

Systems Thinking Is Vital to Long-Term Equitable COVID-19 Response and Recovery in Wisconsin

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For some, COVID-19 served as yet another crisis to illuminate the deep structural inequities in our society. Black, Indigenous, People of Color (BIPOC) individuals, those in rural communities, and people experiencing homelessness experienced disproportionate harm—including death—from COVID-19. Deep analyses exist to guide experts who focus on specific communities. Here we champion tools that can be applied in times of calm and crisis to name longstanding structural deficiencies and intervene on root causes. The issue of equity in COVID-19 response and recovery involves multiple, interconnected systems, each with their own rules, histories, and invested stakeholders. The public health system does not stand isolated from health, economic, and civil systems, as emphasized by colleagues naming the triple threat of health, civic engage-

ment, and economic opportunities faced by BIPOC individuals.¹ Many communities and individuals experience intersectional disparities and find themselves at a disadvantage for COVID-19 response and recovery due to mul-

to examine the role of deeply embedded beliefs or mental models, systems structures, and patterns of behavior that live below the surface of events. Feedback loops are also extremely useful to name patterns that must be broken. An

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iple factors. This complexity often can get lost in attempts to make sense of problems and select effective solutions. We undertook a systems analysis to learn from the response and recovery in Wisconsin and share takeaways in this commentary.

A SYSTEMS THINKING APPROACH

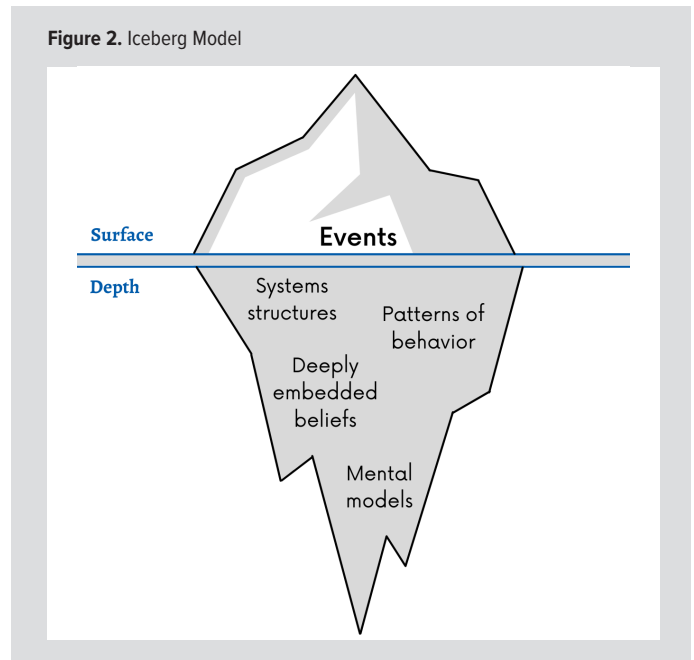
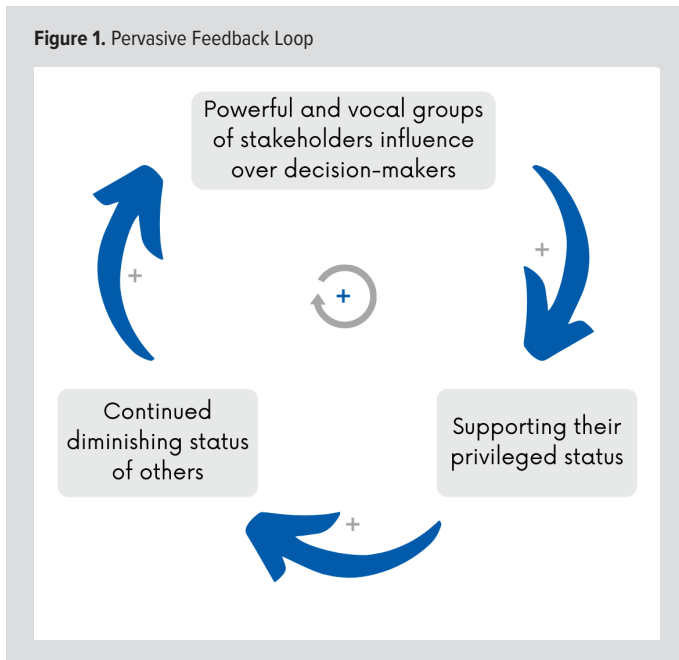
Systems thinking takes into account structures, patterns of interaction, events, and organizational dynamics. Such an approach helps actors—be they individuals, institutions, or communities—to anticipate rather than react to events and better prepare for emerging challenges.² It emphasizes looking at a whole rather than parts, stressing the role of interconnectedness.^{3,4} Systems thinking provides public health professionals with a “toolbox” that equips them with the understanding of how to first prevent and then tackle these issues.⁵ Diagnostic tools include the Iceberg Model, which can be used

example of a pervasive feedback loop (Figure 1) is “Success to the Successful,” in which powerful and vocal groups of stakeholders have more and more influence over decision-makers, further supporting their privileged status and continuing to diminish the status of others.⁶ Responsive tools include ABLe Change⁷ and the Water of Systems Change.⁸ We will apply the latter, which highlights three different levels of the conditions holding a problem in place: structural, relational, and transformational, and the various conditions at play, including policies, practices, relationships, and mental models. Some tools are both diagnostic and responsive. Process mapping, which allows public health professionals to comprehend, examine, and enhance processes in complex systems, has been shown to considerably improve the function of health systems in the event of a public health emergency.⁹

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APPLYING SYSTEMS THINKING TO EMERGENCIES

Public health emergencies are “wicked problems” with no simple solution and include many actors who interact and depend on one another to respond effectively. Preexisting relationships, collaboration, and communication plans make emergency response more effective. Systems thinking tools, such as the Iceberg Model (Figure 2), have been used successfully to illuminate the systemic barriers that are the root causes of events, seen repeatedly during different crises. Diagnosing complex mental models that influence policies and practices ensures that lessons gleaned from cross-sectoral collaboration, information sharing, and capacity building are implemented during responses.⁵ In other words, all the collaborating in the world is insufficient without a comprehensive understanding of structural causes. Studies have shown the benefits of systems approach in enhancing preparedness for natural disasters like floods,¹⁰ tsunamis,¹¹ and earthquakes.¹² We join others in the belief that such an approach can also be applied to crises like the COVID-19 pandemic.^{4,13,14}

WHAT SYSTEMS THINKING REVEALS

In the wake of the COVID-19 pandemic, many state and local municipalities struggled with the challenges of mass vaccination across pop-

ulations. Whether partisan vaccine hesitancy, barriers to communication across diverse communities, or technological advancement implementation, one may view vaccination as a logistical challenge in which the seemingly vast differences in particular populations are insurmountable.¹⁵ However, a common theme connects the challenges these populations face posed by this vital task of vaccination: systematic disinvestment in health care-dependent infrastructure.¹⁶

Let’s take technology as an example. Many public health leaders and agencies turned to technology as the answer to the logistical challenges a mass vaccination rollout poses for messaging and vaccine appointment scheduling.¹⁷ The reliance on technology served as a barrier to those experiencing the most burden of the disease—socioeconomically or geographically underserved communities.¹⁸ We can see this in rural communities in particular, which have the added barrier of limited access to broadband internet and public health infrastructure based on years of limited funding to small and local health care providers.¹⁹ The unhoused also represent a microcosm of the worst effects the pandemic can have on an underserved population, as these people face the added hurdle of being disconnected from typical means of communication and access to care.²⁰ When health care is viewed as a com-

modity, not a collective right, it is easy to see how divestment results.

These disparities are even further pronounced among racial minorities who have suffered disproportionately throughout the pandemic in morbidity and mortality.²¹ The impact of the pandemic on Black and Brown communities extends far beyond COVID-19, resurfacing wounds caused by centuries-long exploitation, mistreatment, or disregard by the medical community.²² From historic medical experimentation on Black people to current socioeconomic policies and barriers that perpetuate lack of public health and medical investment in these communities and mistrust in medical institutions, these factors result in a reinforcing feedback loop.²³ Longstanding disinvestment serves as proof that the government either is actively harming or does not care enough about BIPOC communities.²⁴

AN EQUITABLE RESPONSE IN CONTEXT

The COVID-19 pandemic spurred the rapid development of vaccines—a momentous and unprecedented accomplishment resulting from significant financial investment and urgency. When vaccine distribution began, COVID-19 had already had a disproportionate impact on the health of BIPOC individuals, with increased amounts of deaths and hospitalizations com-

pared to White individuals.²⁵ Within Wisconsin, as we write in September 2021, over 6 million vaccine doses have been administered thus far, with Black and Indigenous individuals receiving the vaccine at significantly lower rates.^{26,27}

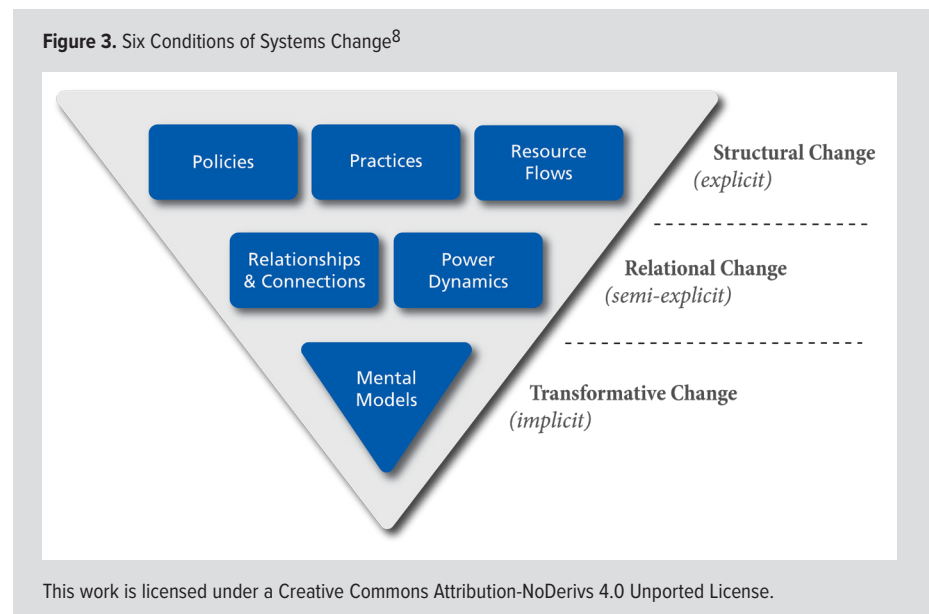
Vaccine Hesitancy

Despite their effectiveness and safety, many people remain skeptical and hesitant to receive COVID-19 vaccines in the United States. Systemic contributions to hesitancy include “inequitable distribution of doses, failure to place clinics in sites accessible to BIPOC communities, and underinvestment in health care providers and services in BIPOC communities.”²⁴ Learning from the “Three Cs” framework,²⁸ vaccine hesitancy results from a decision-making process involving a constellation of factors: complacency, convenience, and confidence. For this pandemic, lack of confidence was amplified due to longstanding distrust within BIPOC communities, as described above. Black people are understandably wary of whether vaccines are truly safe or if the history of being used as the subjects of experiments is repeating itself, since contemporary experiences of politics and medical care do not allay such fears.²⁹

Convenience also played a role in COVID-19 vaccination efforts and importantly served to reinforce existing distrust. Early on, vaccine distribution focused on exigency—using major drug stores and grocery chains that offered maximum reach and assured access to infrastructure for proper storage of vaccines. It was well-documented that these locations were not as accessible for many BIPOC communities, due to food and pharmacy deserts.³⁰ The combination of lack of convenience and confidence results in a feedback loop, exacerbating distrust within communities and further perpetuating inequity.

Early Distribution Priorities

COVID-19 vaccine distribution was further complicated by the diverse priorities, goals, and needs of the stakeholders involved. The classic “Tragedy of the Commons” paradigm emerged as stakeholders with different goals and priorities competed for a limited resource.⁶ Decision-makers who decide where the vaccine goes, how much vaccine is allocated, and who is



eligible are influenced by a variety of factors. Influence from advocacy groups and corporate interests further complicated these decisions. The pervasive Success to the Successful feedback loop emerges, as more powerful and vocal groups of stakeholders have more influence over decision-makers, further supporting their privileged status.⁶ The lack of an existing clear plan for vaccine prioritization and eligibility, as well as poor communication, created public confusion and slowed vaccine distribution in the state early on.³¹ By summer 2021, however, systems thinking approaches that emphasize trust and accessibility resulted in increased uptake, a step in the right direction to address inequities in vaccination rates.³²

RECOMMENDATIONS

“The world as we know it is built on a story. To be a change agent is, first, to disrupt the existing story...and second, to tell a new story so that people have a place to go.”³³

A systems thinking approach to improve health equity in COVID-19 response and recovery offers the opportunity for lasting, transformative change—change that is essential for the endemic phase of COVID-19, and to prepare for the next public health emergency. We offer recommendations using the “Six Conditions of Systems Change” (Figure 3) framework considering the impact of interventions on structural, relational, and transformative levels.⁸

Structural Change

Reinvesting in the economy and infrastructure in communities creates lasting structural change that fosters health equity. For example, the Reconnecting Communities Act³⁴ includes funding (albeit insufficient) to remove highways that cut through Black and economically disadvantaged areas. Literal physical barriers to connectedness impede easy access to anchor institutions that can offer vaccinations, such as local schools, churches, or community centers.

Broadband infrastructure will offer a different sense of community and connectedness. Funding is included in both federal and Wisconsin budgets to ensure home internet access.³⁵ The federal legislation endeavors to end “digital redlining” and create a permanent program to help more low-income households access the internet.³⁶ While the internet can be used to access false information, which has exploded online, it can also be used for telemedicine, education, connecting with one’s familial and social network, and signing up for vaccination appointments.

Relational and Transformative Change

Relational and transformative change are deeply intertwined. Transformational change happens when the stories we tell ourselves and our community change. Whether one believes the new stories or not is driven by relationships. Lasting change is possible when we undo the implicit mental models that drive behavior; in

other words, discrediting the current story and telling a new one. One such ingrained story is individual responsibility—especially with health issues; we collectively as Americans believe that a person is at fault if they get sick, and the flipside of prioritizing patient autonomy over community consciousness.³⁷ This story is perpetuated in data reports and media coverage.³⁸ Telling the story that personal health care is a privilege makes public health impossible to sell.

Additionally, the story of vaccination is politicized, and our historic and deep-seated distrust in government has been weaponized, making vaccine hesitancy and refusal prominent mental models and badges of honor for some. The sociologist Brooke Harrington reminds us that the most prominent relevant systems at play are the informal economy of an individual's social capital.³⁹ In other words, our “reference groups” are those we listen to, those who can lend us money, those who have our back and step in to help with everyday tasks, and those who share our values. It has been recommended that messaging should focus on autonomy and personal freedom.^{40,41} For example, the message could be framed to get vaccinated so you can attend a concert or an indoor sports event. Such an approach will no doubt work in the short run, but it perpetuates the story that we should act for ourselves. In the long run, we need a story of collective concern.

FINAL THOUGHTS

A noted truism is that systems are designed to achieve the results they get. If we want equity in COVID-19 response and recovery, we need to design systems to achieve equity. System thinking tools help us imagine lasting change and commit to continuously implement policies and procedures to achieve that change. While it is extremely challenging to change the story that undergirds the American psyche, an equitable future depends on it.

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could not be used with other techniques in the past) and cellular therapy labs for chimeric antigen receptor (CAR) T-cell therapy, which has been the subject of numerous MCW clinical trials in the past several years.⁴

Additionally, the 130,000 to 150,000 square-foot Cancer Research Building will maximize state-of-the-art and progressive research practices across the entire spectrum of disciplines including basic, translational, clinical, population science, and policy. Further, by leveraging the Cancer Center's team science approach, the new building will provide tremendous opportunities to enhance efficiencies and collaboration within scientific neighborhoods that address the MCW Cancer Center's strategic priorities. The Cancer Center's "Integrated Disease-Oriented Teams" (iDOT) – comprising basic, translational, and clinical cancer researchers/physicians who are involved in improving care delivery – will

benefit from expanded collaborative space to develop research from the bench to the bedside to the community – and back.

The development of the Cancer Research Building underscores MCW's commitment to diagnosing and treating rare cancers, which affect fewer than 40,000 individuals annually in the US – although as a group, they comprise slightly more than 25% of all cancers. And because rates in children are very low, all children's cancers are considered "rare." Rare cancers cause about a quarter of all cancer deaths each year.⁵ The new building will leverage key scientific investments to accelerate discoveries in metabolomics, structural biology, immuno-oncology, precision oncology, and rare cancers, and cancer disparities – for the eradication of cancer for all.

Groundbreaking for MCW's new Cancer Research Building is expected in summer 2022.

I anticipate sharing progress on the new Cancer Research Building in future Dean's columns.

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