

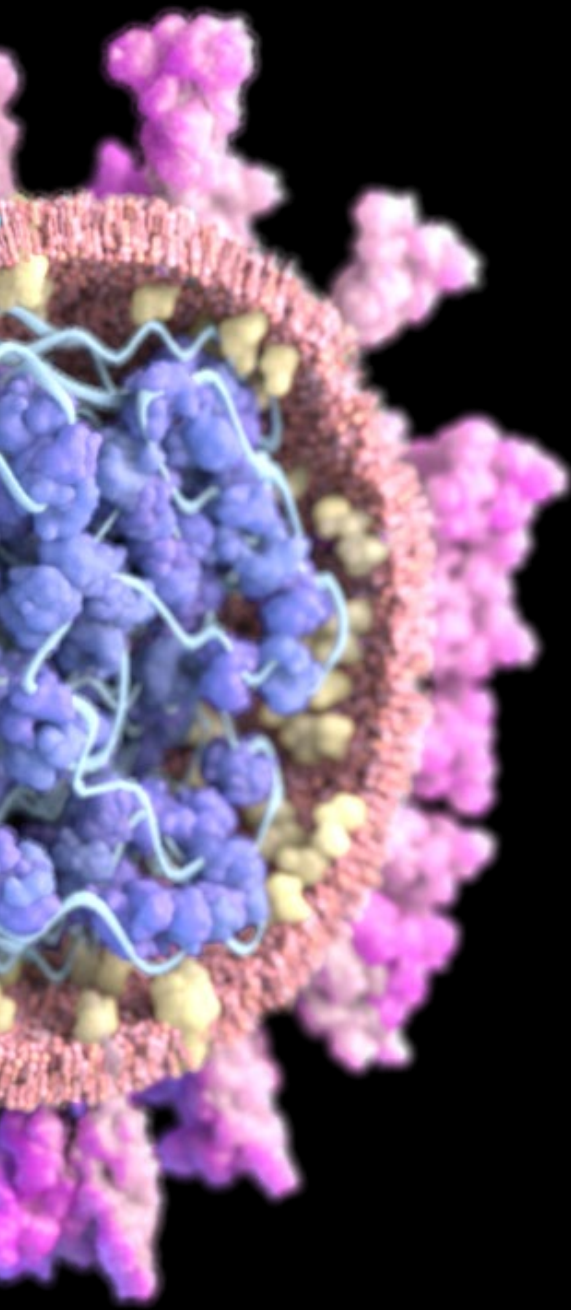
**LIFE
(SCIENCES)
AFTER
COVID-19**



The Power Of Scientific Rigor

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HEALTH



The piece you're about to read is from Klick Health's Life (Sciences) After COVID-19 series, a collection of expert perspectives designed to inform and inspire the life sciences community for the coming changes and opportunities we anticipate as a result of this global health crisis.

We invite you to engage with a multitude of these viewpoints by seeking out other pieces from this series, including *Changing Contexts Changes Habits* and *Maintaining The Sacred Doctor-Patient Relationships Through Pandemic-Accelerated Technology Adoption* at **covid19.klick.com**.

THE INSIGHT

The COVID-19 pandemic has demonstrated how the application of scientific principles to policy making and business is no longer optional.

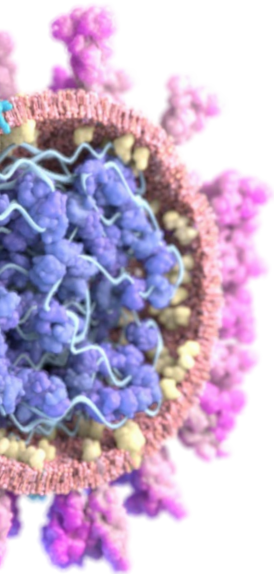
The scientific method is something that every sixth grader can probably recite by heart, but few end up truly understanding sufficiently to apply to real-life situations. A hypothesis (or number of hypotheses) is generated from a careful evaluation of available evidence. That hypothesis is then put to the test in a controlled experiment where the impact of an intervention on a particular system can be evaluated. From that evaluation, conclusions can be drawn about the nature of the system, and new evidence can be probed for more refined hypotheses to then be tested. Iteratively, we come closer to an objective truth about how that system—and interventions targeting it—work. Putting the scientific method into practice involves developing a framework that incorporates this general process and tailoring it to the question at hand.

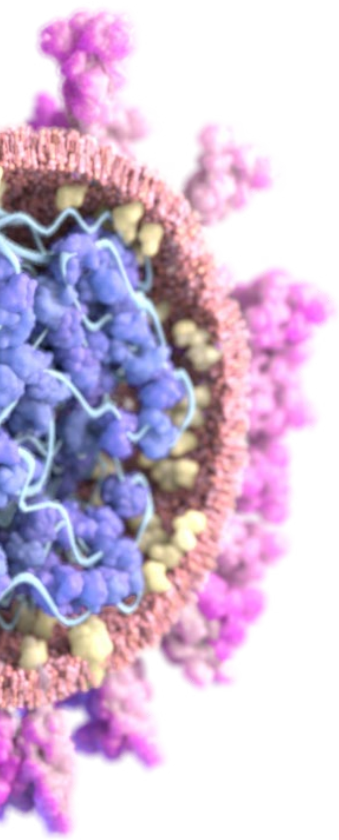
Despite its relative simplicity as a process, up until a few months ago, science had been having a serious public relations problem. The popular perception of science, particularly in North America and Western Europe, was that it was



stodgy, dated, not relevant to the day-to-day experiences of regular people, and “just another way of looking at the world.” Popular skepticism of everything from the safety of genetically modified crops and the need for vaccinations to the veracity of the moon landing was growing slowly and steadily, in spite of overwhelming scientific evidence to the contrary. What’s more, the rise of social media platforms where ill-informed hucksters spoke on apparent equal standing with scientists—who had devoted their lives to understanding complex ideas—fed into this growth and further fueled the fire.

Then COVID-19 hit. Oh, what a difference a pandemic makes. Around the world, but particularly in the U.S., we are witnessing a series of real-world, scientific experiments about public health policy in the face of a disease that still has more unknowns than knowns. Policymakers have chosen to consult with various infectious disease experts—not all of whom agree on everything—to formulate different plans to mitigate the





scope of the pandemic and then determine how to reopen, literally testing different hypotheses about how diseases spread or various mitigation strategies can work in the real world. They've brought in new expertise to deal with an entirely new situation. Or they haven't. Unlike many aspects of public policymaking, these sets of public health directives (or lack thereof) have immediate, easily measurable metrics to gauge their effectiveness: the number of COVID-19 infections; the rate of increase or decrease of those infections; and the number of hospitalizations and deaths due to COVID-19. Some geographic regions have slowed COVID-19 infections to a crawl, others have determined how to control an inevitable wave of infections, while others are being consumed by them.

Forward-thinking people in the business world are starting to think ahead of the pandemic and about how their companies can adapt to a world with COVID-19. Developing a scientific framework for their plans will be critical to not only surviving, but thriving in a world that is fighting COVID-19, and the post-pandemic world that comes after.

After the pandemic ends:


- **How can businesses apply the scientific method to their own reopening plans in a way that protects their employees, customers, and core business?**
- **What can businesses do to develop similar scientific frameworks to enhance their own offerings and practices?**



THE EVIDENCE

Few things connect the worlds of law enforcement, professional sports, and regional governance, but one notable exception is how the application of scientific methodology revolutionized core aspects of how they make decisions and perform.

With the profusion of various TV shows incorporating forensic science like *CSI* across locales, it's easy to forget that it wasn't that long ago that forensic science didn't exist.



Their general hypothesis was that objective data collection and analytic techniques would be superior to investigator instincts and eyewitness reports.

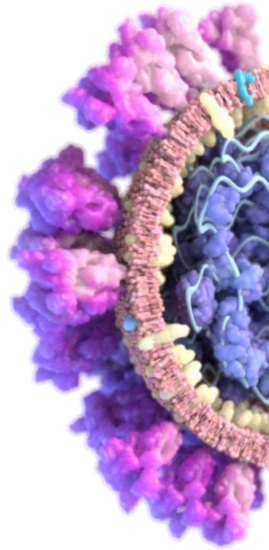
Criminals were typically identified and convicted based on eyewitness testimony, which we now know can be of dubious reliability and objectivity. In that same world investigators primarily used their "gut instinct" which is again unreliable and subjective. It took incorporating scientific frameworks into a prominent law enforcement agency to begin changing the culture of catching and convicting criminals. That organization was the Federal Bureau of Investigation (FBI).

The FBI evolved from an organization whose agents operated primarily on individual instinct, to one that utilized a scientific approach to finding and convicting criminals. Their general hypothesis was that objective data collection and analytic techniques would be superior to investigator instincts and eyewitness reports. They introduced fingerprint analysis as a forensic technique, then, encouraged by early success, added handwriting and typographic analysis, behavioral science, as well as ballistics studies.^{1,2}

It required training an entire generation of "G-men" to think differently, and changing an organizational culture to not only accept but celebrate the forensic scientists who weren't out in the field. But the net result was the creation of one of the most effective and well-respected law enforcement organizations in the world.

What does this have to do with professional sports? Readers of Michael Lewis' book (and the subsequent film starring Brad Pitt) *Moneyball* will be familiar with Billy Beane, the general manager of the Oakland A's from 1997 to 2015. Beane is credited with sparking a revolution in player recruitment and valuation as well as team makeup.

Prior to Beane's tenure as general manager, professional baseball teams looked to bring in "star players." These individuals, whose performance in one or two areas (home runs, RBIs, ERA, etc.) justified a significant price tag, and came with the hope that they could boost the overall performance of the whole team.



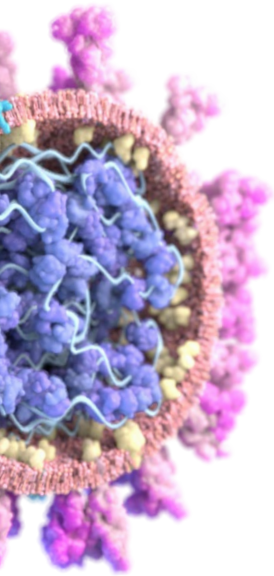
Beane wanted to test his hypothesis that a team is an interlocking group of complementary skill sets, rather than a reflection of the output of a few standout players. So, eschewing traditional recruiting approaches, he introduced advanced statistical analysis to craft teams of players, who may not shine in individual metrics the way previous stars did, but fit together into the team dynamic in a way that improved the overall performance while decreasing the team payroll³. Under this new system the A's went on to set a record 20 consecutive win streak that vaulted the A's ahead of competitors throughout the league, until they also began adopting the same scientific approach.

Which finally brings us to COVID-19. In late-2019 when China was beginning to acknowledge the spread of a new, novel coronavirus, a number of nearby countries, including South Korea, Singapore, Taiwan, and Japan, consulted with their public health experts and developed extensive plans for containing a potential infection. Those plans involved various degrees of lockdown and comprehensive testing programs. All of these countries were able to keep total infections and deaths to a minuscule fraction of their overall populations.

Western Europe and North America, by contrast, waited much longer to establish a scientific framework to deal with the virus, and have suffered considerably more infections and deaths as a result. Within Europe, Sweden is a notable exception in its approach to required behavioral changes needed to limit disease

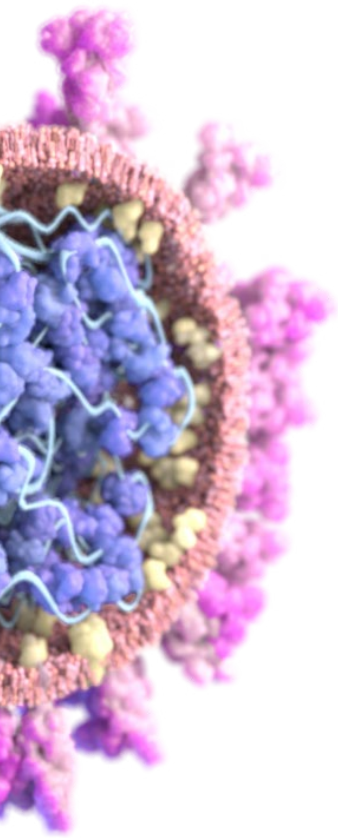
spread; instead it tested a "herd immunity" hypothesis that posited asymptomatic, infected individuals would limit disease spread by itself. Italy, France, Germany, and other countries implemented harsher lockdown procedures that resulted in an initial large number of infected individuals, and were able to contain those infections without overwhelming hospital systems while Sweden's infected population continued to grow. The real world A/B test clearly shows which hypothesis was born out.

The varying responses between states in the U.S. offers a similar contrast. While states like Massachusetts, New York, and New Jersey were the sites of early infections and suffered large numbers of infections, hospitalizations, and deaths, they all developed plans that relied on scientific expertise to contain and eventually control infection rates. These plans tested the hypothesis that limiting social interaction via shutting down businesses and non-essential travel would reduce infection rates low enough that the disease could be controlled. While none have eradicated the disease, hospital capacity is now adequate for new cases, and new case rates have dropped dramatically from their peaks. By contrast, states that have largely ignored the advice of scientific and public health experts, including Texas, Florida, and Arizona, have massive, uncontrolled outbreaks that are considered to have been almost entirely preventable^{4,5}. All three of these states initially instituted lockdowns.



But when Florida put together a scientifically supportable plan for reopening, it was implemented before cases were sufficiently under control and the required infrastructure was in place. Similarly, Texas rejected guidance to stay closed longer, reopening with less of a plan in place and sooner than experts recommended. Arizona, whose original shutdown was viewed as effective, almost entirely abandoned containment measures it had previously instituted.^{6,7,8,9,10}

The common thread across these highly disparate areas of law enforcement, professional sports, and public health is their response to challenges utilizing scientifically developed frameworks to test evidence-based hypotheses from the beginning. They demonstrate how this approach can result in better outcomes than those that take a more traditional, “shoot from the hip” approach.



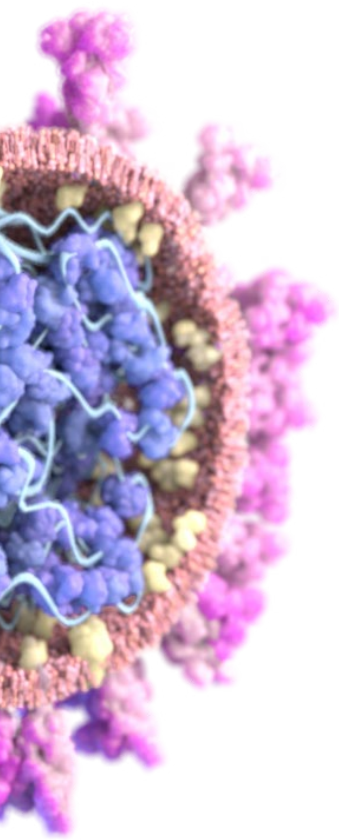


THE POSSIBLE FUTURES

Making the case for...

It's difficult to understate the difference a scientific approach can take to address important problems as they arise. The ability to use evidence to generate a meaningful hypothesis, test it, and then change direction if the results contradict that hypothesis are what saved Coca-Cola after its "New Coke" launch failed and what led to the eventual introduction of "Coca-Cola Classic". It's the same rationality that led IBM to pivot to becoming a professional services organization when the mainframe computer market was being disrupted.

And it's literally saving lives in geographies that are embracing a rational approach to limited disease spread in the age of COVID-19. While it may go against some aspects of human nature to not act immediately when faced with a crisis and rationally evaluate the evidence to devise best approaches (even when it means publicly admitting those approaches were flawed if the evidence says they were), it is demonstrably the most effective way to solve problems in healthcare.



The COVID-19 pandemic has layered a rather stark, Darwinian filter on top of organizations that continue to refuse to acknowledge the importance of incorporating the scientific method into decision-making. One possible future is that organizations—whether they be corporations or governments—that remain steadfastly in denial of the importance of integrating scientific methodology and thinking (generating rational hypotheses based on evidence, systematically testing those hypotheses, then altering course based on the results) into their practices may not survive the pandemic. A slightly rosier take is that as the benefits to using a scientific framework to problem solving become more and more obvious, decision makers across the highest levels within these organizations will be forced to adopt those same approaches or face a significant competitive disadvantage. Indeed, as is evidenced by the adoption of advanced statistical analytic techniques by virtually all major professional sports organizations in the decades following Billy Beane’s successes, the incorporation of proven scientific methodology can quickly become the minimum requirement to compete effectively. The failure of using unscientific approaches to contain the havoc that COVID-19 continues to wreak should be a clarion call to anyone in a decision-making capacity that the time to start thinking scientifically is now.



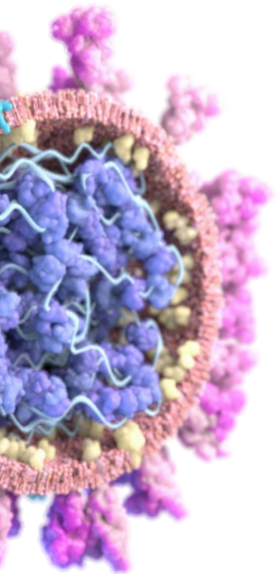
Making the case against..

Human beings can be incredibly stubborn creatures. Even in the face of overwhelming contrary evidence, people are often unwilling to admit they've made a mistake. Science also thrives on mistakes. It's how science moves forward: by coming up with theories, implementing tests based on those theories, seeing what works, keeping what works, and discarding what doesn't. It's an iterative process. It's also not typically what people are used to. Whether in public policy or in business, people are used to leadership that touts a single solution that will work. If it does, the leader takes credit for it. And if it doesn't, it's typically swept under the rug. As different types of testing and reopening plans are being implemented, we're essentially seeing the largest public health A/B test in history. And the nature of any A/B test is that some As will be better than some Bs, and vice versa. But for many people, that narrative is too complex and it may push them further away from science as they're not accustomed to high-profile, public failure being part of the learning process.

Doing science in any context also takes time. It requires a culture that prioritizes it, and the resources to do it properly.



Immediacy can be the enemy of rationality; when problems need to be solved quickly, it can be difficult to ensure everyone involved slows down and formulates a rational solution to test—even when there are long-term benefits associated with that approach. It is entirely possible that organizations will embrace science when it suits them and default to gut-based decision-making when things become difficult.



THE ACTION PLAN FOR LIFE SCIENCES LEADERS

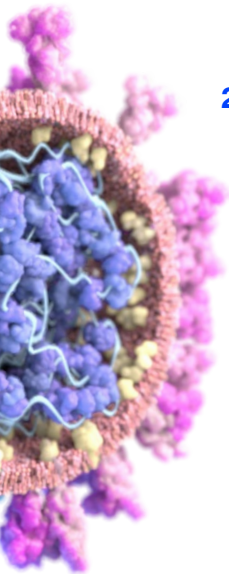
Cultivate a respect for science from the top down. Use available information to generate new ideas to test. Bring in outside expertise when needed. Embrace failures as learning opportunities.

1. Cultivate a respect for the scientific method from the top down.

Despite pushback from people entrenched in the old ways of doing things, leaders like Billy Beane are able to remold their organizations into ones that are built on scientific decision-making by publicly embracing the new methodologies, providing cover for anyone in their groups who want to experiment with new approaches.

2. Use available information to generate new ideas to test.

COVID-19 containment measures weren't invented in 2019 when the pandemic began. Many were developed to treat outbreaks of similar viruses in the past. As the pandemic developed, those implementations were tweaked to better fit a new disease that worked differently, but the origin of those policies was based on existing evidence and data.



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A strong sense of what has already been tried in similar situations, as well as a deep command of the available facts will allow decision-makers to utilize an informed intuition framework to quickly generate useful hypotheses and then iteratively improve them as their experiments bear fruit.

3. Bring in outside expertise when needed.

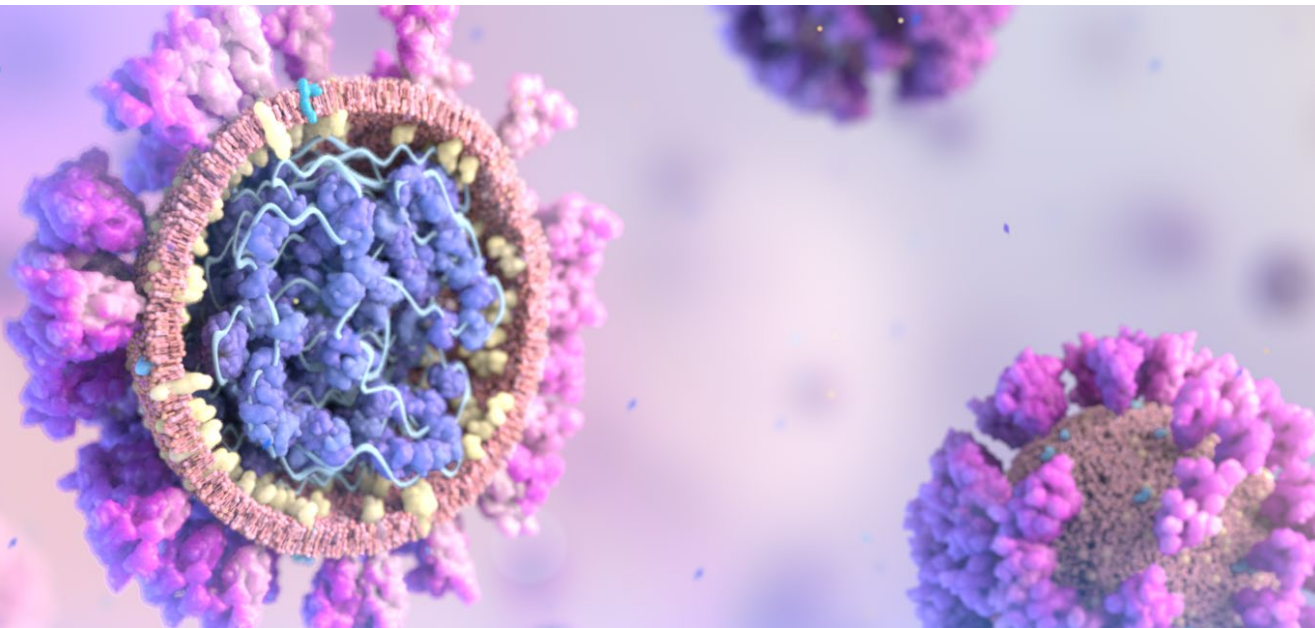
Governments that have dealt with the COVID-19 pandemic effectively have done so by consulting with subject matter experts to determine the best courses of action. When faced with a new situation, it always helps to find the people who already know how to navigate similar situations to formulate the best action plans.

4. Embrace failures as learning opportunities.

Science doesn't move forward by everyone giving up when the first experiment doesn't yield the desired result. Each time something is tried, it's an opportunity to learn from what went wrong and build those learnings into the next iteration to improve the results. It's important that leadership within an organization makes it known that a team will be utilizing a scientific framework to solve a particular challenge, and then even if the chosen approach doesn't work the way it was intended, they highlight the benefits of what was learned and how that allows for the next attempt to be improved. Utilizing a true experimental-versus-control methodology that embraces failure will bring a team towards their strategic goals much more quickly and decisively than a time-over-time analysis. A team that understands working towards a goal is an iterative process that keeps building on itself is a more effective team.



How will your organization incorporate scientific methodology into its decision making processes?



1. <https://www.fbi.gov/history/history-publications-reports/the-birth-of-the-fbis-technical-laboratory1924-to-1935>
2. <https://archives.fbi.gov/archives/about-us/lab/forensic-science-communications/fsc/oct2007/research>
3. <https://thesportjournal.org/article/an-examination-of-the-moneyball-theory-a-baseball-statistical-analysis/>
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5. <https://www.statnews.com/2020/04/09/social-distancing-controlling-covid-19-which-measures-are-most-effective/>
6. <https://www.texastribune.org/2020/04/27/texas-coronavirus-health-experts-say-more-resources-needed-reopen/>
7. <https://www.texastribune.org/2020/05/15/texas-reopening-coronavirus-cases/>
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9. <https://www.miamiherald.com/news/health-care/article242407651.html>
10. <https://www.wbur.org/hereandnow/2020/06/12/arizona-covid-19-rise-reopening>

We hope you've found this piece from our Life (Sciences) After COVID-19 series valuable and engaging. For more content like this, download our other published perspectives at **covid19.klick.com** and sign-up to receive future insights as soon as they become available.



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As the Senior Vice President of Medical Sciences, Mike leads the medical, behavioral, and engineering disciplines within Klick Consulting, applying scientific methodology and expertise to client problems across the healthcare landscape. He also serves as the executive director of Klick Health's applied science research and development laboratory.

Prior to joining Klick, Mike built and led an award-winning medical strategy team at a healthcare advertising agency. Previous to that, he was the principal investigator of a preclinical neurological disease research lab at a major pharmaceutical company.

Mike conducted his postdoctoral research in pain biology at the University of Cambridge. He holds a PhD, MS, and MPhil from Columbia University in Neuroscience, and a BS in Molecular and Cellular Biology from UC Berkeley. He's the author of multiple peer-reviewed scientific publications and holds several patents in healthcare-related technologies, and has written articles in Newsweek, Forbes, Slate, and Huffington Post.



While change can create challenges, it also opens the door to new opportunities. Join us as we explore the many imaginable paths to post-pandemic growth. We welcome you to start a dialogue with the author of this piece:

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