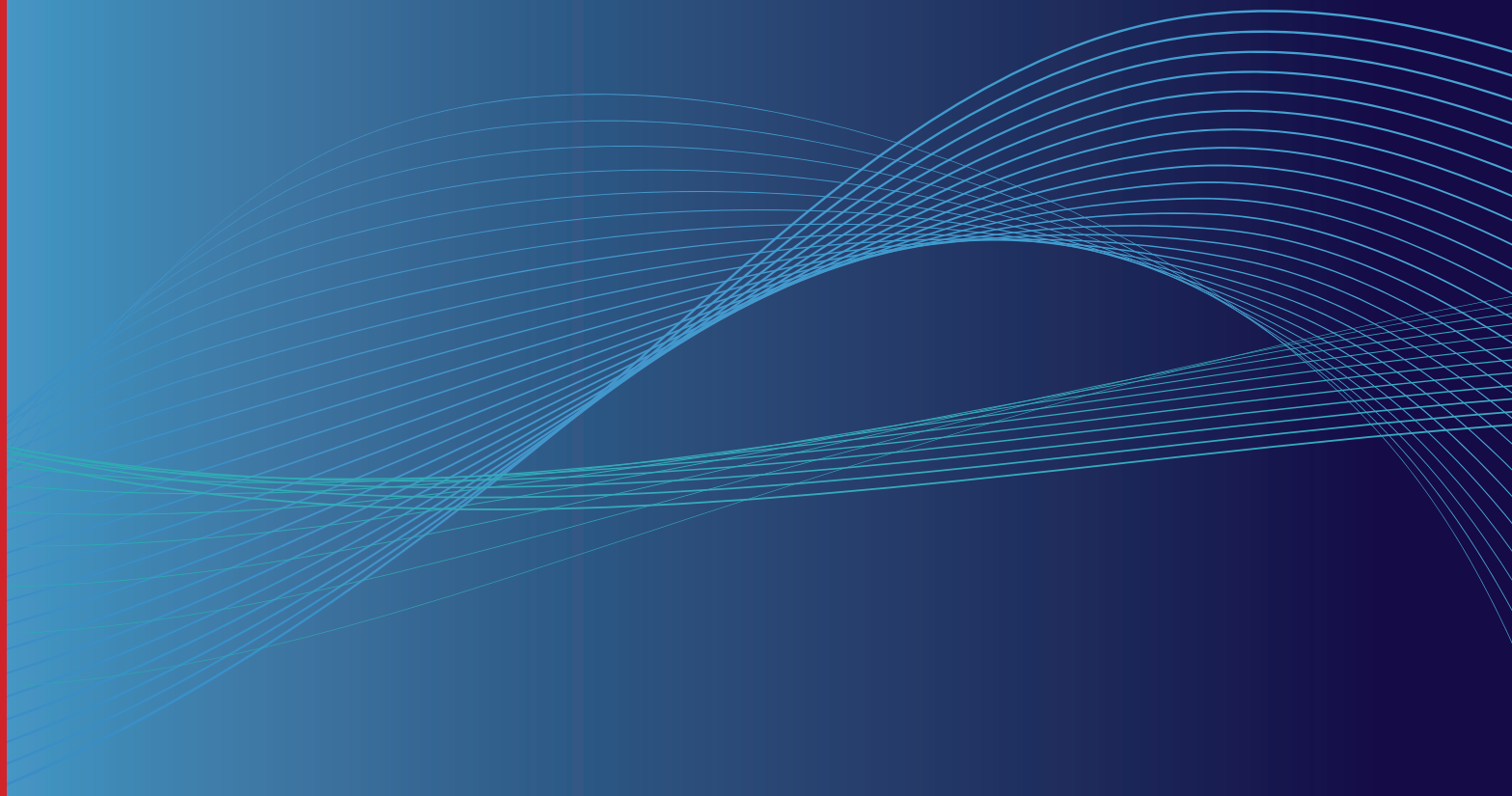
BENDING THE CURVE:

Understanding How Leadership Affects Pandemic Responses

A Proposed Research Project



CONCEPT DOCUMENT | APRIL 2021

PREFACE

The world is witnessing enormous variation in how well COVID-19 is being controlled across nations, states/provinces, and localities. Assuming that COVID-19 will not be the last major pandemic of this century, it is critical that we understand the full range of factors contributing to successful and failed responses to the current crisis. In particular, we are interested in the role played by public sector leaders.

Epidemiology provides a solid base of knowledge to guide good public health investigation and management of pandemics, as evident in the containment of SARS1, bird flu and Ebola – all of which had pandemic potential. Effective public health responses to crises fits a classic understanding of management as a process guided by clear and agreed-upon goals, a plan for achieving those goals, and a group of people with defined responsibilities for implementing the plan. But the successful response to a crisis also and critically requires public leadership at multiple levels.

Key elements of needed public leadership practices include the empathetic delivery of clear, consistent, honest communications; and building the trust necessary to help people understand what is really happening so they can participate effectively in strategic actions. It includes creating political consensus, and mobilizing critical resources and collective action in both the public and private sectors; and it includes the capacity to inspire and motivate people to sacrifice their self-interests to serve a wider and longer-term common interest. Public leaders need the capacity to convene and to facilitate collaboration when there are conflicting goals and interests, such as maximizing public health versus maintaining a robust economy. Leadership is different from management. In short, leadership is much more varied, nuanced and contextual in its manifestations than is management. We hypothesize that these and other good leadership practices provide necessary synergy with effective management of a public health crisis, and may be significant factors that help explain the difference between early epidemic containment versus its rapid spread.

The application of scientific methods has great life-saving potential if the leadership practices known to contribute to COVID-19 mitigation success or failure are known and quantified, are built into leadership training programs for public and public health officials, and become expected or required competencies of elected officials. After all, COVID-19 is not the last outbreak of this century with the potential to cause a pandemic, and we need to do better next time.

BENDING THE CURVE:

Understanding How Leadership Affects Pandemic Responses

A research project focused on incorporating quantifiable leadership variables into pandemic prediction models so as to save lives

Concept Developers: *Allan Wallis, PhD; Brian Williams, PhD; David Olds, PhD; Carl Larson, PhD; Kathy Kennedy, DrPH, MA; Darrin Hicks, PhD; Reuben Granich, MD, MPH; Victor Dukay, PhD, MBA*

When the world is struggling to contain a global health threat such as the current coronavirus pandemic, computer models can help decision-makers understand the behavior of the invading pathogen. Models are also valuable tools for comparing alternative responses to the pandemic by various governments and for predicting future challenges they may face. But models are only accurate if they take into consideration all of the key factors affecting what they are trying to measure.

A group of epidemiological modelers, public health experts and leadership scholars have come together to explore how the concept of *leadership* during a pandemic affects the lives of people in positive or negative ways. We believe that leadership is the act of creating, directing, and sustaining collective energy focused on a goal or outcome. In this sense, leadership is a set of actions and practices. We hypothesize that countries, states and cities that have strong and effective public sector leadership are experiencing reduced Covid-19 infection rates, reduced use of medical resources and reduced death rates.

Consequently, they are also able to safely and more quickly resume economic and social activities. We believe that leaders need to become aware of the impacts of their practices and actions and that existing and future pandemic models should incorporate *leadership* as an additional quantifiable factor.

This concept paper outlines in general terms how we propose to test our hypothesis. We also want to investigate whether ineffective leadership results in more negative outcomes such as higher rates of infections and deaths and slower economic recovery. We intend to test this hypothesis with proven social science research methods aimed at advancing our understanding of what constitutes effective leadership in response to pandemics and at improving the precision of predictive pandemic models. We hope that leaders and their teams faced with ongoing and future pandemics will benefit from our findings.

Although we believe the methods described here can be applied to any catastrophic emergency, this discussion focuses primarily on the current COVID-19 pandemic.

Our Working Hypothesis

Public sector leadership has a significant impact on the effectiveness of efforts to mitigate negative outcomes of the Covid-19 pandemic.

This Proposal-Phase 1

What we want to do

Identify, understand and quantify the leadership practices and behaviors that improve or weaken efforts to mitigate pandemic outcomes.

How we will do it

Compare global leadership practices and behaviors—at the national, state/provincial, and municipal levels—in which pandemic outcomes vary widely.

Why this is important

The knowledge that comes from this research will assist current and future leaders in their efforts to manage pandemics more effectively so as to reduce transmission rates, deaths and balance the values of public health with economic vitality.

Long Term Goals-Phase 2

The research proposed in Phase 1 identifies critical public sector leadership practices and behaviors in response to the Covid-19 pandemic. Our long term goals are to:

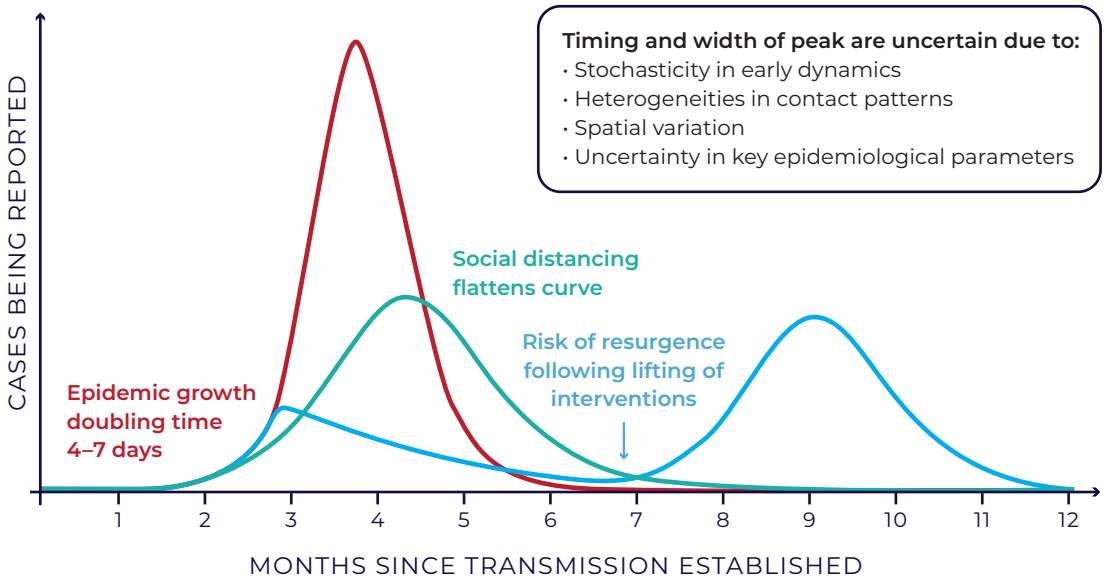
- Incorporate quantifiable public sector leadership variables into current and future pandemic models in order to improve the accuracy of their predictions.
- Provide decision-makers with a concrete way of seeing how alternative behaviors and practices can affect outcomes in mitigating health crises.

Goal: Bending the Curve

Epidemic and pandemic modelling can help inform the containment of a disease outbreak or other public health threats. These models generate curves projecting how the pandemic might evolve over time for different kinds and levels of interventions aimed at controlling the spread. They can help elevate social awareness and compel timely action, effectively reducing the rate of infection, geographic reach and, ultimately, death rates. However, the public health scientists who generate such models and show the way forward to containment are not elected officials and generally lack direct authority to mobilize action on a broad and coordinated scale. During an epidemic or a pandemic, both political and public health leaders share the goal of "bending the curve" to mitigate potential harm to the general population, but typically their approaches to reaching this goal differ.

The work of public health officials is guided by empirical investigations built on cumulative knowledge of the demonstrated past effectiveness of different courses of mitigation [see Figure 1]. But their work is characterized by considerable uncertainty, because they are constantly learning about the virus or other pathogenic agents in ways that may alter initial assumptions about such factors as incubation period, duration of infectiousness, most vulnerable populations, whether the virus is mutating, and whether infected individuals can be asymptomatic.

Figure 1. *Illustrative Simulations of a Covid-19 Transmission Model*



"A baseline simulation with case isolation only (red); a simulation with social distancing in place throughout the epidemic, flattening the curve (green), and a simulation with more effective social distancing in place for a limited period only, typically followed by a resurgent epidemic when social distancing is halted (blue). These are not quantitative predictions but robust qualitative illustrations for a range of model choices."

Source: How Will Country-Based Mitigation Measures Influence the Course of the COVID-19 Epidemic, Anderson et al., The Lancet, March 9, 2020. Full text at www.thelancet.com

In contrast, the work of elected officials often involves balancing competing values—for example, maintaining a robust economy versus reducing the rate of infection and the number of deaths—when deciding what mitigation measures to adopt. Whereas public health officials typically would like to see mitigation begin as soon as a serious health threat is identified, elected officials may hesitate while assessing how imminent and significant the pandemic might be before committing resources, alerting the public, and trying to alter behaviors. When political leaders choose a specific course of action, they must speak with authority while also maintaining the flexibility to adjust their actions as new knowledge emerges. Their performance can instill trust and a willingness to act on the part of their citizens, but their words and deeds can also divide and sow confusion.

The research proposed here has two goals:

1 First (phase 1), to identify and understand specific, quantifiable leadership behaviors and practices that improve or worsen pandemic mitigation efforts. Based on this understanding, the goal is to improve the capacity of leaders to respond effectively to pandemics and the challenges of balancing public health needs with maintaining economic vitality.

2 Second (Phase 2), to improve the accuracy of epidemiological modeling by providing a foundation for simulating the effects of specific public sector leadership practices and behaviors on the course of a pandemic. Likewise, to provide public sector leaders with concrete way of seeing (e.g., through predictive modeling) how alternative behaviors and practices can affect outcomes in mitigating health crises and associated economic disruptions.

> "More than 120,000 Americans have now perished from Covid-19, surpassing the total number of U.S. dead during World War I. Had American leaders taken the decisive, early measures that several other nations took when they had exactly the same information the U.S. did, at exactly the same time in their experience of the novel coronavirus, how many of these Covid-19 deaths could have been prevented? ..... the U.S. could have prevented 70% to 99% of its Covid-19 deaths. This has been a needless tragedy."
>
> - Isaac Sebenius and James K. Sebenius *
> *June 19, 2020 - STAT - Boston Globe Media*

** Isaac Sebenius graduated from Harvard College in May 2020 with a degree in molecular and cellular biology. James K. Sebenius is a professor of business administration at Harvard Business School and director of the Harvard Negotiation Project based at Harvard Law School.*

Research Design

Design of phase 1 of the proposed research consists of three components.

1 **Analysis of networks** through which expertise is organized, power is applied, and information is disseminated. The objective here is not simply to describe these networks but to understand how they evolve over the course of responding to a pandemic.

2 **Use of grounded theory** to explore the behaviors of key actors within these networks, including how they use information in decision-making and how their actions change in response to what they learn from the consequences of their own actions—that is, through reflective learning. Grounded theory provides the logic for sampling, specifically through the constant comparison of carefully selected cases.

3 **Analysis of critical decisions** discernible across the cases being analyzed. Principal objectives of this analysis are to identify both effective and ineffective leadership practices and behaviors that affect mitigation of the pandemic, including evidence of reflective learning. *Critical incident* method will be used in developing this component.

Each of these components is briefly described in the following sections of this document.

Networks Analysis

Although the public sector must take the lead in responding to a pandemic, the power to act is broadly distributed across national, state/provincial, and local levels within the public sector as well as across public, private, and nonprofit sectors. Consequently, modeling leadership factors must focus not solely on the behaviors of key actors but more broadly and significantly on their performance within formal and informal networks.

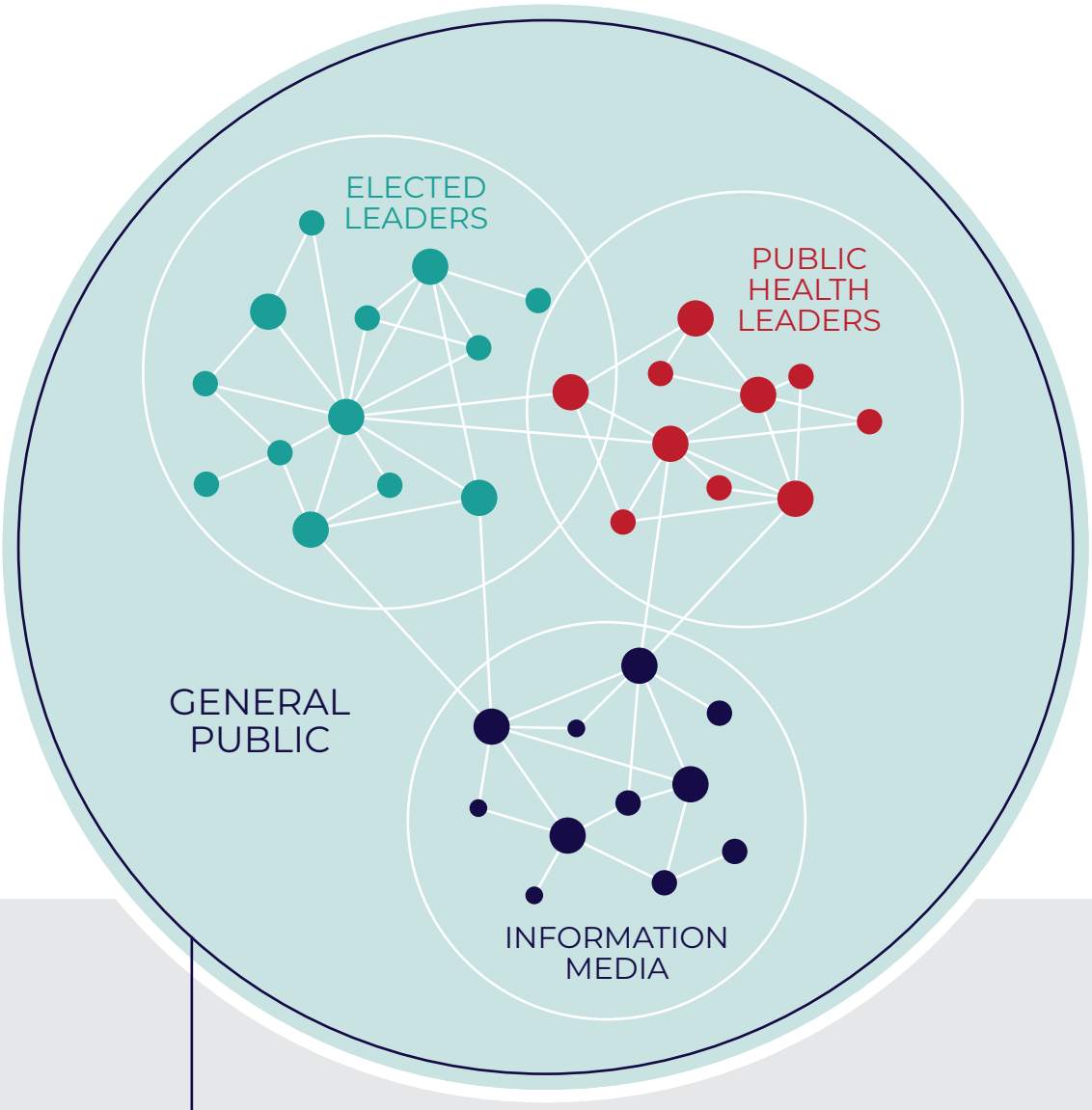
Formal networks are defined by command structures, whereas informal networks are structured through personal and often *ad hoc* relationships. Although authority is embodied in formal networks, the global scope of pandemics makes robust informal networks essential. Because informal networks often lack clear or strong authority, their effectiveness is significantly affected by trust—honesty, openness, consistency, and respect—among actors. Both formal and informal networks with a high degree of trust among key actors are likely to enjoy a freer exchange of information and a willingness to collaborate and share power, because the transactional costs for engaging in collective action are reduced. Networks with high degrees of trust among actors also support greater flexibility in responding to changing circumstances, including new knowledge about the virus that requires changes in models and subsequent mitigation strategies.

Interacting with one another, the networks of public health and elected officials work to influence the behaviors of individual citizens, for-profit organizations and nongovernmental organizations. Essential to the exercise of such influence is a third network whose function is to communicate information. This network includes various media outlets. Actors in this network can operate to enhance the credibility of and compliance with official policies, or they can undermine the policies.

One of the striking differences between the current pandemic and the 1918 Spanish Influenza is the extensive transmission of information through social media. With so many outlets, individuals can choose the sources of news they trust, effectively filtering out other, perhaps more credible, sources. Leaders have learned to use social media effectively and to selectively send messages through favored outlets.

The ultimate goal of individuals in the networks described here is to help foster behavior changes in the general public. If a stay-at-home order is issued, but the response rate is low and quickly tails off, then it will largely be ineffective. Moreover, if different elements of the network are directly or indirectly sending conflicting messages to the public, the ensuing confusion is also likely to make implementation ineffective [see Figure 2].

Figure 2. Diagrammatic Representation of the Networks of Elected Leaders, Public Health Officials, Actors in Information Media, and the General Public



Nodes represent individual actors. Actors are connected with one another through formal and informal ties. Formal ties may represent authority relationships whereas informal ties may be based more on trust and knowledge. Individual actors may also be connected through formal and informal ties with others operating in different domains. The collective effect of all three networks is to alter public behavior so as to mitigate the effects of the virus.

Theoretically, in a system of networks operating to maximize beneficial public health outcomes, the network of public health experts would recognize the impending pandemic early, would make policy recommendations, and engage in ongoing data collection and analysis to provide a basis for possible policy course corrections. In turn, actors in the leadership network would interact at a high level with experts in the public health network to shape timely policies and would ensure those policies were effectively implemented. For its part, the media/information network would help get the word out to the general public about the policies being put in place and then report back on the effectiveness of those polices.

Our assumption is that leaders play a central role in bringing about an effective pandemic mitigation response. Consequently, variations in effectiveness of those responses to the pandemic would reflect, at least in part, differences in leadership behaviors and practices, which our research is designed to identify and measure. Differences in the performance of individual leaders may reflect how they choose to support interdependent social values, such as maximizing public health versus maintaining a healthy economy. It may also reflect the institutionalization of prior learning. Apparently, one of the reasons that Singapore, Hong Kong and New Zealand have been initially effective in bending the curve of their epidemics is that they learned from the SARS epidemic how to prepare in advance for the next pandemic.

Grounded Theory

Network analysis is descriptive. In itself, it does not explain why a specific actor has achieved centrality, only that he or she is identified as operating in a central position relative to other actors. For our purposes, we want to consider key leadership behaviors of such central or nodal actors.

Although there is a large body of literature investigating the behaviors and practices of effective leaders and the limitations of ineffective leaders, the proposed research requires an exploratory framework rather than one testing an existing theory that may or may not turn out to fit the challenges presented by a particular pandemic. From this perspective, an appropriate approach is *grounded theory,* an inductive method for conducting qualitative research aimed at theory building. Grounded theory uses constant comparative analysis. It starts with a small set of cases from which some tentative themes are derived. These themes serve as theoretical constructs that can be used to describe and, ultimately, to measure leadership behaviors. Subsequently, more cases are added to test the robustness of the constructs and to assess whether additional constructs should be considered. The process ends when no additional constructs need to be added for the analysis of a new case.

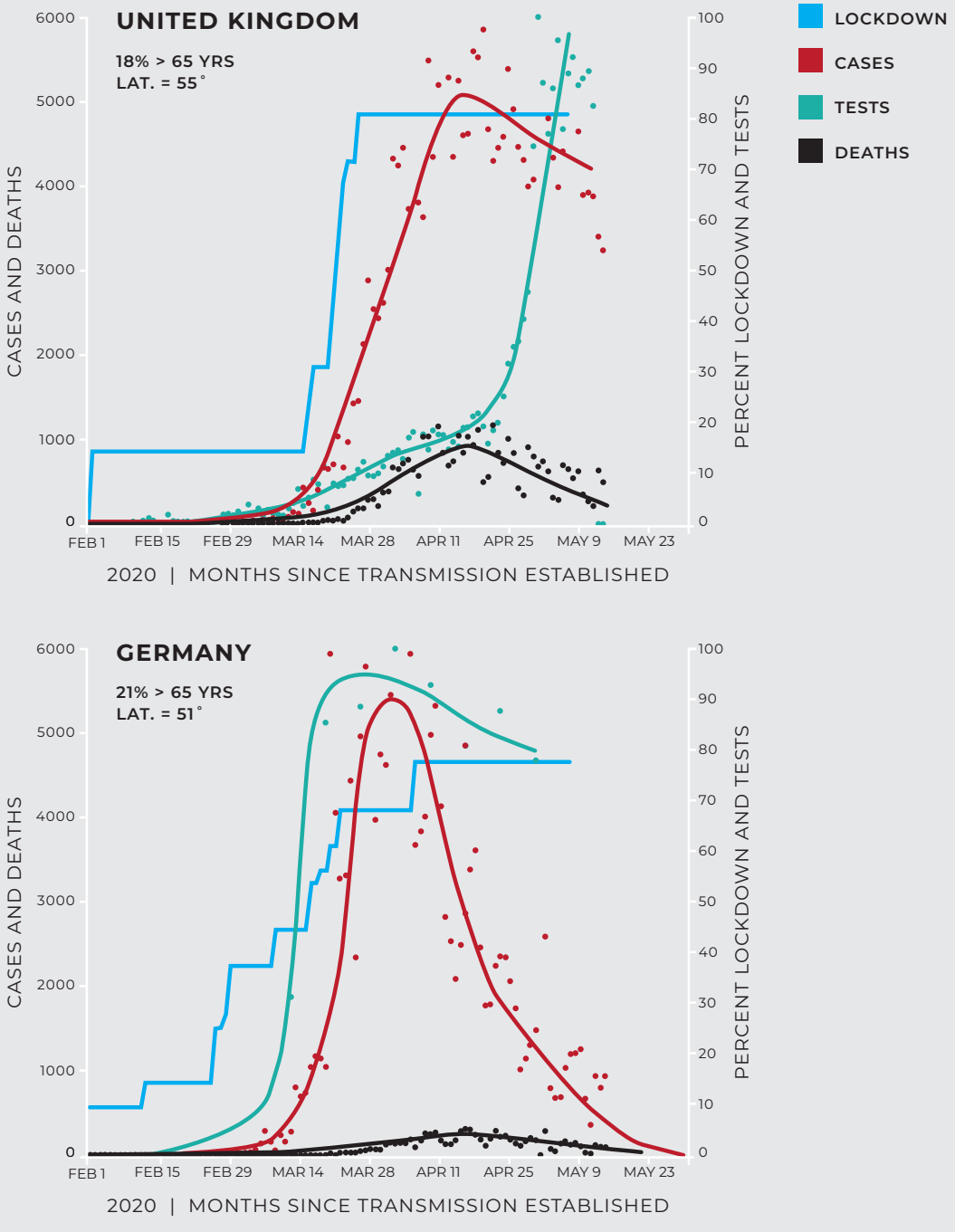
The design of the proposed research looks at a set of pairwise comparisons, with each pair at the same scale (national, state/provincial, and municipal). As a partial control, we will primarily select pairs in which the capacity to act—for example, the capacity of the health care system to test, trace, and treat in similar economic conditions—are approximately the same. Presumably, this will allow the effects of other factors—especially leadership—to be more evident.

The initial selection of cases benefits from a search for strong contrasts between countries, as measured by frequently collected data such as the count of new cases and/or death rates. In Europe, for example, the UK has more than three times the death rate per 100,000 infections as Germany. Consequently, Germany has been able to phase out of its lockdown faster than the UK, thereby reducing the pandemic's economic impact while not adversely affecting public health (e.g. not producing a second spike in cases) [see Figure 3]. The same kind of stark contrast can be seen between U.S. states—for example, early in the pandemic California versus New York or, at the municipal level, between New York City and San Francisco.

Our approach will be to start by analyzing three sets of paired cases—one at the national level, one at the state or provincial level, and one at the municipal level. Based on analysis of these initial pairs, the sample will be expanded with additional pairs at each level until "saturation" is achieved—that is, when adding additional pairs does not result in the identification of new leadership constructs. We assume that saturation will have been achieved with a total of thirty pairs, ten at each level. However, saturation may occur with fewer pairs and may vary by level. The body of information continues to grow about factors which are influencing pandemic patterns and outcomes, factors such as travel patterns, housing density, size

of the elderly population, etc. We will continue to commit a substantial part of our energy to identifying such factors and incorporating them into our criteria for selecting and analyzing the cases which underly our emerging grounded theory.

Figure 3. Comparison of Critical Decision Modeling for United Kingdom and Germany. An example of current Covid-19 projection models showing key variables that decision-makers rely on to make public pandemic policy



Source: Brian Williams, Ph.D, South African Centre for Epidemiological Modelling and Analysis (SACEMA); http://sacema.org/people/staffgraphed May 25, 2020

Critical Incidents

The constructs we develop through grounded theory will be designed to explain why the behaviors and practices of some leaders are significantly more effective than others. To help identify such constructs, it is useful to compare behaviors involved in the same type of decision-making—for example, mitigation strategies such as recommending social distancing, issuing stay-at-home or lockdown orders, initiating contact tracing, and requiring face masks to be worn in public. Delays in making such decisions can have significant adverse effects on the rate of new infections, demand for hospital care and, ultimately, deaths.

In analyzing each of these incidents, we are interested in how the nodal leader with political power engages other leaders in that network and how leaders in the public health network are engaged. We are also interested in how the leader balances conflicting values—most notably, the tradeoff between maximizing public health (keeping people from getting infected) versus minimizing damage to the economy (keeping people employed)—and how the leader uses the information network to explain policy decisions so as to win public trust and compliance.

We expect to find critical incidents in which the leader must address emerging situations—for example, in Wuhan, China, where the stay-at-home order was lifted because no new cases of infection were identified for a two-week period but then a small cluster of new cases emerged. Although the infected individuals were carefully tracked, the new outbreak prompted a decision to test all of the city's 11 million residents over again. How was this decision made? What elements of the leadership and information networks were engaged? What does this tell us about how resource availability can define the choice of actions? Ideally, the same set of critical incidents will be reviewed for each case study—e.g., decision to reopen the economy.

The analysis of critical incidents can help in developing an understanding of how leaders learn and modify their behaviors to make them more effective. If a specific decision provokes significant pushback from other actors in the network or in the form of public protests, the leader may modify or rescind the decision—for example, President Trump's rapid reversal of his decision to disband his Corona Virus Task Force because of the criticism of close allies. Although ideally leaders learn by reflecting on the consequences of their actions, alternatively they may actively and publicly deny that those consequences, especially negative ones, had anything to do with their leadership.

Identifying behaviors associated with specific critical incidents typically relies on in-depth interviews with key informants. Conducting first-hand interviews is very time consuming, but an enormous amount of information is also available through official documents, information uncovered by investigative reporters, and data from public opinion polling. Computer-assisted content analysis facilitates the review of vast amounts of such data.

In addition to examining media reports to reconstruct behavior during critical incidents, we are interested in how a leader makes use of media to convey policy decisions to the public. Is this messaging clear, convincing, and consistent over time? Is it true and accurate? If there is a policy change, how is this explained? Does media reporting reinforce the message or question it? Does the leader challenge the media for being biased?

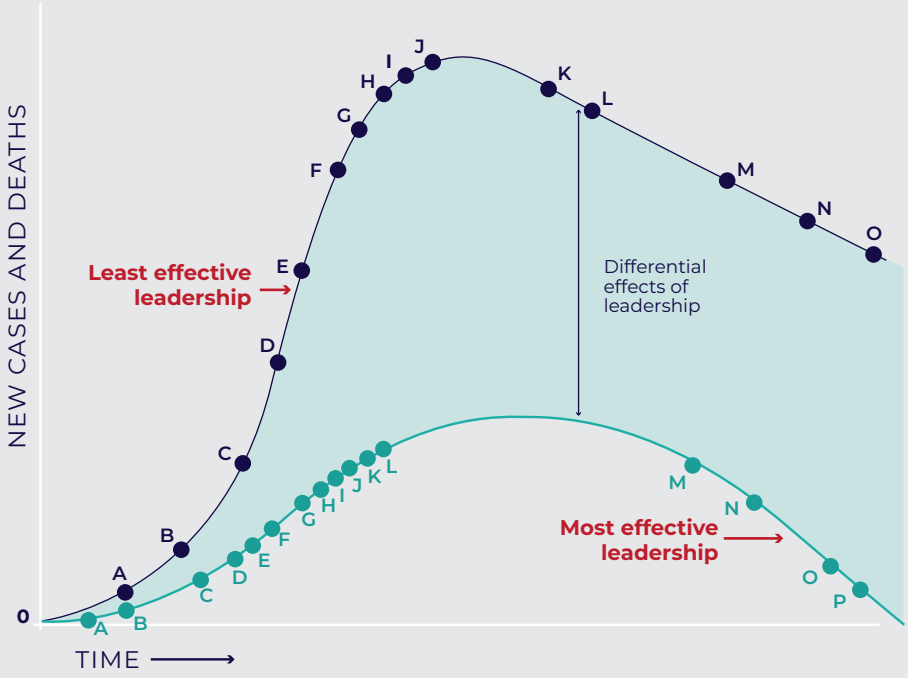
Benefits of This Research

There can be little doubt that leadership is a significant factor in determining the effectiveness of actions taken by elected officials, health experts, and the general population in response to the current pandemic. Effective global leadership at the national, state, and local levels of government can help save a significant number of lives while restoring an economy more rapidly. Conversely, ineffective leadership can increase and prolong the pain and disruptions suffered by a society well beyond the end of the crisis. The COVID-19 pandemic offers a natural experiment for investigating the leadership factor because it affects localities with radically different forms of governance ranging from autocratic to democratic, different cultural values from collectivist to individualist, and different resource capacities [see Figure 4]. It may be that resource-constrained countries with a collectivist culture and strong leadership are responding to the pandemic more effectively than countries with significant resources but with polarized politics and weak leadership.

Figure 4. *Conceptual Representation of the Effects of Leadership Practices and Behaviors in Addressing a Pandemic*

KEY POLICIES

A. Pandemic officially recognized
B. Initial restrictions on travel
C. Lockdown or stay-at-home policy announced
D. Testing and tracking policies announced
E. Testing initiated
F. Tracing program initiated
G. Critical supply shortages identified
H. Testing targeted to high-priority settings
I. Tracing selectively deployed
J. End of any critical supply shortages declared
K. Testing fully operational
L. Tracing program fully operational
M. Stay-at-home order eased
N. Stay-at-home order removed
O. Restrictions on travel removed
P. Any remaining restrictions on economic activities lifted



The shaded area represents a range of responses to a pandemic, with the lower boundary indicating outcomes under the most effective leadership and the upper boundary representing least effective leadership. Points along these curves represent key policy decisions and their implementation (see key). Success is measured by no or few new cases and deaths, as well as the ability to safely reopen the economy.

Source: Allan Wallis, PhD, retired associate professor of public policy at the Graduate School of Public Affairs, University of Colorado at Denver.

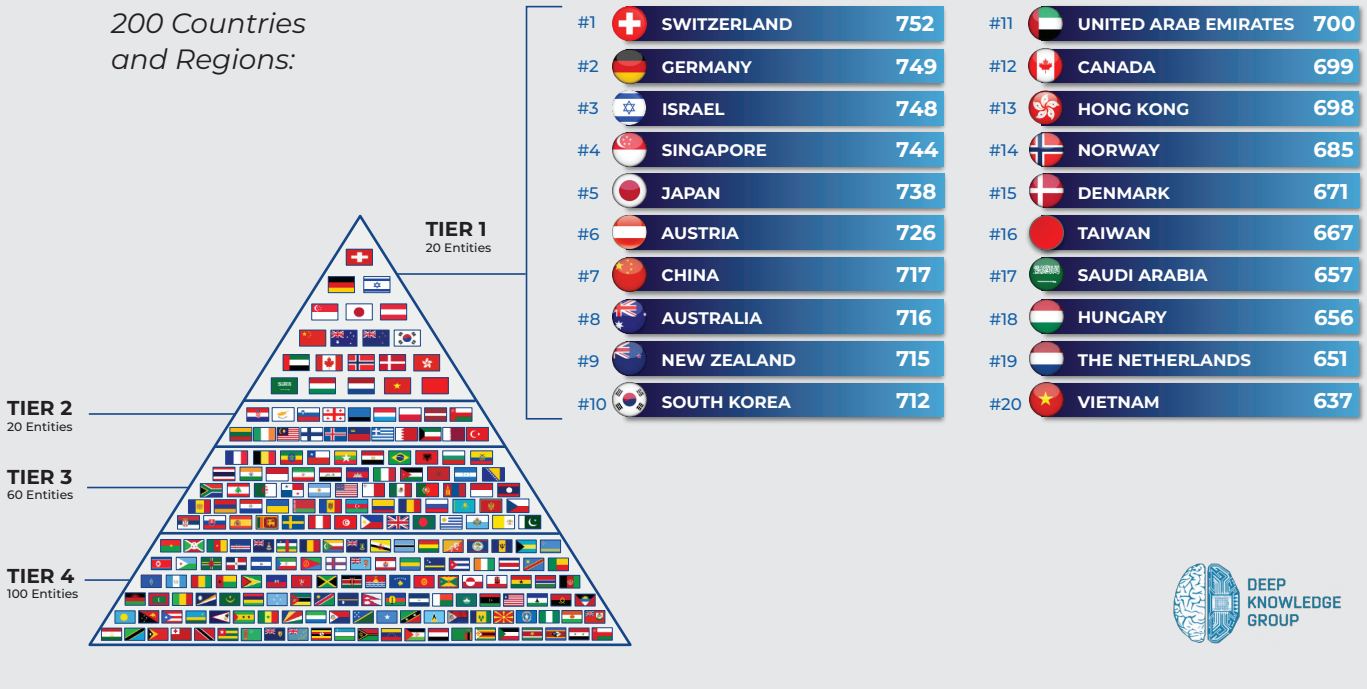
Although we have much anecdotal evidence, we lack a clear, empirically based understanding of what specific leadership behaviors and practices are being employed in response to the current crisis, how they operate, and what effects they have on effectively controlling the pandemic. In particular, our research will examine how leaders negotiate the difficult tradeoffs between protecting public health and maintaining economic health. Our research methods are chosen specifically to describe and measure concrete leadership behaviors and to tie them to specific pandemic outcomes. Through a better understanding of these behaviors, we will suggest ways of refining epidemiological models so that they can account for the leadership factor and its effect on the variables that are currently being measured and predicted in pandemic models (e.g., infection rates, number of individuals infected, ICU utilization rates, ventilator use rates, and deaths). We also want to use this understanding to help educate leaders about what makes their behaviors effective or ineffective, in the hope that they will improve their responses to future crises.

Further Research

The research program described here is designed to achieve our first goal: identifying and understanding specific leadership practices that improve or worsen mitigation efforts.

We also wish to address a second goal, which is improving the predictive capacity of epidemiological models by quantifying the effects of leadership practices (i.e., accounting for variations in the effectiveness of mitigation efforts that can be attributed to leadership practices and behaviors). In order to achieve this goal, we will have to expand the research sample described earlier in order to allow for valid statistical analysis, such as the use of factor analysis and linear hierarchical modeling. The detailed research design for achieving this second goal will be the subject of a separate research proposal and will reflect the findings of the research proposed in phase 1 of this proposal.

Figure 5. *Covid-19 Regional Safety Assessment*



Source- Health Policy Watch

About the concept developers

ALLAN WALLIS, PhD, is a retired associate professor of public policy at the Graduate School of Public Affairs, University of Colorado at Denver, where he directed the academic concentration on local governments and taught courses on leadership and ethics, urban social problems, urban politics, and growth management. He has served as interim director of the Wirth Chair in Sustainable Environmental and Community Development and as director of the PhD program in public affairs. He has also directed research for the National Civic League. Wallis facilitated the development of a comprehensive HIV/AIDS service plan for metropolitan Denver and the state of Colorado, as well as the Colorado Comprehensive Asthma Plan. He was co-principal investigator in developing a handbook for conducting needs assessments in Colorado for those infected and affected by HIV/AIDS. In addition, he served as a co-principal investigator for a research study of the well-being of orphans and vulnerable children in Tanzania East Africa, a study funded by the Rockefeller and Kellogg foundations.

BRIAN WILLIAMS, PhD, grew up and went to university in South Africa, earned a PhD in physics at Cambridge University, and afterward taught physics at Strathclyde University, the University of Helsinki, and the University of Dar es Salaam. A Royal Society Research fellowship took him back to Cambridge, where he worked on electron microscopy in the chemistry department. But wanting to return to Africa, he switched to entomology at a research center in Nairobi and killed tsetse flies in the Maasai Mara region as part of a control project. Back in England, at Oxford, he worked on geospatial models of the control of tsetse flies and then took a post at the London School of Hygiene and Tropical Medicine, where he worked on malaria and measles. In 1994 Nelson Mandela was released from prison, and Williams returned to South Africa to work on the occupational diseases of gold-mine workers—especially tuberculosis (TB) and silicosis and then HIV and AIDS. Finally, he accepted a post in the tuberculosis department at the World Health Organization (WHO) in Geneva, where he eventually retired. He now does modeling work on SARS-Corona-2.

DAVID OLDS, PhD, is Professor of Pediatrics at the University of Colorado, where he co-directs the Prevention Research Center for Family and Child Health. He has developed and tested a program of home visitation by nurses known as the Nurse Family Partnership (NFP). The NFP is designed to improve the outcomes of pregnancy, children's health and development, and women's health and life-course. The NFP is the only prenatal/early childhood program that meets the top tier of evidence established by evidence-based programs, and it has been identified as the program with the strongest evidence throughout the world that it prevents maltreatment of children. Today, the NFP serves more than 50,000 families per year in the United States and 18,000 per year in seven other countries. Olds has received numerous awards for his work, including the Charles A. Dana Award for Pioneering Achievements in Health and the Stockholm Prize in Criminology.

CARL LARSON, PhD, is Professor Emeritus and former Dean of Social Sciences at the University of Denver. His ten books have dealt with communication, negotiation, teamwork, collaboration, and leadership. He has consulted for many organizations, including the Centers for Disease Control and Prevention (CDC), the Environmental Protection Agency, the National Aeronautics and Space Administration, the Federal Bureau of Investigation, and the U.S. Congress. He has received awards for teaching, research, and community service.

KATHY IRENE KENNEDY, DrPH, MA, is a public health scientist and educator who has worked in more than fifteen countries, conducted several multicenter international studies, and served as technical advisor to WHO for ten years. She is executive director of the Regional Institute for Health and Environmental Leadership (the CDC-founded public health leadership development institute for the U.S. Rocky Mountain region) and has provided comprehensive leadership training to more than 1,000 public health professionals. In addition, Kennedy is Clinical Professor of Public Health at the University of Colorado Anschutz Medical Campus, where she teaches global public health and public health leadership and has created academic programs in global public health and maternal and child health.

DARRIN HICKS, PhD, is a full-time professor at the University of Denver. He teaches courses and conducts research in argumentation, rhetoric, community collaboration, and the philosophy of communication. His research has appeared in journals such as *Rhetoric and Public Affairs, Cultural Studies, Quarterly Journal of Speech, Argumentation, Argumentation and Advocacy, Journal of Public Administration Research and Theory, and Evaluation Review.*

REUBEN GRANICH, MD, MPH, has more than 35 years of experience in public health, working for national, state, and local governments, the United Nations (UN) system, and in private-sector health care delivery. He has worked on HIV and TB control in the United States and in more than 25 low- and middle-income countries. He has experience working with the CDC, California State TB Control Branch, Department of State's office of the President's Emergency Plan for AIDS Relief (PEPFAR), or the World Health Organization, and UNAIDS.

As Head of Health and Data Science at Vestergaard (a Swiss manufacturer of public health tools for people in developing countries), he is focused on using new mobile technologies to crowd-source data to improve disease control. His other areas of work include using blockchain technology, artificial intelligence, and machine learning to address major public health issues.

While stationed at UNAIDS and WHO in Geneva (2007–2014), Dr. Granich led an initiative called *Three I's for HIV/TB,* HIV treatment as prevention including "test and treat" to eliminate HIV infection, developed the 90-90-90 targets to eliminate HIV transmissions, and helped develop the HIV Treatment Situation Room software platform. As the WHO Medical Officer for Tuberculosis in India (2002–2003), he led an 80-person technical team supporting the country in expanding its national TB Directly Observed Treatment, Short Course (DOTS) program from covering a population of 400 million to covering approximately 850 million people.

Dr, Granich has a BA in biochemistry and cellular biology (UC San Diego) and an MD (Stanford University), and he completed residencies in internal medicine and preventive medicine/public health). He also has a MPH in epidemiology (UC Berkeley) and completed the CDC Epidemic Intelligence Service training program in Atlanta (1996–98). He is a retired captain in the U.S. Public Health Service.

VICTOR DUKAY, M.A, PhD, MBA, president of the Lundy Foundation, believes that human ingenuity coupled with respectful cooperation can resolve all problems, no matter how difficult. He has brought this outlook to his every professional endeavor—from creating a successful jet-leasing business to founding an international management consulting firm and the Lundy Foundation in 1991. He has integrated his passion and skills with the foundation's resources to address the organizational effectiveness of nonprofits, empower populations marginalized by society to create change, and draft legislation requiring the U.S. government to evaluate the impact of all foreign assistance programs. He was awarded the 2011 Dr. Thomas A. Dooley Humanitarian Award from the University of Notre Dame for his past work with orphaned and vulnerable children in Africa and twice received the Contributions to the Improvement of Teamwork and Collaboration Award from the University of Denver. He was featured in a book, *The Humanitarian Leader in Each of Us: 7 Choices That Shape a Socially Responsible Life* (SAGE Publications, 2011), which explores how anyone with motivation, energy, and perseverance can make a difference in society and affect the lives of those in need. He holds an undergraduate degree in economics from the University of Notre Dame and three advanced degrees, including a doctorate in human communications focused on high-performing team theory from the University of Denver. He is currently working on a three-year project (Investing in High–Performing Campaign Teams to Enhance the Common Good of Democracy) that is focused on elevating how U.S. political campaigns are organized, managed, and empirically assessed with the end goal to elect competent, collaborative, transpartisan candidates to public office using high-performance team/managerial theory.

IN-KIND SERVICES

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