



Health System Resilience—The Foundation For Pandemic Preparedness

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“Almost every problem confronting our society is a result of the fact that our public-policy makers are doing the wrong things and are trying to do them righter.”

—Russell Ackoff <<https://thesystemsthinker.com/transforming-the-systems-movement/>>

The COVID-19 pandemic has uncovered many systemic failures of our [overall governance arrangements](https://dx.doi.org/10.7189/jogh.12.05021) <<https://dx.doi.org/10.7189/jogh.12.05021>> and in particular those regarding [health systems and policies](https://www.tandfonline.com/toc/khsr20/9/2) <<https://www.tandfonline.com/toc/khsr20/9/2>>. In many cases, governments have been shown to be unable or unwilling to effectively respond, adapt, evolve, and learn when faced with rapidly emerging challenges. At the core, they have failed to see that health systems are nested in society’s larger governance framework and thus are intertwined with social and economic policies. From a systems perspective—understanding phenomena as [interconnected and interdependent](https://global.oup.com/academic/product/at-home-in-the-universe-9780195111309?cc=us&lang=en&) <<https://global.oup.com/academic/product/at-home-in-the-universe-9780195111309?cc=us&lang=en&>>—our governance arrangements lack an important build-in property: resilience, which substantially affects societal function and responsiveness.

Resilience

The concept of resilience first emerged in [ecology](https://doi.org/10.1016/j.socscimed.2019.04.020) <<https://doi.org/10.1016/j.socscimed.2019.04.020>> to describe the phenomenon of perturbations or disruptions of complex adaptive ecological systems causing instabilities that can flip them into an [alternative stable state](https://dx.doi.org/10.5751/ES-02029-120123) <<https://dx.doi.org/10.5751/ES-02029-120123>>. More recently, definitions have included an understanding of resiliency as “[the ability to bounce back](https://dx.doi.org/10.15171/ijhpm.2018.06)” <<https://dx.doi.org/10.15171/ijhpm.2018.06>>; however, the notion of “[bouncing back](https://dx.doi.org/10.15171/ijhpm.2017.36)” <<https://dx.doi.org/10.15171/ijhpm.2017.36>> does not fit well with the [emergent dynamics of complex adaptive systems](https://dx.doi.org/10.1111/jep.13045) <<https://dx.doi.org/10.1111/jep.13045>>. Complex adaptive systems are wholes that, rather than bouncing back, “[move forward](https://doi.org/10.1016/j.gloenvcha.2006.02.004)” <<https://doi.org/10.1016/j.gloenvcha.2006.02.004>>, or put differently, they “flip over” to an *a priori* unpredictable “new” stable state. Moving forward in a desired direction in an environment of inevitable instability requires anticipation as much as the ability to respond in an adaptive rather than categorical fashion.

Resilience Of Organizations

The notion of resilience has been embraced by organizational researchers. They describe organizational resilience as the capacity of all stakeholders to cope with crises so that they can maintain (or improve) its core functions and reorganize themselves to meet the changing circumstances in real time. Strengthening organizational resilience therefore must span the entire scale [from the individual, to community, and to society as a whole](https://dx.doi.org/10.5751/ES-09088-210444) <<https://dx.doi.org/10.5751/ES-09088-210444>>.

Resilience: A Built-In Property Of Health System Organizations

We build our organizations and institutions with the intention to achieve a given purpose. As such, they are socially constructed systems that achieve exactly those outcomes that we build into their [design](https://dx.doi.org/10.1097/HCM.000000000000284) <<https://dx.doi.org/10.1097/HCM.000000000000284>>. Hence, we need to design our health systems with an *a priori* focus on “resilience” to ensure their adaptability, which in turn ensures their [dynamic](https://dx.doi.org/10.1136/bmj.j2323) <<https://dx.doi.org/10.1136/bmj.j2323>> [stability](https://dx.doi.org/10.1016/s0140-6736(15)60755-3) <[https://dx.doi.org/10.1016/s0140-6736\(15\)60755-3](https://dx.doi.org/10.1016/s0140-6736(15)60755-3)>. In other words, resilience cannot merely be bolted onto existing organizational structures and [dynamic pathways at a later stage](https://www.sciencedirect.com/science/article/abs/pii/S014971890400071) <<https://www.sciencedirect.com/science/article/abs/pii/S014971890400071>>. Health systems hence must be understood as an embedded part within our wider societal system and its dynamics. It must be [appreciated that the resilience of the health system](https://dx.doi.org/10.1016/j.socscimed.2019.04.020) <<https://dx.doi.org/10.1016/j.socscimed.2019.04.020>> is closely entwined with the [economy, the social system, the environment, and so forth](https://www.who.int/publications/i/item/9789240029682) <<https://www.who.int/publications/i/item/9789240029682>>.

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Building Resilience Into Health Systems

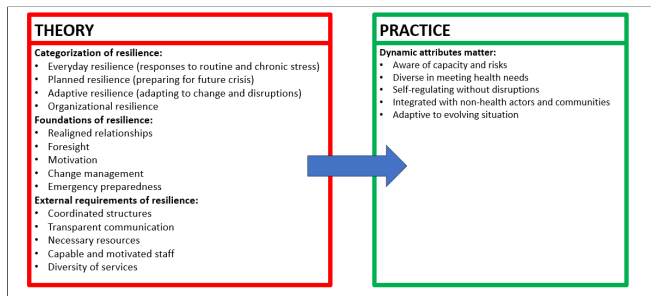
The starting point to building a resilient health system is an awareness that the old mental models, in particular their narrow administrative hospitalcentric focus on silos of diseases, are no longer fit for purpose. Change requires an [explicit change of the mental model](https://dx.doi.org/10.1207/S15327000EM0304_5) <https://dx.doi.org/10.1207/S15327000EM0304_5>, as otherwise the old ones that have driven the system thus far will maintain the status quo or worse deteriorate it further. The success of a new mental model depends on all stakeholders to embrace the understanding that the health system is an [interconnected and interdependent system within the larger societal system](https://dx.doi.org/10.1061/NHREFO.NHENG-1471) <https://dx.doi.org/10.1061/NHREFO.NHENG-1471>.

Key Characteristics Of A Resilient "Complex Adaptive" Organization

[Resilient "complex adaptive" organizations](https://dx.doi.org/10.15171/jihpm.2018.06) <https://dx.doi.org/10.15171/jihpm.2018.06> have a number of key characteristics (see exhibit 1). First, they have a clearly defined purpose, [which is intersubjectively known and understood by all its stakeholders](https://mitpress.mit.edu/9780262581622/between-facts-and-norms/) <https://mitpress.mit.edu/9780262581622/between-facts-and-norms/>. This is because organizational purpose conveys why the organization exists as well as determines the basis for what specific activities ought to be undertaken. Leaders in "complex adaptive" organizations (including health systems) maintain everyone's focus on the purpose and provide the necessary support so that the work that needs to be done in an adaptive fashion [occurs in a seamless fashion within and across the organization's various organizational levels](https://link.springer.com/book/10.1007/978-3-319-64605-3) <https://link.springer.com/book/10.1007/978-3-319-64605-3>. This provides a key level of necessary resilience for the organization to manage crisis as much as everyday operational tasks, which are constantly challenged by internal and external perturbations.

In addition, organizational resilience requires [interorganizational diversity](https://www.mckinsey.com/featured-insights/diversity-and-inclusion/diversity-wins-how-inclusion-matters#/) <https://www.mckinsey.com/featured-insights/diversity-and-inclusion/diversity-wins-how-inclusion-matters#/>. Health system members, [rather than being told what to do](https://www.tandfonline.com/doi/full/10.1080/17441692.2023.2212750) <https://www.tandfonline.com/doi/full/10.1080/17441692.2023.2212750>, must be allowed and encouraged to develop multiple ways to respond to the inevitable systemic perturbations that affect their work—it is the key to achieving system stability. The [more diverse](https://dx.doi.org/10.1038/s41893-022-01048-7) <https://dx.doi.org/10.1038/s41893-022-01048-7> and the more dynamic an [organizational system](https://www.nature.com/articles/35012234#relevant-content-header) <https://www.nature.com/articles/35012234#relevant-content-header> the more will it [remain stable](https://shop.sloanreview.mit.edu/store/the-link-between-diversity-and-resilience) <https://shop.sloanreview.mit.edu/store/the-link-between-diversity-and-resilience> in case of one part failing.

Exhibit 1: Resilient organizations: Theory is necessary but not sufficient for practice



Source: Compiled from: Kruk ME, Ling EJ, Bitton A, Cammett M, Cavanaugh K, Chopra M, et al. [Building resilient health systems: a proposal for a resilience index](https://www.bmj.com/content/357/bmj.j2323) <https://www.bmj.com/content/357/bmj.j2323>. *BMJ*. 2017;357:j2323; Blanchet K, Nam SL, Ramalingam B, Pozo-Martin F. [Governance and capacity to manage resilience of health systems: towards a new conceptual framework](https://www.jihpm.com/article_3341.html) <https://www.jihpm.com/article_3341.html>. *Int J Health Policy Manag*. 2017;6(8):431-5; Grimm PY, Oliver S, Merten S, Han WW, Wyss K. [Enhancing the understanding of resilience in health systems of low- and middle-income countries: a qualitative evidence synthesis](https://www.jihpm.com/article_3999.html) <https://www.jihpm.com/article_3999.html>. *Int J Health Policy Manag*. 2022;11(7):899-911.

Approaching The Building Of Resilient Health Systems

There is no single approach to building resilient complex adaptive health systems. Suggested strategies by the [World Health Organization](https://www.who.int/publications/i/item/WHO-UHL-PHC-SP-2021.01) <https://www.who.int/publications/i/item/WHO-UHL-PHC-SP-2021.01>, the [Organization for Economic Cooperation and Development](https://www.oecd.org/health/ready-for-the-next-crisis-investing-in-health-system-resilience-1e53cf80-en.htm) <https://www.oecd.org/health/ready-for-the-next-crisis-investing-in-health-system-resilience-1e53cf80-en.htm>, and the [European Observatory on Health Systems and Policies](https://www.ncbi.nlm.nih.gov/books/NBK559803/) <https://www.ncbi.nlm.nih.gov/books/NBK559803/> are largely aspirational; however, they do not address a number of key system issues, namely: context, systemic design, and leadership.

Context Matters

[Contextual understanding is paramount](https://www.ncbi.nlm.nih.gov/books/NBK498645/) <https://www.ncbi.nlm.nih.gov/books/NBK498645/> to building resilience and encompasses [multiple domains and stakeholders](https://dx.doi.org/10.1061/NHREFO.NHENG-1471) <https://dx.doi.org/10.1061/NHREFO.NHENG-1471>. Key questions for understanding context include: Is there political will for health system redesign? What are the various environmental and socioeconomic structures that may create obstacles? Is there sufficient infrastructure to support the health service?

A Networkcentric Approach To Health System Design

Building resilience into the health system to withstand the perturbations of the inevitable next pandemic, disaster, or armed conflict requires a [networkcentric approach](https://dx.doi.org/10.1126/science.1111534) <https://dx.doi.org/10.1126/science.1111534>. It entails building a highly dispersed network of primary health care and public health resources that can be accessed as required in the [local context](https://dx.doi.org/10.1126/science.1111534) <https://dx.doi.org/10.1126/science.1111534> to maintain its core functions, rather than relying on a highly [centralized hospital system](https://dx.doi.org/10.1080/23288604.2023.2165429) <https://dx.doi.org/10.1080/23288604.2023.2165429>.

Ensure Diversity

A [resilient complex adaptive health system](https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(21)00029-2/fulltext) <https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(21)00029-2/fulltext> should be sufficiently aware, diversified, self-regulating at the local and regional level,

Build In Redundancies

A resilient health system requires resource “redundancies”—that is, back-up systems that provide ready access to extra beds, operating rooms and consumables, and especially staff beyond the minimum requirements—to run primary care practices or hospitals to ensure stability and quality of health services at times of peak demands or crises. These redundancies must protect staff to prevent [burnout and psychological suffering of staff](https://dx.doi.org/10.1080/23288604.2023.2165429) <https://dx.doi.org/10.1080/23288604.2023.2165429>, maintain staff skills and staff diversity to ensure their adaptive capacity and ability to learn under [rapidly](https://dx.doi.org/10.1061/NHREFO.NHENG-1471) [changing](https://dx.doi.org/10.1061/NHREFO.NHENG-1471) <https://dx.doi.org/10.1186/s12913-023-09182-4> circumstances, as well as secure necessary financial and physical resources. The lack of redundancies in the health system was dramatically exposed during the COVID-19 pandemic.

Leadership

Leaders must be committed to the principles of [adaptive leadership](https://www.hup.harvard.edu/catalog.php?isbn=9780674518582) <https://www.hup.harvard.edu/catalog.php?isbn=9780674518582> and a governance approach that promotes flexibility, nurtures the development of [social networks and collaborations](https://dx.doi.org/10.15171/ijhpm.2018.06) <https://dx.doi.org/10.15171/ijhpm.2018.06>, and focuses on what [pragmatically matters](https://dx.doi.org/10.31128/AJGP-04-19-4907) <https://dx.doi.org/10.31128/AJGP-04-19-4907> (that is, does staff deliver the needed services of those in need).

Conclusions

Resilience is a build-in property of a complex adaptive system such as a health system. Thus, a resilient complex-adaptive health system will, by the end of a crisis, not only function differently but [function better](https://dx.doi.org/10.1016/S0140-6736(15)60755-3) [https://dx.doi.org/10.1016/S0140-6736\(15\)60755-3](https://dx.doi.org/10.1016/S0140-6736(15)60755-3) as it has [transformed](https://dx.doi.org/10.1061/NHREFO.NHENG-1471) <https://dx.doi.org/10.1061/NHREFO.NHENG-1471> as a whole to [meet](https://dx.doi.org/10.1007/s41471-022-00132-0) <https://dx.doi.org/10.1007/s41471-022-00132-0> new circumstances and to deliver upon the [various health system goals](https://www.who.int/publications/i/item/9789240042476) <https://www.who.int/publications/i/item/9789240042476>. In this light, our article aims to stimulate a broad discourse amongst all stakeholders to reflect upon, and conduct research into, the problems of the current system rather than suggesting specific ways forward, since solutions to any problem need to arise from within local contexts. Yet, we argue that this reflection should begin, first and foremost, with a change in our mental frame. In particular, a mental framework that identifies and maintains the patient’s/person’s health needs (not wants nor diseases) as the crucial focal point for systemwide rebuilding efforts. If rebuilding is done toward achieving resilient complex-adaptive systems, then the overall health of a community/state/nation will be reflected in its prosperity.