, and limit the reliance on emergency and hospital care in study after study after study. Health systems with a strong foundation in primary healthcare flourish and demonstrate far superior health outcomes for their people than those systems that over-rely on single-cause, single-cure approaches filled with sometimes unnecessary procedures, hospitalizations and ill-suited efforts toward illusive cures.

Episodic Complexity

Shifting from more theoretical constructs of complexity in primary healthcare setting towards a more pragmatic development of a user-friendly tool for hospital physicians to use to identify patients requiring complex care in the hospital setting, we learn from Bandini and his associates (Bandini, et al., 2018) about the importance of what they call episodic complexity in contrast to a patient status complexity (also known as multimorbidity). The traditional definition of a complex patient is one with two or more chronic conditions.

The authors point out that many people who have a complex health status may not require complex engagement with the health system. They give an example of a person with Diabetes, Hypertension, Coronary Artery Disease and moderate chronic kidney disease being admitted to the hospital with a simple case of community-acquired pneumonia. Although this person clearly meets the traditional definition of being a complex patient, his admission episode is quite simple, requiring a well-established protocol of antibiotics and oxygen, followed by a highly predictable improvement and discharge from the hospital back home. They contrast this with episodic complexity, which they define as having one or more of these characteristics or events during the current hospital episode:

1. Simultaneous instability of 3 or more organ systems
2. Episode requiring more time for thinking, handling relationships, and human/professional confrontations
3. No clear diagnostic/therapeutic paths indicated in Evidence-Based Medicine guidelines
4. Unplanned readmission for same cause within 1 month of D/C
5. Patient not responding to therapy
6. Episode requiring end-of-life decisions

Based on these 6 Episode Complexity factors, they found nearly a third of their patients had Episodic Complexity with a very high correlation with risk of death during hospitalization (25 X higher probability), and a clear connection to increasing the length-of-stay (by 4.5 days on average). By far the most common episodic complexity factor was the increased need for time related to relationships during the care with patient, family, other professionals. One could see how a “disease-focused clinical pathway” that does not incorporate behavioral, relational, and conflictual factors might have very limited impact on important care outcomes like death and average length of hospital stay.

As pointed out in the Meikirchian model of health—the relationship between agents within a complex adaptive system outweighs the importance of the status of each individual, including, in this case, the patient. The authors also point out that we miss a great deal of complexity by only focusing on the number of chronic conditions a patient has---on the status of the patient. Complexity, as a dynamic system, draws our attention to previously missed ways of seeing the fluid and often turbulent nature of

health and healthcare complexity. Stepping back to look through a complexity lens allows us to see more clearly what is actually happening in our healthcare interactions and how best to address previously missed factors that contribute substantially to patient outcomes.

Complexity of Cancer Screening

In their compelling review of complexity interventions in healthcare setting, Braithwaite and associates (Breathwaite 2021) provide a window into successful interventions using complexity science and approaches in healthcare. Each narrative is compelling. However, we will share just one to provide a picture of how the complexity approach to healthcare quality and safety may improve our capacity to influence healthcare more effectively while developing new leadership skills in the process. Braithwaite and his colleague begin by exploring how a community of clinicians responded to receiving a high-risk result for a cancer screening test. They describe the difference between "care as imagined" vs "care as done." They begin with the linear, mechanistic "imagined care" model most of the clinicians believed was happening:

1. Screening tests carried out to assess risk of cancer being hereditary.
2. Results reported as a high or low risk.
3. People with high-risk result were referred to a genetic service.

The study included multiple clinician stakeholders---surgeons, medical and radiation oncologists, pathologists, and genetic specialists. The research team developed a process map of "referral as done", which revealed several important factors that greatly reduced & delayed the referral rates---such as fear of overwhelming the patient with a new issue, peri-operative complications that delayed discussion of test results with the patient and family, lack of consensus on who was going to make the referral, and lack of clarity on how to document the results in the electronic medical record.

None of these factors were included in the "referral as imagined" linear process developed at the beginning of the study---yet most real-time quality and performance improvement programs in healthcare are based on the "process as imagined" more than the "process as done." The introduction of frontline Lean efforts such as Kaizen are the rare exception---by developing process maps and real-world workflows and engaging frontline in the process. Yet, many of these Kaizen-type efforts have challenges being integrated into the larger healthcare system---often acting more as "idealized retreats" than long-term impactful change processes, in large part due to enormous clinical inertia and leadership inertia that often resist even the best laid out plans for improvements.

So, how did Breathwaite and associates impact the gap between "as imagined" and "as done"? They brought together all the agents (in this case they facilitated meetings of all the specialists together) to clarify roles, review the troubling referral rate completion data, examine barriers and helped create a shared mental model that fostered a whole-system approach to the care of the patients. Deepening the understanding and relationship between the physician agents allowed for meaningful shifts in referral rates that allowed them to achieve results that better matched their expectations while recognizing the many barriers that must be overcome to get there. They did not blame one specialty or another, or scapegoat nurses or care managers---they focused on relationships and increased teamwork across the several specialties to navigate the complexity inherent in what seemed like a very simple, linear process "as imagined" yet was a mess of barriers and dropped balls "as done."

Current and future healthcare leaders will need to adapt traditional top-down leadership directives toward more agile and flexible collaborative leadership engagement. Breathwaite and associates point out the many shortcomings of strict hierarchical management, which relies on the "putative ability of a single person or executive grouping 'at the top' to be in charge, [yet it] can in reality never cope with all the complexities present in a system, let alone an entire chain, health region or jurisdiction." They propose a set of alternative models of leadership and management in complexity, focusing on:

a. Strategies such as distributive leadership
b. Decentralized responsibility
c. Communities of practices
d. Relationship-building
e. Opinion Leaders
f. Shared Mental Models
g. Networked Influence

In essence they are describing the leadership model of fluid, dynamic complex systems like flocks of birds, schools of salmon, and hives of bees. All of these CAS rely on a small number of basic rules, local (move left to avoid an attacking predator) and distant feedback (move north to return to our nesting/spawning site / hive), self-organizing teams, and emerging behaviors that help produce the best outcomes in often novel and productive ways.

Improving healthcare is highly complex and integrating complexity science and the concept of complex adaptive system now brings us to the next level of strategic advantage toward predictions and forecasting---perhaps by learning from fields like meteorology on ways to begin to more accurately forecast events like Covid-19 and other epidemics which tend to drastically disrupt the healthcare environment in seemingly sudden and random ways.

Prediction and Forecasting

We are where the meteorologists were in the 1960's now before infrared sensors were sent across the globe and into space to help forecast the weather. Although their prediction models are far more sophisticated and accurate than the 1960's, people's faith in weather predictions seem no more accurate than in the past demonstrating even evolved forecasting models in healthcare will not be widely believed at first. We suspect that Covid will produce a new CA5 forecasting models---and our hope is that we use it beyond infectious diseases into broader areas of contagion that include ideologies, conspiracy theories, and ideas that create their own form of pandemic in the age of worldwide web connections and air travel.

We want to embrace more complex forecasting models, along with potential for early interventions intended to provide broad Community Immunity across things well beyond infectious diseases as they are traditionally regarded---transmitted by parasite, virus or bacterium, contagious ideas, ideologies, conspiracy theories, and thoughts that create pandemics on a near continuous basis. In order to fully appreciate new forecasting models, we must turn first to the traditional model that has dominated health care planning.

Discreet Event Simulation (DES)

DES was first described in the 1950's and piloted in Steel Plants. It is a simulation model that focuses on operational and tactical tweaks that can increase efficiency within a short timeframe based on the flow of a product through time and places. Its key Simulation factors are as follows:

1. Stochastic—allows for random events to disrupt the flow
2. Passive Agent (usually a product or inactive person moving through a workflow)
3. Often focused on a single unit workflow, such as a hospital ward or emergency department when used in healthcare.

DES has been used successful to research workflow improvements in hospital wards, operating rooms, intensive care units, emergency departments, and for specific health conditions such as diabetes and hypertension. Although successful in helping map and improve workflows to be more efficient, it has most often been used in a research framework and there is some indication that less than 10% of DES models in healthcare are ever fully implemented in the settings they are researched.

Although likely helpful in reducing healthcare waste via more efficient workflows in hospital wards and the like, the passive nature of the agents (products and people) in these simulations limits its capacity to realistically simulate live healthcare environments in which many decision-makers and professionals are interacting in vary active ways. Thus, it may more closely function in rather linear, complicated environments in which decisions play a very small role---for example performing a common procedure in an operating room in the most efficient way, says nothing about whether the procedure performed was necessary or of high-value to the person receiving the procedure.

System Dynamics Simulation (SDS)

SDS also emerged in the 1950's from Systems Theories, incorporating non-linear dynamics to better understand complex behaviors in a system. First developed by Jay Forrester at M.I.T. and best known for its implementation by the Club of Rome for its study of the global environment (Meadows, et. al., 1972), SDS relies heavily on causal feedback loops and policy levers in developing mathematical models within organization systems. Fundamental to SDS are several principles regarding the nature of systems (Meadows, 2008, p. 188):

Systems

- A system is more than the sum of its parts.
- Many of the interconnections in systems operate through the flow of information.
- The least obvious part of the system, its function or purpose, is often the most crucial determinant of the system's behavior.
- System structure is the source of system behavior. System behavior reveals itself as a series of events over time.

Unlike DES models which tend to focus on single-unit workflows, SDS allows for broader simulations across several work units with dynamic feedback loops providing causal impacts on product flow. The key factors of SDS for complex systems are as follows:

1. Non-stochastic (non-random)
2. Passive agents (products, people, groups of people, work units)
3. Causal Feedback Loops (provides dynamic nature of the system)

4. Policy levers—allows for scenario planning via iterations using different policy approaches

One of the most widely used illustrations regarding the use of SDS modeling concerns management of the deer population on the Kaibab plateau in Arizona. In building a policy that focuses on the predatory population (mountain lions), deer population and forest on the plateau, it is all too easy to end up with a plateau that has no deer, predators or threes. A SDS model shows how this can occur: https://www.bing.com/videos/riverview/relatedvideo?&q=System+Dynamic+Model+Examples&&mid=894CEC12390F6B839F00894CEC12390F6B839F00&&FORM=VRDGAR

In extending the Kaibab analysis to our entire world, it is shocking to witness the death of an entire global system through use of SDS modeling (as engaged by the Club of Rome).

Unfortunately, like DES, the agents in the SDS form of modeling are passive---meaning they operate more like wigits or products than fully functioning decision-makers which we find in the real-world experiences. SDS also lacks the random interjection of unanticipated changes or impacts from unexpected decisions being made as also happens in the real world of healthcare. Patients are not passive products passing through workstations as imagined by early Scientific Method (machine-focused) assembly-lines of the auto-industry and many other manufacturing industries that laid the groundwork for both DES and SDS modeling. Both of these forecasting simulation models are highly sophisticated and can play an important role in moving the efficiency needle of healthcare, yet neither can robustly challenge our broader need of rethinking and re-imagining healthcare that can more broadly invest in the most impactful and cost-effective ways of improving the health of our nation.

Both DES and SDS are sometimes termed "compartmentalized simulations" in that they allow for simulations of contained systems in equilibrium, which can limit the generalizability of their results outside of the studied system. They also do not allow for disequilibrium or allostatic states often found in natural environments where lower-level dynamics can suddenly shift into new unpredictable states due to external forces or accumulation of influences that lead to a tipping point into a higher-level state, such as water going from ice to fluid to steam, when shifted from 32 → 33 degrees and 211 → 212 degrees in very non-linear fashion.

Although both DES and SDS modeling are increasing rapidly in healthcare as we develop more robust data-bases to allow for more sophisticated simulations---we are also seeing a rise in Hybrid Modeling (combining 2 or more simulation models such as DES and SDS) to better simulate real-world healthcare events as well as the emergence of a newer, more effective way to simulate complex systems with active agents who make decisions and interact with other active agents in more complex and random ways, called Agent-Based Simulation (ABS).

Agent-Based Modeling

ABS also emerged as a theory in the 1950's. Yet, it did not develop into functional simulations until the 1990's when computer capabilities allowed for it's more complex and dynamic simulation processes. Its original broad use emerged via the gaming industry in the Game of Life—a complex game that allows for autonomous (active) agents to make decisions that can lead to the expansion of life or death in themselves and their near neighbors. As Nigel Gilbert (2008, p. 1) has noted: "Agent-based simulation has become increasingly popular as a modeling approach . . . because it enables one to build models where individual entities and their interactions are directly represented."

Some examples of ABS analyses resemble those used by SDS in its modeling of the Kabab plateau eco-system. Specifically, ABS has been used to model Wolves, Sheep and Grass. This model illustrates a dynamic interplay of populations based on initial population size and reproduction rates. It allows for very realistic predictions of population dynamics in US parks: https://ccl.northwestern.edu/netlogo/models/WolfSheepPredation

Compared to our prior two models, ABS has an attractive array of factors—beyond just the representation of individual actors--that increases its capacity to simulate reality in healthcare:

1. Stochastic—allows for random events and decisions to impact outcomes
2. Active Agents—agents are active decision-makers, not simple products or passive people flowing through a system.
3. Feedback loops---autonomous, active agents interact with each other within the context of the simulation, producing both immediate and delayed impacts on outcomes of the system.
4. Emergence—allows for emergent behaviors to impact broader environment of the simulation.

Most agent-based models are composed of numerous agents that exist at various scales. The agents might be individuals, groups, organizations or entire communities. These models also require some mode of decision-making—usually a mode that is rather simple and straight-forward. A third requirement of an ABM is that it include some process for bringing about change in the behavior of participating agents. Learning and adaptation occur that lead to the modeling of diffusion of ideas and to the tipping points made "famous" by Malcolm Gladwell (2000). Fourth, an agent-based model requires a "field" (topology) on which the agents interact with one another. As in the case of SDS, boundaries are established so that an analysis can be conducted that focuses on the behavior of agents operating in this specific field.

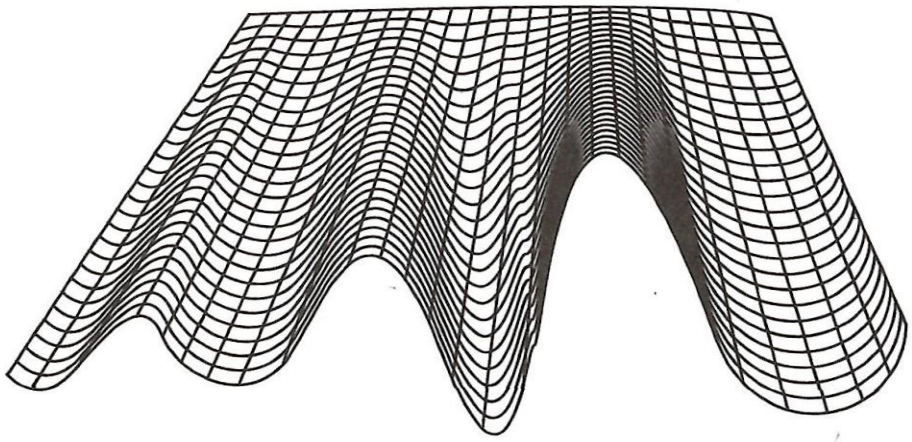
All of this is done so that a computer-based simulation can be engaged to determine ways in which the behavior of a single individual can impact on the overall behavior of agents operating in a specific system. Unlike DES and SDS, agent-based modeling opens the door for exploration of the critical, but often elusive, dynamic of *Emergence*. It is in the capacity of a complex, adaptive system to produce something that is emergent (absolutely new and surprising) that this system is ultimately most adaptive and capable of higher order learning and change.

Confronting the Virus on a Warped Plane

System dynamics modeling moves us past the static and mechanistic world of DES. It provides us with a portrait – a "snapshot"—of a system that is complex, with many interrelated parts. Agent-based modeling, in turn, moves us to a computer-based narrative—a "move"--of a dynamic, interacting system. However, neither of these modeling tools conveys something of what it is like to actually navigate through a complex, adaptive system. What is it like from moment to moment when moving through a field (typology) that is dancing—such as in our contemporary world of health care. How might the life of a leader in health care be portrayed on a daily basis—especially when this leader is confronting a powerful, complex challenge such as COVID-19.

To get a concrete sense of this dynamic, ordering process in a complex adaptive system as it relates to COVID-19 in mid-21st Century health care systems, we return to a portrayal of complex adaptive systems that we introduced in our second essay in this series (Bergquist and Fish, 2023). This portrayal was first offered by a noted biologist, Conrad Waddington (1997) more than twenty years ago. He describes warped planes on which objects move in an unpredictable manner. Using the metaphor of a ball being placed at the top of a slopping plane (thin sheet of metal or plastic) that has been bent and warped (forming ridges and valleys) Waddington notes that the ball will begin to roll straight down the plane until it encounters one of the ridges. At this point a series of oscillations tend to occur. The ball moves back and forth before it eventually begins to roll down one of the valleys and picks up speed again.

Graph One: The Warped Plane



If several balls are rolling down the plane at the same time, this first ridge will become a point of bifurcation for the entire system. Some balls will move in one direction (depending on the pattern of oscillation when encountering the ridge) and roll down one valley, while other balls will move in a different direction, rolling down one or more of the other valleys. A ball may gain enough momentum to roll over the top of one ridge into a second valley. If there is not sufficient momentum, the ball will remain in the current valley.

Thus, a few critical moments in the life of the ball's roll down the plane make a major difference in the outcome of the roll. The pattern of oscillation determines which valley is chosen and whether or not the momentum is sufficient for the ball to shift to another valley. There is a cluster of conditions (in the form of valleys and ridges) that define the specific alternative courses to be taken by the ball.

Encountering the Virus

At the start, as the ball is rolling down the warped plane it encounters the first warp (a ridge with two adjacent valleys). At this point, it tends to oscillate. As just noted, oscillations tend to precede

bifurcation. At the point when the ball ceases to oscillate and begins to move down one of the adjacent valleys, an irreversible decision has occurred.

This is the dynamic operating when a virus leaps from one region of the world (one valley on the plane) to another region. Typically, there is just a small number of infected people who usually have traveled from the original region of infection. The infection can be immediately detected, and the infected person quarantined. Nothing occurs. The virus is "stopped in its track." It is a matter of perfect timing and fast response. The oscillation in this instance is the moment of decision being made by those in medical authority. Unfortunately, the response is often not timely or fast. Many delaying or deferring questions are asked:

"Are we sure this is the dreaded virus?"

"I thought it was present only in XYZ (name of country or region)."

"This could just be a nasty flu. We certainly don't want to alarm people in this community—they are already stressed out."

"If we announce that one person has been infected and quarantined then our economy will immediately go down in flames! All because one old person got sick (or) All because that damned tourist went to the wrong country and hung out with the wrong people!"

As we noted in the first essay in this series (Fish and Bergquist, 2023) the identification of delays in any system is critical to understanding it's dynamic operations. System theorists (e.g. Meadows, 2008) tell us that one of the most important (and often overlooked) features of any system is the delay function. How long does it take to detect a change that is acting on the system from outside (or inside)? How long does it take to share information with other sectors of the system about this change? How long does it take to act upon the information that has been received and shared? In the case of COVID-19 (and other viruses) a delay of even one day can be devastating. The ball no longer oscillates. It moves into the new valley (infecting residents of this second valley at a high rate).

There is more to say here about the movement of the ball (and the virus) down the new valley. When the ball begins to move down one of the valleys, it usually doesn't roll directly down the center of the valley. Rather, because it entered the valley from an angle (having oscillated among several options before entering the valley), it rolls up the side of one of the valley's ridges. The ball then corrects itself by rolling back across the floor of the valley and up the other ridge of the valley—while continuing to move down the valley. Leaders in the system operates in this valley are vacillating. They are moving back and forth regarding what to do next. Ideally, the leaders (and those people who are residing in this second valley) soon end their vacillation. They make thoughtful decisions in a slow, measured manner (Kahneman, 2011). Those operating in this second valley make quick, yet orderly adjustments and minor changes at this point. Collectively, they are agile, moving in a self-correcting fashion. This is all well and good—provided that the system is operating in an optimal manner, with abundant agility.

Tragically, this is not the way things operate in many valleys. What happens when the system is stressed, and levels of anxiety are high? What takes place when there is an invading enemy (such as COVID-19) that is uncaring about the welfare of people living in the valley and is itself quite agile (and invisible). The oscillation continues. Under these conditions, the natural swings of the ball back and forth down the valley can trigger even more anxiety. This leads to fast, "knee-jerk" reactions--what behavioral

economists call the reliance on inappropriate but convenient “heuristics.” Kahneman’s fast, habitual (and rigid) thinking takes over. Decisions are made in a chaotic manner. As a result, the ball often swings back and forth even more violently—and may move to yet another valley. This means that the disfunction of one community or society can result in the virus spreading elsewhere. The blame as well as the virus spreads and intensifies. A perfect storm takes place. We are facing a full- blown, globally destructive pandemic.

Inside the Valley

What does it look like to live and work in a system that experiences the movement of the ball into its own valley? Everyone knows that something terrifying has just come to their organization, community, society. Pretty soon things are in disarray. Something is about to happen. Unfortunately, one can only speculate on what will happen under these conditions of disarray or chaos. The oscillations of the ball are unpredictable (as is the spread of the virus). When the ball is swinging widely from one ridge to the other ridge, it has as great a chance of moving over the top of the left ridge into the adjacent valley as it does of moving over the top of the right ridge into that adjacent valley.

Most of the members of a system (organization, community, society) don’t really know much about (or perhaps even care much about) either of the adjacent valleys. There is always hope that the ball will continue to roll down the current valley without much oscillation or uncertainty. If it does go to another valley, then perhaps it will never return to our valley. Someone else will have to deal with the virus—it is no longer our problem.

Clearly, the ball is not done with the change process. The virus has not discontinued its spread to other communities and regions. The oscillation in any one valley can be attributed, at least at times, to the anxiety and inappropriate actions that have been taken. At other times, the oscillation can take place because the rate of change (speed of the ball) is simply too great for the valley (society) to handle--the faster the speed, the wider the swings The ball may have swung too far and actually rolled up over the top of the ridge into the adjacent valley.

As in the case of the initial oscillations that preceded the ball’s movement into the second valley, the movement into a third valley is preceded by oscillations—though in this case the oscillations are usually quite large. They are quite visible and bigger than what was expected (given what has been conveyed by residents of the previous valleys through which the ball rolled). The virus is now well-known and even more frightening to all involved. Occupants of all the surrounding valleys are increasingly anxious and are likely, as a result, to operate in an inappropriate, thoughtless manner is and when the virus hits their own valley. The virus even more easily wins the day, moving from valley to valley.

Learning in a New Valley

If the ball does move over the top of one of the ridges, then it will roll down the side of another valley. A whole new set of parameters will be in operation in the new valley. The systems operating in this valley need to make some immediate adjustments. However, the challenge they face seem to be unlike anything they have seen before. The ball will not be at the top of the valley when it rolls over the top of the ridge. Hence, it is not like a ball that is starting at the top of the warped plane.

Agility is demanded of both the leaders and members of the community residing in this valley. On the one hand, residents of this new valley have ample opportunity to learn from mistakes (and successes) of

residents in valleys through which the ball rolled (virus invaded). This requires that residents of the new valley talk to those in the other valleys. There can be no isolation or fear of the "other" (those living in the other valleys).

On the other hand, residents of the new valley must "hit the ground running" as the ball (virus) enters their valley. They must learn some new lessons as well as listen to the lessons conveyed by residents of valleys through which the ball has previously rolled. Why must new lessons be learned? This is because the ball (virus) will never operate in the same manner in the new valley. Its trajectory at the top of the first valley (the inception of the virus) no longer operates. The ball (virus) is now entering each valley from a different angle, at different speeds. It is received in different ways in each valley—depending on levels of anxiety, expertise, and culture-based attitudes about the ball (virus).

A large health care system that downsizes will never be the same as a smaller system that was never large in the first place. A reformed alcoholic will never be the same as a lifelong teetotaler. The reformed alcoholic, for instance, might be more compassionate (or less compassionate) regarding those who are still active drinkers. The wounds caused by downsizing will never really heal. We can never again be indifferent to a threatening pandemic once we have experienced an outbreak of one virus. Pandora's box can never be closed again—the evils of our world (and the virus) have been let loose and can't be recovered or fully controlled. What about the next virus to hit our shores? A new virus outbreak is perceived in a different manner from a virus that has been moving through communities for several months. And what about viruses that has been with us for many years and that is only occasionally given much attention?

Multiple Valleys and Multiple Truths: Perhaps We Are the Ball

The challenge and potential harm become even more profound when we recognize that the ball in real life may be residing simultaneously in two or more valleys—as certainly is the case with a virus. Technically, it is a bit different if the single ball splits into two or more balls at the top of the plane or if there were always two or more balls operating all the time on the warped plane.

In the case of the current virus, the ball appears to have split and multiplied – though in the case of COVID-19 there has been some speculation that it actually broke out in several locations, perhaps over an extended period of time. There may have been multiple balls let loose at the top of the plane. The corona virus, in some form, might actually have been with us for quite a while— in which case the ball is not new to us but has been rolling around our valley undetected or mis- perceived for an unknown period of time.

We might even come to realize that we are living in several different valleys and can't simply wait for the ball (virus) to leave one valley. As global citizens, we are not only living ourselves in multiple valleys—we are required to embrace multiple truths and perspectives arising from our life in each valley. And we must care about what happens in these other valleys, for we live there too. We are living in and journey through multiple valleys on a warped plane. Being a global citizen during this challenging era of VUCA plus and COVID-19 is quite a challenge.

What about dancing landscapes? When living on Waddington's warped plane, we are likely to feel that this plane is a dancing landscape. We encounter new balls flipping into our valley. It is a tipping point for us—the unpredictability of the ball entering our valley may be experienced as a dancing change in our life. Is the landscape actually dancing, or is it each of us who is dancing?

Are we actually the ball on the warped plane that is entering a new valley? Are we what is “tipping” over the top of the ridge? Everything changes when one is moving into an unanticipated valley and rolling in a new manner through this new valley. There are new realities and new viruses. As global citizens we feel confused and vulnerable—with considerable justification.

Each ridge is a point of decision, the ball can fall to one side or the other, which path it takes is extremely dependent on initial conditions. A very minor change can switch the path from one attractor - the hole, to a nearby one - missed! Once this bifurcation point has been passed it may take a very large perturbation (a hidden stone say) to switch attractors again, we say the system has become 'locked' into a particular attractor.

Personal Reflection on a Dancing Landscape

We would suggest that all of us living in mid-21st Century America (and perhaps anywhere else in the world) are living on a dancing landscape. One of us [JF] currently is plugging away at navigation on a warped plane of health care: he is giving talks at several medical schools and overseeing massive shifts in reproductive health care after roe v wade overturned recently. Because of the Supreme Court decision regarding abortion rights, members of the health care community in the USA are witnessing a surge in VUCA-Plus challenges. More importantly---every person living in the United States (and elsewhere in the world) is concerned for someone who might have an unwanted pregnancy at some point in life.

The following comments are offered regarding this health care challenge:

> Imagine you are a medical student who wanted to do your training back home in Texas and now you find you will be hunted down like an outlaw if you help someone get an abortion or care for them in the Emergency department for complications of a home abortion. We have returned to pre-73 "illegal abortions".
>
> Some people in our land believe we can make people illegal and behaviors illegal and they will "go away"
>
> That kind of thinking gets us into no end of trouble again and again and again. Didn't we learn anything from prohibition?
>
> We seem like fast creators and slow learners on many fronts.
>
> I've found my ability to play around with complexity is not that common, so I find ways to provide visuals that seem to help.
>
> Just led our leadership team through a year-long, comprehensive strategic planning process, following these 7 steps:
>
> #1. review, revise, re-broadcast vision statement
>
> #2. SWOT analysis
>
> #3. Scenario planning for strategic options
>
> #4. Smart Goals and Action planning for top 3 strategic levers

#5. Strategic Execution Plan

#6. Resource mapping and allocation to support execution plan #7. Review, reflect, revise strategy.

As usual, my leadership team began rather skeptical and annoyed with me as we are short-staffed and a bit exhausted by Covid disruptions over the last couple years (which I then pointed out was because I as the strategic leader had completely missed Covid coming and how it would impact our brand new program---we were highly adaptive once it hit which was awesome, yet at a cost that now had exhausted our team and made us vulnerable to deterioration, burn-out, etc.). I told them that is what happens when only 1 person is in charge of strategy---we miss more things because of our blind spots. Leadership teams make it much more likely we will cover each-other's blind spots by challenging each other and digging deeply into where we need to go.

I had each leader volunteer to lead one step in the strategy process---and, as usual, they performed beyond my expectations (I coached each of them, yet they made the steps their own) and we now have developed a strategy that has changed the way we think and work together already.

So, I have now coached, coaxed, guided, persuaded, nudged, pulled, pushed and driven my leadership team to outperform me in strategy which is a truly rewarding and remarkable experience.

I can say with utter confidence now that the program no longer needs me.

As conveyed in these personal reflections, the two of us believe that the complex challenges facing contemporary heath care systems in the United States (and elsewhere in the world) require that we "not go it alone." Navigating and learning on a warped place requires diverse perspectives. Living on a dancing landscape requires shared support and safety. Understanding is unlikely to take place in an isolated professional silo. Neither prediction nor forecasting will be effective when we are sitting alone at our desk--even if we have a computer to assist us. Teamwork becomes the key ingredient in successful working and living in our mid-21st Century world of health care.

Teamwork

The dynamic nature of team-decision-making can be challenging to maintain and reconvene with each emerging challenge found in complex dilemmas. Complexity has a timeframe that is beyond the control of the decision-makers. It requires teams to engage repeatedly over a span of time, rather than simply a single node of decision. Healthcare is highly complex yet lacks teamwork---so in the polarity of individualism and teamwork, it is distorted too much in favor of individualism, particularly within the physician and leadership cultures.

What does all of this mean? It means too much individual autonomy. One of us usually offers a joke to point this out to doctors. We need to offer gentle jokes as a way to bypass our defensiveness--because as physicians we highly prize our individual autonomy. Someone saying anything negative about this autonomy can appear as though they are betraying the tribe. Here is the joke:

> If a pilot was given the kind of autonomy surgeons have had historically---then they could decide to fly to Brazil to visit their girlfriend on way to taking a plane full of people from Boston to SF, because "hey, I'm the captain of this plane, I go where I want to go".

That is the extreme of individual autonomy, which becomes tyranny in its most extreme form.

Secrets and Elephants

Too many secrets are often being held among those working in contemporary health care systems. Secrets are a key tool of Patriarchy/ Vertical Hierarchy. They have a purpose, yet if over-done, they become a source of POWER over others. This is how cults get their power, through secrets. You must have secrets to keep the Patriarch/ Cult Leader in power, because they are just as flawed as everyone else, yet making them perfect serves a purpose for the hierarchy. Secrets are not intrinsically bad---yet when over-used they can amplify power and distort things. When we retain secrets and fail to share information with other members of our team or organization, we are likely to fail in our attempt to fully appreciate what is happening all around us.

Given the challenge of secrecy, we propose that we consider a more in-depth dive into individual vs team culture in healthcare with a complexity lens. Why does navigating complexity require teamwork? It is become the issues being confront are often not straight-forward easily addressed problems. Rather, as we mentioned in our first essay (Fish and Bergquist, 2020), the more deeply we dig into an issue we find that it is a multidimensional problem. At an even deeper level we will find underlying dilemmas, polarities and mystery.

When digging deeper, we find that it takes "more minds" to have full picture of what is going on. As in the old Sufi parable, each of blind men touch only part of the elephant and believe that they “know” all of the parameters of the object they are touching. Only when they come together and “compare notes” do they discover that they are touching an elephant. There is a parallel African proverb: "it takes a village to eat the elephant". North Americans might say "a journey across the Grand Canyon begins with a single step. A leap of faith at the edge ends at the bottom, not the other side" We will not navigate complexity well in healthcare until we shift toward teamwork in a meaningful way.

Curiosity and Polarities

Curiosity keeps the door open to learning no matter what the situation. If we can remain curious, then we maintain presence, awareness no matter what is going on. If we remain curious when our spouse is angry about something we have done, then we don't fight, we bond and grow together. Although curiosity may have killed the cat, we believe curiosity is the essential first approach to addressing conflicting issues (polarities).

As we noted in our previous essay (Fish and Bergquist, 2022), polarities are best resolved by remaining engaged with each side of the polarity until we fully appreciate its potential validity and benefit. Only then do we move to the negative side of this polarity. If we move too soon to the negative side and abandon our curiosity regarding each polarity, then we move prematurely to preference for one or the other polarities. In the face of polarity, we begin Either/Or thinking. We choose “to play favorites”, become attached to specific limited outcomes, and take up opposition to one of the sides.

We must instead begin with the assumption that both sides of a polarity have their place. It is with a strong sense of curiosity that we engage and seek to appreciate each side of the polarity. Curiosity, in

turn, leads to questioning, reality testing, and the introduction of intuition. When we are curious regarding both sides of a polarity, then we are likely to become curious regarding what the two sides of the polarity might look like when brought together. It is through this “meta-level” curiosity that we are likely to move eventually toward both/and approaches to the polarizing issue we are addressing--and toward a higher order synthesis of the two sides.

The curiosity pathway leads to spiritual growth, while the preference pathway leads to "winning/losing" and suffering. The middle way incorporates both pathways. This middle way, in turn, leads to greater complexity—which requires multiple perspective, guidance and help. Diversity and teamwork are required. It is nearly impossible to navigate a polarity by ourselves.

Barry Johnson (1996) offers us an excellent book on Polarity Management. We have offered several examples of polarity management as engaged in addressing complex health care issues (Fish and Bergquist, 2022). Johnson’s model of polarity is highly clarifying. It is quite profound—and elegant. One of us [JF] is working on how to integrate this into a major polarity we've been struggling with since arriving 8 years ago to create our program. We offer the experience of engaging in polarity-based team building to navigate and leverage the individual-and-team polarity in his program. The following observation by one of us [JF] has been made regarding the use of Johnson’s model:

> I am clearly what Johnson would call a Crusader for Teams. I had an epiphany of sorts about 15 years ago that primary care would never achieve it full capacity until teamwork flourished there. 1 doctor with a different MA each clinic trying to help 1 patient navigate an increasingly complex health system has become futile and full of dysfunction, unnecessary suffering and inadequate resource support to meet the needs being brought there. So, I realized as what was then called Patient Centered Medical Home was being widely discussed, that it would not manifest until true teamwork was resourced and created within primary care. I worked at that for about 5 years at the County system I was working in---made a good deal of progress that was then disrupted severely by EPIC medical record creation that reinforced Silo separations of the staff working in primary care.
>
> When I came to John Muir, I came with a growing sense of determination that I would found this program on teamwork---not just of doctors with doctors, but across the entire community. That work began with partnerships {dyads), then built toward teams, and is now emerging toward a genuine sense of a learning, leading and loving community (my vision for our residency program which has now become a shared vision of everyone in the community---or at least getting there).
>
> So, I have been fanatical about team building, psychological safety, trust, health conflict navigation, team commitment, team accountability (rather than top-down), and all of us taking care of each other so we can take care of others {like the patients).
>
> I can see now that we can use the Polarity matrix to move toward heightened strengths of both individual and team dynamics. I think our community will enjoy that because we are seeing some of the downsides of teams and I wasn't quite sure how to address that without looking like I'm giving up on teams---so this now will make it totally FUN. Thanks for that.

In this brief narrative we find not only the value of understanding and appreciating a specific polarity but also the struggle that inevitably occurs when abandoning for a moment one's own firmly held beliefs and preferences. Polarity management is not for the faint-of-heart!

The Drama of Health Care Polarities

We suggest it is not just curiosity that is required to manage the many polarities arising in contemporary health care systems. Courage is also required to deal with the push toward premature resolution of a health care related polarity—courage that is not found among the faint-of-heart. Courage is required not only because of the requisite setting aside of one's own biases but also because of the powerful forces that arise when confronting the major "life-and-death" polarities that are often found in a health care system.

These forces often take on mythic properties, such as conveyed in movies (such as *Alexander Nevsky*) directed by Sergei Eisenstein, the noted Russian film maker. He first portrays an empty battlefield—often a large flat plain (with nearby hills) or even a frozen lake. Eisenstein then offers a series of brief visual images portraying competing armies on this battlefield. He first provides broad screenshots of both assembled armies. He moves back and forth between images of the whole army attacking from the left and images of the other army attacking from the right. Banners and flags representing the values and vision of each army are sequentially portrayed. The scene then moves to a close-up shot of specific protagonists representing each army. The scene moves from an image of the individual leader or warrior attacking from the left to an image of an opposing leader or warrior attacking from the right side. Then back to the broad screenshots of the two armies racing forward toward one another.

The images shift at an accelerating pace—accompanied by Sergei Prokofiev's pulsating music. Finally, the battle is engaged, with multiple scenes of individual warriors battling one another—and often wounding and killing one another. The music becomes cacophonous. Everything is swirling about. There is confusion and chaos. Finally, there is calm. The battle is over. Dead warriors are portrayed strewn out over the ground in large numbers. Generals are seen wandering through the body-litter battlefield in great despair. Women are often portrayed searching for their dead loved ones. The music conveys solemnity and grief. There is a crescendo and thundering musical conclusion to this enactment of war.

Each side has its own reason for engaging in warfare (protect the "father land", revenge the travesty, reclaim long-lost land, etc.) As viewers of an Eisenstein movie, we are enthralled by the dynamic polarizing action. Using Eisenstein's basic model, we see comparable portrayals of armies in conflict in American and European movies. There are competing leaders, competing images of the "good" and "bad" in all of these movies. Compelling cinematic portraits of conflicts are conveyed that determine the destiny of tribes, communities, nations—even humankind. These dynamic images of polarized forces take on mythic character.

In real life, we find parallel conflicts among competing "armies" of thought, priorities and conviction in the world of health care. Entire systems are at "war" with one another. There are individual leaders, heroes and warriors. There are mounting casualties, and the inevitable grieving of lost opportunities, lost careers and lost sense of purpose and meaning. Silos are competing against silos again and again. Ultimately, no one side ever really "wins" the war. There rarely is real change. Big, frenzied change is enacted on the "battlefield." These are changes that makes no difference ultimately in the distribution of power in the world of health care.

Schizogenesis in Health Care Systems

The myths and dramatic dances of polarities remind us of a systems concept offered by Gregory Bateson (2000)—based on his observation as an anthropologist studying the dynamics of tribes operating in several parts of the world (mostly New Guinea). He wrote of *Schizogenesis*—a term which refers to the tendency for two systems (organizations, tribes, nations) to polarize. They relate to one another in a manner that drives the two systems further apart from one another or that leads to escalation of similar activities in both systems.

One type of schismogensis is called *Complementary*, meaning that as one system goes in one direction, the other system goes in the opposite direction. For instance, as one tribe becomes more belligerent and active, the other tribe becomes more passive and withdrawn. We see this occurring in many health care systems, with the leader becoming more assertive and his employees becoming more compliant. Both parties are colluding in making the leader's assertiveness justifiable and acceptable. This complementary form of polarization tends to be long-lasting, and it is deeply embedded, as a rule, in the culture of an organization.

The second type of schismogentic polarization identified by Bateson is called *Symmetrical*. As one system exhibits higher levels of a specific behavior, the other system will try to match this level. For instance, if one nation builds more rockets, then the rival nation will also have to build more rockets—the classic arms race. In a health care system, this symmetrical dynamic operates when both the leader and the employees tend to become more assertive (or more passively aggressive).

This symmetrical process of polarization is often what we mean by the "vicious circle." It is characterized by exponential growth (the "power law" of contemporary chaos and complexity theorists) and will lead quickly to explosion and collapse. We typically, don't find symmetrical polarization to be long-lasting in organizations. Rather, we are likely to witness escalation, collapse and then a renewal of the symmetrical polarization with new parties being invited to engage in this very dangerous and destructive dance.

One of us [WB] had the opportunity to spend time with Bateson and heard him speak of the great power that arises from schizogenetic polarization. It gains its power from the mythic properties associated with "reason[s]" for the polarization, conflict and accompanying judgements regarding the "virtue" and "rightness" of each tribe's perspectives. As in the case of Eisenstein's portrayal of the battle for one's "homeland," the schizogenetic polarization moves well beyond the realm of problem or even dilemma. Much as in the case of an avalanche or what complexity theorists call a "strange attractor," resources are recruited to bolster each side of the split. A form of nuclear proliferation is engaged. There is no resolution because there is no communication between the two side. The conflict is ongoing. Wars are repeatedly waged. Lessons are rarely learned by either party. The death of ideals, visions and people is inevitable.

The challenge is great in addressing a schizogenetic split within a health care system. It requires that multiple polarities are managed and that the diverse perspectives found in a well-functioning team be fully deployed. The pull toward one side or the other will be great. It is hard to be reflective and appreciative of both sides as they charge against one another on a frozen battlefield. Difficult though it

might be, there is no other option than to advocate for slow thinking (Kahneman, 2011) and to facilitate the engaged of an appreciative perspective (Bergquist, 2003) regarding the valid perspectives and values to be found among those dressed for battle on both sides.

Conclusions

It strikes us that people's yearning for certainty makes complexity management particularly challenging. People will choose a bad certain reality over a complex, uncertain more positive one. We saw that very clearly with Covid-19. Even "herd" oriented folks refused vaccinations for political reasons it seems, even-though the hero they were following got his own vaccines promptly and saw rapid vaccine production as a great victory for his administration. That was a very odd twist to the tale. The hero had battered the scientists so much that I think that message penetrated more firmly than his own self-worshiping "I made the vaccine happen faster" narrative.

Unfortunately, leaders in Health Care can convert "traditionalists" and "skeptics"/ "pragmatists" into Opponents, Rivals, and Enemies. This is either/or thinking taking over. We must instead invite skepticism—we must encourage it—for skeptics are often highly pragmatic folks who know exactly how to make things work as long as their concerns are listened to and incorporated into the design, etc. All too often we tend to push them out, dismiss their concerns, etc. So-Called “visionary” health care leaders all too often ridicule skeptics—thus driving them underground to become saboteurs in many instances.

It is to safe, supportive teamwork that we must turn. We must be open to new ideas and new perspectives on the complex world of health care in which we are working. Such support, safety and openness is not easy to find or maintain in an anxiety-filled world that is swirling with VUCA-Plus challenges. Yet, we must find the courage to engage with other people in the midst of these challenging conditions. We must be curious precisely at the moment when we might wish instead to hide in a corner, silo – or cave. Perhaps there are some tools and strategies that help us with our courage and curiosity. We introduced one of these strategies (polarity management) in an earlier essay (Fish and Bergquist, 2022) and expanded on it in this essay. We also provided several tools and strategies in other essays in this series (such as the preliminary steps suggested by David Snowden and Ralph Stacey, as well as Miller and Page in working in and with complex, adaptive systems).

In the fourth and final essay in this series we provide several additional tools and strategies—and relate them to concepts of effective leadership that is needed when navigating the dancing landscape of contemporary health care. We are fortunate to have received several comments regarding the use of concepts, tools and strategies we introduced in our previous essays. We include these comments and our reflections on these comments in this final essay. As we have repeatedly noted, it is great to get “a little help from our friends (and teammates).”

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