COVID-19, AI and the Future of Medicine

Front Line Innovations and Insights

WORLD MEDICAL **INNOVATION** FORUM

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WELCOME

This year we gather for the sixth annual World Medical Innovation Forum in the extraordinary environment of a world-wide pandemic that has altered medicine, the delivery of care to patients, and the way we live. This virtual meeting will explore the technologies driving the response to the coronavirus, how medicine is being reinvented real time and how the urgency of today will take root in the future. In 18 virtually broadcast sessions, Mass General Brigham's Harvard faculty, industry experts and leading investors will jointly reflect on the technologies and challenges defining this historic era in health care.

The World Medical Innovation Forum was established to reaffirm the importance of collaborative innovation—academia, industry and government working together to create solutions to medicine's great challenges. Our goal is to provide actionable insights for Forum participants. We are grateful to the 60 senior executives, investors, Harvard clinicians and investigators who will share their insights as speakers.

We welcome thousands of audience participants from dozens of countries and nearly every state. I thank our many sponsors representing some of the most innovative companies in health care and the Steering Committee and Planning Team for their outstanding contributions. I recognize our Co-chairs Gregg Meyer, MD, Chief Clinical Officer, and Ravi Thadhani, MD, Chief Academic Officer, as well as Chris Coburn, Chief Innovation Officer, for their leadership. We hope that many of you will join us next year in-person on May 10-12, 2021 when we reconvene.

Anne Klibanski, MD
President and CEO, Mass General Brigham; Laurie Carrol Guthart Professor of Medicine, HMS

In addition to our dialogue today, we want to share forecasts made by a number of our leading Harvard faculty on technologies that will characterize medicine in 2030.
Please see page 15.

Thank you for joining us. This year's event will feature in-depth engagement among expert panelists. Our enduring goal remains to provide an environment where principals can directly share their insights and priorities. While the Forum's speakers have been managing their organizations' COVID-19 response they have also been reflecting on how care will be improved by the tools, insights and resolve gained in fighting this pandemic.

The Forum is brought to you by Innovation, the global business development arm of Mass General Brigham. Its mission is the commercial application of the breakthroughs and unique capabilities of the system's 6200 Harvard faculty —bringing benefits to patients worldwide and generating new resources to further the nation's largest academic research enterprise. Our work continues as we help to collaboratively shape fundamentally transformed care.

We express our deep appreciation to the many individuals who made this Forum possible and are particularly grateful to our speakers for sharing their passion, expertise and unique perspectives. Generous support by our leading sponsors – Bayer, GE Healthcare, Biogen, Boston Scientific, Fujifilm, InterSystems, One Medical and Siemens Healthineers – underpins today's event.

Many thanks to the Steering Committee members whose insights made the Forum possible and the Planning Team's dedicated work.

Enjoy the day and we look forward to seeing you in person May 10-12, 2021 in Boston!

Gregg Meyer, MD
Chief Clinical Officer, Mass General Brigham; Interim President, NWH; Professor of Medicine, HMS (World Forum Co-Chair)

Ravi Thadhani, MD
Chief Academic Officer, Mass General Brigham; Professor, HMS (World Forum Co-Chair)

Christopher Coburn
Chief Innovation Officer, Mass General Brigham


THANK Y

As these past weeks and months prove,

THE FUTURE OF MEDICINE

has – and always will be – people.

Thank you to the hospital staffs, doctors, nurses, first responders and the entire healthcare community for showing the world how to bravely elevate patient care.

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Many thanks to the members of the Steering Committee for their leadership in shaping the Forum agenda, identifying speakers and securing sponsors.

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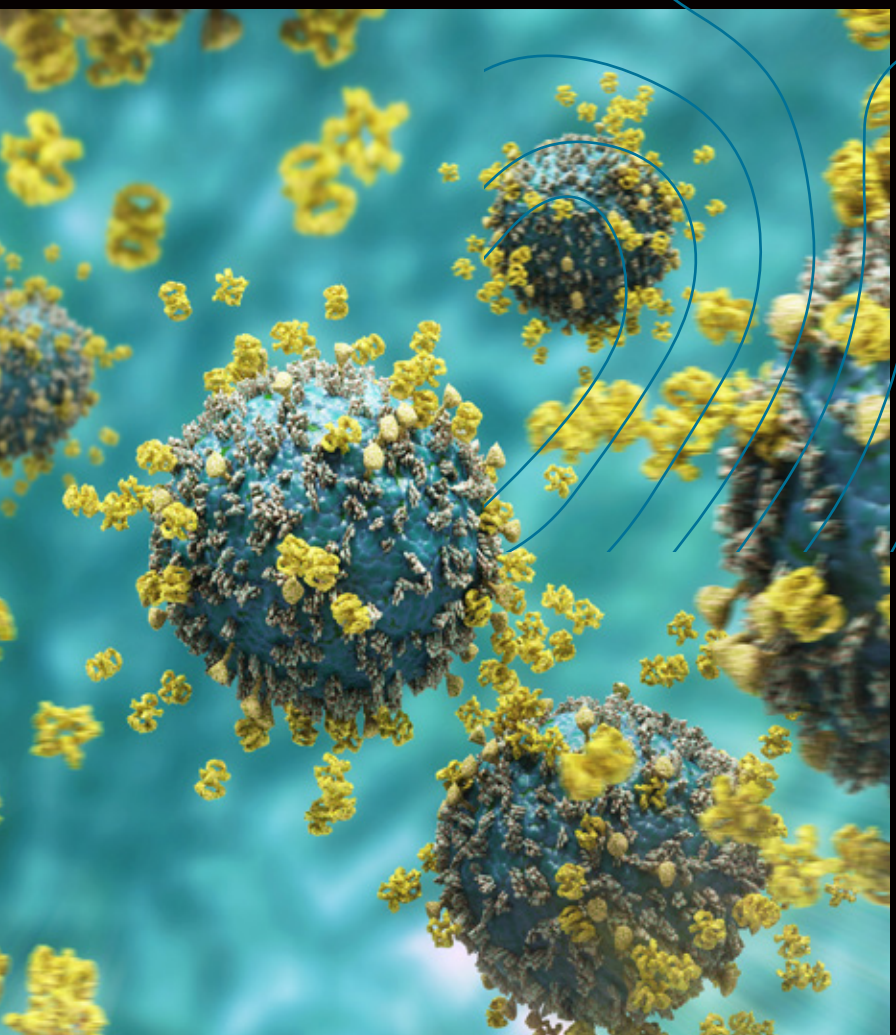

The last ten years have yielded remarkable advances in biology and medicine, from a new class of immune-based treatments for cancer to the emerging use of AI to guide clinical decision-making. But where will this wave of innovation take us in the next decade? Experts across the Mass General Brigham Health community to weigh in with insights, predictions, and calls to action.

Drugging the Microbiome

Lynn Bry, MD, PhD
Director, Massachusetts Host-Microbiome Center and Crimson Core, Dept. Pathology, BH; Associate Professor of Pathology, HMS

The vast community of microbes that live in and on us are more than just mere passengers. They are active participants in our health. This microbial universe, the microbiome, is increasingly recognized for its roles in exacerbating — and preventing — disease.

As a field, we have been sifting through the microbiome to determine which microbes are the key players. What parts of their biological makeup are important? And what are the molecular targets in the human body? Can we zero in on what is happening biochemically — the small molecules made by microbes, for example — and harness those as therapies rather than the microbes themselves? Once we understand the biological mechanisms, our power to help patients is even stronger.

Over the next ten years, these activities will start to pay off. Therapies will move toward precise combinations of microbes and, increasingly, their metabolites and small molecules. We'll see microbial-based therapies aimed at various conditions — like improving the function of immune checkpoint inhibitors for cancer treatment or lowering the risk of strokes and cardiovascular disease.

We now recognize that microbes release neurotransmitters as part of their normal metabolism. How do those impact your enteric nervous system, the network of nerves that controls your gut? Believe it or not, you have more nerves in your gut than in your brain. This gut-brain axis could prove to be an important therapeutic touch point in a variety of diseases.

By 2030, we'll also see the first wave of approvals for therapies that deliver defined mixtures of different microbes for conditions such as food allergies, eczema and other conditions. A decade ago, making microbes into medicines was almost unthinkable. But with the explosion of biopharma companies in this space, particularly here in Massachusetts, this effort is not just thinkable — it's doable.

Putting Technology to Work in Hospital Rooms

Alistair Erskine, MD
Chief Digital Health Officer, Mass General Brigham

Technology is transforming multiple facets of health care. But one often-overlooked aspect is the hospital rooms where patients recuperate from surgery or other serious health conditions. How will those change in the next decade?

First, large flat-screen TVs will be ubiquitous, acting as major hubs of communication. With always-on, two-way video conferencing, patients will stay connected with loved ones, and family and friends will be able to keep a watchful eye on their recovery. These capabilities will also enable physicians, who often work at multiple, distant sites, to connect more readily with patients and their families.

Microphones will be deployed throughout the room — like miniature, mute Alexas —constantly listening and recording clinicians' notes as well as orders for medication or blood tests. Such ambient voice technology will render in-room computers and keyboards obsolete, freeing up more time for face-to-face connection.

These video and voice features lay the foundation for a broad spectrum of AI-based tools — for example, to help monitor patients at risk for falls, a task that now lies in human hands with dedicated patient sitters.

Location-based services, the equivalent of an in-hospital GPS, will also help maximize clinicians' time and efficiency, making it possible to track clinical equipment, identify a patient's whereabouts (is she in x-ray or resting in her room?), and help doctors, nurses, and other clinical staff meet up in person.

Importantly, this bubble of technology will not burst when patients head home. Rather than being discharged with a stack of paper and a few prescriptions, patients will be given a disposable patch or other wearable device that can measure their vital signs and signal for help if they are not well. That way, we can extend this state-of-the-art support network beyond the hospitals' walls.

Expanding the Toolbox for Cancer Drug Discovery

Keith Flaherty, MD
Director of Clinical Research, MGH; Professor, Medicine, HMS

When it comes to defeating cancer, our toolbox is woefully small. For example, of the roughly 20,000 protein-coding genes in the human genome, only about 45 are currently targeted with a cancer drug or other molecularly honed therapeutic. When you consider the full molecular machinery that fuels cancer growth, our current defenses amount to a handful of dents. Of course, the ideal anti-cancer armamentarium doesn't necessarily need to number in the tens of thousands, but it should certainly contain hundreds. How can we resolve this dramatic mismatch by 2030?

First, we need to understand the full spectrum of cancers' vulnerabilities. To do that, we must be able to scrutinize tumor cells isolated directly from patients, not those that are grown in the laboratory. Just as antibiotics are screened for their sensitivities — by collecting a patient sample, isolating the bacteria, and exposing them to antibiotics to see which ones are effective — we can apply similar principles to patients' tumors. This approach would allow us to catalog all the ways that patients' tumors are vulnerable — and importantly, to zero in on the vulnerabilities that lack corresponding drugs. Teams in academia and industry are now working to accomplish this.

Yet once these cancer vulnerabilities are identified and validated, probably somewhere on the order of 200 to 300, we'll need to massively accelerate the process of drug discovery. That sounds like a pipedream, but with recently developed methods in chemical proteomics, it is becoming feasible. Researchers can rapidly and efficiently screen proteins — thousands at a time — for potential drug-binding sites and develop small molecules that bind to them. These methods are beginning to flip the script on how chemistry has been traditionally applied to drug discovery. Hopefully, they can also help us gain the upper hand against cancer.

A Three-Legged Stool and the Future of Oncology

Daphne Haas-Kogan, MD
Chair, Department of Radiation Oncology, BH;
Professor of Radiation Oncology, HMS

Cancer care and treatment have completely transformed in the last 25 years. During my clinical training, I watched too many patients succumb, often quickly, to their disease. Fast forward to today, and even with advanced or aggressive forms of cancer, many patients go on to live long, happy, productive lives.

Of course, much progress still lies ahead. Over the next ten years, I see our efforts focused in three key areas, which all join together to drive progress in oncology. The first leg is AI and machine learning. With these technological advances, we will be even better equipped to plan patients' treatments and determine which approach is best for which patient.

While AI-based methods will unburden oncologists from some of the more labor-intensive, time-consuming tasks, deep scientific and clinical expertise will be especially critical. That's because we'll have to judge the validity of what the algorithms tell us. After all, those algorithms are only as good as the data used to design them, and as AI end-users, we won't always know if that data were good or bad. So expert knowledge of oncology, both its underlying science and clinical care, represents the second leg of the stool.

The final leg is the rapid progress we'll see in personalized cancer care. This personalized approach has many inputs, including the molecular biology and genetics of patients and their tumors as well as the anatomy of their organs and tissues. It is about choosing which treatments are likely to work best while avoiding those with the greatest potential for harm, whether short-term or long-term. It is also about treating our patients and their families as the individuals they are, with unique psychological and emotional needs, and partnering together to heal the whole person.

The Ethical Dilemma of Imperfect AI

Jayashree Kalpathy-Cramer, PhD
Director, QTIM Lab, MGH;
Associate Professor of Radiology, HMS

Is imperfect health care better than no health care? As we look ahead to 2030, when AI and machine learning will be more embedded in medicine, we'll need to deeply consider this question.

Today, the majority of data used to train machine learning algorithms are "WEIRD" — derived from Western, educated, industrialized, rich, and democratic countries. If those training data contain any bias — for example, sampling more white patients than non-white patients — we know that the resulting AI can propagate and even amplify those biases. For example, we've seen this manifest as racial disparities in the performance of speech and face-recognition algorithms as well as algorithms used to allocate health services. Those have been chilling wake-up calls.

At the same time, we already live in a world where billions of people lack access to basic health care. For example, India is home to over 1 billion people, yet has around 200 or so pediatric ophthalmologists to care for its youngest residents — an order of magnitude fewer per capita than in the US where the disease is much less prevalent. Across the globe, babies go blind simply because they can't get the diagnosis and eye care they need.

Over the last few years, my colleagues and I have developed an AI-based algorithm that can detect such highly treatable forms of eye disease in premature babies — in many cases, outperforming expert ophthalmologists. Particularly in areas where health care access is limited, it could augment the skills of local health care workers, who often lack ophthalmology training, and enable them to provide better care. In India, that could mean preserving the sight of thousands of babies — and all of the opportunities that come with healthy vision.

So, as we consider when it is ethical to use our imperfect algorithms, we must also decide when it is unethical not to use them.

Widespread Whole-Genome Sequencing for Medicine

Elizabeth Karlson, MD
Director of the Rheumatic Disease Epidemiology Research Program, BH; Professor of Medicine, HMS

Genetics isn't a part of everyday medicine. But in 10 years it will be.

Today, as clinicians, we assess patients' family histories to understand what diseases run in their families — a proxy for what genes our patients likely carry and what genetic diseases they might be at risk for. We take detailed personal histories, with questions about lifestyle, smoking, and diet, that also tell us something about disease risk. And we order lab tests to get a deeper sense of biological factors, like high cholesterol, that indicate an elevated disease risk. With all of this input, we devise our output: evidence-based recommendations to help treat or, even better, prevent disease.

Despite these efforts, our understanding of patients' risk of disease is often incomplete. Family history can be an unreliable source of genetic information, particularly when it comes to common diseases. But a whole genome sequence — a readout of all of the letters that make up a person's DNA — is much more precise. And, thanks to the wonders of biomedical technology and human ingenuity, it is also much more affordable than it was just five years ago.

By mining the information within patients' genomes, researchers have discovered that it is possible to identify patients at highest risk for a range of common diseases, including heart disease, inflammatory bowel disease, breast cancer, and others. By expanding the use of this "polygenic risk scoring" approach, it is likely that even more conditions will be added to this list.

There remain significant barriers to overcome before whole genome sequencing can become a part of mainstream medicine, including issues related to data analysis, genetic privacy, clinical implementation, and, importantly, health equity. But we are already glimpsing its remarkable promise for one of the holy grails of medicine: disease prevention.

Transforming the Role of Radiologists in Detecting Intimate Partner Violence

Bharti Khurana, MD
Director, Trauma Imaging Research and Innovation Center, BH; Assistant Professor of Radiology, HMS

Consider a scenario that plays out millions of times a year across the world: a middle-aged woman walks into her local emergency room with a suspected forearm fracture. As part of her initial evaluation, she is asked the standard screening questions for intimate partner violence (IPV), to which she replies "no." The ER physician orders an X-ray, the radiologist reads it, identifying a fracture in the right distal ulna, and writes up a report. The patient's arm is put in a temporary cast. She is given a referral to an orthopedic surgeon and sent home.

The woman's immediate injuries were treated, but what was missed? Her care team failed to recognize that she is a victim of IPV. But by 2030, with the help of an AI-powered decision support tool that my colleagues and I are now developing, it is my hope that such failures will decrease dramatically.

With AI, we can now harness standardized, evidence-based guidelines to help reduce the variability — and often, subjectivity — that underlies current radiology practice. Moreover, we can begin to integrate automated, imaging-based tools with patients' electronic health records, which in the case of IPV, will help alert health providers to a history of recurrent injuries and other patterns consistent with non-accidental trauma.

By putting these capabilities to work, we can transform the practice of radiology. Not only will we be able to more readily detect the hidden signs of IPV, but we will also be liberated from a host of mundane, time-consuming tasks — making it possible for us to become more deeply involved in patient care. After all, isn't that why we pursued careers in medicine — not to be squirreled away for hours in the reading room, but instead, to make a real difference in patients' lives?

AI Serving Patients: Chatbots, Virtual Visits, and Medical Records at Your Fingertips

Adam Landman, MD
VP, Chief Information and Digital Innovation Officer, BH; Associate Professor of Emergency Medicine, HMS

Much attention is paid to how clinicians' lives will be improved by AI. But let's remember that AI can — and will — make patients' lives better, too.

If you asked me a few months ago to predict how digital technology would improve patient care in the next decade, I would have said that the burden of appointment scheduling would move online, handled more quickly and seamlessly by chatbots and other AI-driven tools. And that triaging patients based on their symptoms and health histories would become automated, with chatbots advising: "Head to urgent care," or "If you are not better in a few days, book an appointment." That appointment could be a virtual visit — similar to a secure FaceTime call — and not in person.

But COVID-19 has accelerated the digital transformation of health care. We used AI chat bots to help triage patients with possible exposure or symptoms to the appropriate care setting. And virtual care was the preferred first step to reduce the likelihood of viral spread. We achieved years of digital progress in a handful of months. Now, we must learn from our experiences and continue to use virtual care technologies when appropriate instead of reverting to our old ways.

Massive changes are also underway regarding patients' medical data. Fundamental policy shifts are moving toward a mandate that patients' data be made available to them — and in electronic form. For example, a new requirement gives patients the ability to connect their electronic health records to third-party apps, such as those which offer reminders to take prescription medications. Making medical data more readily available is really stirring the pot of innovation, fueling the creation of novel health-related apps for patients. Apple has been a leader in this space with its Health app. Now, a handful of organizations are collaborating to bring the same data sharing and interoperability standards to Android devices.

As these efforts take root, even more data will be put in patients' hands, such as the notes clinicians take during a clinical visit. There's a price to be paid for such liberation — exposing patients' medical information to potential theft and misuse — so data privacy and security will remain vital. But when it comes to their health data, patients will now be in the driver's seat, choosing what and with whom they want to share.

What Will We Do with Our AI "Debt"?

Thomas McCoy, MD
Director of Research, Center for Quantitative Health, MGH; Assistant Professor of Psychiatry, HMS

"AI in health care" often means the use of supervised machine learning for clinical prediction. In that framework, investigators and innovators train models for an array of clinical tasks — from recognizing strokes to stratifying dementia risk — using machine learning algorithms applied to the health data generated through routine care.

The resulting trained models help predict the future based on relationships among facts observed in the past. Such reasoning presumes that historical relationships — codified in the data used to train the models — will repeat themselves: what has been will continue to be. If we rely on these models in clinical decision-making, that presumption becomes a self-fulfilling prophecy.

Trained models at the point of care may well deliver great value by homogenizing care — bringing lower-performing clinicians up to the level of the historical high performers. But this "history in a bottle" is ill-equipped to improve the state of the art in medicine and obscures the extent to which it perpetuates the status quo. For historically underserved patient groups, more deeply ingraining the status quo is a commitment to structural inequity. For patients benefiting from breakthrough cures, the status quo is a commitment to disregarding the new hope and new health arising from new cures.

The models we train on our historical data are a form of debt. That technical debt, like any other, requires service. And that service comes as careful stewardship of algorithms and models, not just during creation, but over their full life cycle.

AI is a plausible means of achieving the critical goal of higher quality care at lower cost. So, we'll need to take on AI debt if we are going to build the best possible version of health care in the decades ahead. As we do so, we must continue to earn patient and community trust — thoughtfully balancing risks and benefits — by dutifully making our monthly payments.

The Promise and Peril of Gene Therapy

Patricia Musolino, MD, PhD
Co-Director, Pediatric Stroke and Cerebrovascular Service, MGH; Assistant Professor of Neurology, HMS

Gene therapy is revolutionizing patient care, particularly for rare, single-gene diseases, which can be devastating for patients and their families. The development of one-time, potentially curative treatments for diseases like spinal muscular atrophy (SMA) and adrenoleukodystrophy (ALD) is a major achievement — decades in the making — that should be appropriately celebrated.

At the same time, as remarkable as gene therapy is, it is incredibly expensive. In fact, these are among the priciest arrows the medical community now has in its quiver. As a society, we will need to grapple with that reality.

But we also cannot rest on our laurels. As physicians and scientists, we must continually push the frontiers of biomedical innovation. For rare diseases like ALD, that means discovering new ways of halting, or even reversing the disease at its earliest stages — ideally, with a pill or other inexpensive and readily-delivered therapy. Because gene therapy will not be a viable therapeutic option for every patient.

Yet these innovations won't wash away the ethical dilemmas that surround gene therapy. Actually, quite the opposite. With the rise of new gene-editing tools, like CRISPR, it will become possible to engineer ever more subtle and precise genetic changes within patients' cells. In the next decade, we'll see clinical trials emerge that apply gene-editing to the treatment of more common diseases, like heart disease and diabetes.

So, we must take seriously our social responsibility to ensure that everyone understands how these technologies work: what they can and cannot do, and what they cost. And we'll need to create thoughtful policies and legislation to guide how they can be used in research and medicine. If we don't, we will unintentionally widen the health disparities that already exist here in the U.S. and around the world.

Preparing the World for the Next Infectious Disease Threat

Rochelle Walensky, MD
Chief, Infectious Disease, Steve and Deborah Gorlin MGH Research Scholar, MGH; Professor of Medicine, HMS

As the novel coronavirus SARS-CoV-2 has spread across the globe, we are now in the throes of a major pandemic. While it is impossible to ignore this viral threat and its impact on patients and health systems across the world, this crisis will subside. And in ten years, we'll be staring down other infectious disease challenges.

What will those be?

Perhaps one of the biggest threats is likely to be a known enemy: antimicrobial resistance. Public health experts predict that deaths due to antimicrobial resistance will outstrip cancer mortality by 2050. In order to address this problem in a serious, systematic way, we must change the paradigm of antimicrobial drug development and use.

That means preserving the antibiotics we have — preventing widespread, indiscriminate use lest they become obsolete — and building a steady pipeline of novel antimicrobial therapies to hold in tight reserve for only the most severe, drug-resistant infections. And we'll need to create the right incentives to get the biopharma industry engaged in this vital effort.

We'll also need innovative diagnostics to help predict the susceptibilities of major infectious agents that result in things like sepsis, in a rapid timeframe, so that treatment can be quickly optimized. Importantly, we'll also have to think beyond traditional antimicrobial drugs. From an evolutionary perspective, the microbes will always be a step ahead of us.

Of course, we cannot forget the health dangers posed by climate change. As just one example, rising global temperatures have expanded the geographic reach of tick-borne infections in the U.S. in the last 20 years. How will other, more deadly infections, like malaria, yellow fever, and dengue respond? And what about the emergence of novel microbes, like COVID-19?

As this pandemic has proven, short-sightedness and lack of preparation put lives at risk. We cannot let that happen again.

A New Paradigm for Ear Health

Bradley Welling, MD, PhD
Chief of Otolaryngology, Mass. Eye and Ear, MGH; Walter Augustus Lecompte Professor and Chair of Otolaryngology–Head and Neck Surgery, HMS

The human ear is a marvel of nature, giving us the ability to hear and maintain balance. At the same time, it is housed in the temporal bone — the hardest bone in the body — which makes studying the ear and its components a significant challenge. While major strides have been made over the last several years to unlock the ear's complex biology, we have much yet to learn. Over the next decade, efforts like the Temporal Bone Registry at Mass. Eye and Ear, which collects temporal bones from deceased donors for sophisticated cellular and molecular studies, will help us push the frontiers of knowledge even further.

We're also going to improve how we apply that scientific understanding to our patients. We'll no longer divide hearing loss into just two gross categories, conductive or sensorineural. Instead, we'll be able to dig even deeper into the root biological causes and pinpoint the origins of patients' hearing loss. And we'll have powerful treatments targeted at those underlying causes. For the millions of people worldwide who suffer from age-related hearing loss, that means therapies that can shield vulnerable cells and tissues as well as regenerative therapies that can regrow the tiny hair-cells and synaptic connections required for healthy hearing.

Importantly, we'll also have the capabilities to address a troubling and widespread condition, known as tinnitus or ringing in the ears. Over 50 million people in the US alone suffer from it, yet there are no medical treatments. While the majority of patients learn to cope with their tinnitus, some 5 percent are so deeply affected that it rules their life. For those people and the many others who suffer from hearing loss, we can — and will — do better.

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8:10 AM | 8:25 AM

Opening Remarks

Dr. Klibanski will welcome participants to the 2020 World Medical Innovation Forum, a global — and this year, virtual — gathering of more than 5,000 senior health care leaders. This annual event was established to respond to the intensifying transformation of health care and its impact on innovation. The Forum is rooted in the belief that no matter the magnitude of that change, the center of health care needs to be a shared, fundamental commitment to collaborative innovation – industry and academia working together to improve patient lives. No collaborative endeavor is more pressing than responding to the COVID-19 pandemic.

Introduction

Scott Sperling, Co-President, Thomas H. Lee Partners; Chairman of the Board of Directors, Mass General Brigham

Anne Klibanski, MD, President and CEO, Mass General Brigham

8:25 AM | 8:50 AM

Care in the Next 18 Months – Routine, Elective, Remote

Hospital chief executives reflect on how health care will evolve over the next 18 months in the face of COVID-19. What will routine health care look like? What about elective surgeries and other interventions? And will care-at-a-distance continue to be an essential component? Simply put, how will we provide, manage, and pay for health care in a world forever changed by COVID-19?

Moderator

Gregg Meyer, MD, Chief Clinical Officer, PHS; Interim President, NWH; Professor of Medicine, HMS

John Fernandez, President, MEE; President, Ambulatory Care, Mass General Brigham

Elizabeth Nabel, MD, President, Brigham Health; Professor of Medicine, HMS

Peter Slavin, MD, President, MGH; Professor, Health Care Policy, HMS

8:50 AM | 9:15 AM

COVID-19: Technology Solutions Now and in the Future

Experts leading large teams at the epicenter of the coronavirus outbreak discuss how technology is shaping the pandemic response today and in the coming years. What technology categories are most important? What tools are healthcare organizations, biopharmaceutical companies, and other organizations leveraging to battle this crisis? How will those tools evolve? And, importantly, how can technology inform the medical response to future pandemics? What were the biggest technology surprises in the current response?

Moderator

Alice Park, Senior Writer, TIME

Stéphane Bancel, CEO, Moderna

Paul Biddinger, MD, Medical Director for Emergency Preparedness, MGH; Associate Professor of Emergency Medicine, HMS

David Kaufman, MD, PhD, Head of Translational Development, Bill & Melinda Gates Medical Research Institute

Rochelle Walensky, MD, Chief, Infectious Disease, Steve and Deborah Gorlin MGH Research Scholar, MGH; Professor of Medicine, HMS

9:15 AM | 9:40 AM

Digital Health Becomes a Pillar: Tools, Payment, and Data

Deployed in the crucible of the coronavirus pandemic, digital health has now become an essential pillar in the delivery of care. Why is that significant? How and why did it happen? What are the essential tools and components? How is the electronic health record and other health data contributing to this digital movement?

Are there novel use cases for telehealth that arose during the first phase of the COVID-19 pandemic? How can digital technologies help enable a full return to work? Thinking ahead to the fall and a possible second wave, are there things we should be doing today to ensure this technology to better detect and profile a resurgence and enhance the patient benefit.

Moderator

David Louis, MD, Pathologist-in-Chief, MGH; Benjamin Castleman Professor of Pathology, HMS

Alistair Erskine, MD, Chief Digital Health Officer, Mass General Brigham
Adam Landman, MD, VP, Chief Information and Digital Innovation Officer, BH; Associate Professor of Emergency Medicine, HMS
Brooke LeVasseur, CEO, AristaMD
Lee Schwamm, MD, Director, Center for TeleHealth and Executive Vice Chair, Neurology, MGH; Vice President, Virtual Care/Digital Health, Mass General Brigham; Professor, Neurology, HMS

9:40 AM | 9:45 AM

BREAK

9:45 AM | 10:05 AM

FIRESIDE CHAT: Bayer Pharma Reflections on Innovation: Creating, Collaborating, and Accelerating Discovery During and After a Pandemic

Dr. Moeller will reflect on how Bayer is weathering the organizational challenges posed by the COVID-19 pandemic. How does a global pharmaceutical company continue to drive drug development when its labs are shut down? What are the critical elements needed to keep the engines of innovation firing even in the face of a global public health crisis? How does a global R&D enterprise plan for an uncertain fall 2020 given a potential return of the virus.

Introduction

John Fish, CEO, Suffolk; Chairman of Board Trustees, Brigham Health

Moderator

Janet Wu, Bloomberg

Joerg Moeller, MD, PhD, Head of Research and Development, Pharmaceuticals Division, Bayer AG

10:05 AM | 10:30 AM

The Patient Experience During the Pandemic

The coronavirus outbreak is not only testing health care staff and resources, it is also having an overwhelming impact on patients. This panel will focus on the approach and technologies providers are using to address the patient experience along the continuum of care including behavioral health

Moderator

Thomas Sequist, MD, Chief Patient Experience and Equity Officer, Mass General Brigham; Professor of Medicine and Health Care Policy, HMS

Anjali Kataria, CEO, Mytonomy
Daniel Kuritzkes, MD, Chief, Division of Infectious Diseases, BH; Harriet Ryan Albee Professor of Medicine, HMS
Peter Lee, PhD, Corporate Vice President, Microsoft Research and Incubation
Jag Singh, MD, PhD, COVID-19 Patient; Cardiologist and Founding Director, Resynchronization and Advanced Cardiac Therapeutics Program, MGH; Professor of Medicine, HMS

10:30 AM | 10:55 AM

The Role of AI and Big Data in Fighting COVID-19 and the Next Global Crisis – Successes and Aspirations

AI is a key weapon used to fight COVID-19. What are the biggest successes so far? Which applications show the most promise for the future? Can it help a return to work? Can AI help predict and even prevent the next global health care crisis?

Moderator

Alice Park, Senior Writer, TIME

Mike Devoy, MD, EVP, Medical Affairs and Pharmacovigilance and CMO, Bayer AG

Karen DeSalvo, MD, Chief Health Officer, Google Health

Keith Dreyer, DO, PhD, Chief Data Science Officer, PHS; Vice Chairman, Radiology, MGH; Associate Professor, Radiology, HMS

10:55 AM | 11:20 AM

Designing for Infection Prevention: Innovation and Investment in Personal Protective Equipment and Facility Design

As with many pathogens, prevention is the best defense against SARS-CoV2, the virus that causes COVID-19. Panelists will discuss the insights, design strategies, technologies, and practices that are emerging to guard against infection and how those innovations are being applied to protect health care providers and their patients.

Based on what was learned during the spring of 2020, are there specific changes that will lessen morbidity and mortality in a potential a second wave?

Moderator

Erica Shenoy, MD, PhD, Associate Chief, Infection Control Unit, MGH; Assistant Professor, HMS

Shelly Anderson, SVP, Strategic Initiatives and Partnerships, & Chief Strategy Officer, BH

Michele Holcomb, PhD, EVP, Strategy and Corporate Development, Cardinal Health

Guillermo Tearney, MD, PhD, Remondi Family Endowed MGH Research Institute Chair, Mike and Sue Hazard MGH Research Scholar, MGH; Professor, Pathology, HMS

Teresa Wilson, Director/Architect, Colliers Project Leaders

11:20 AM | 11:25 AM

BREAK

11:25 AM | 11:45 AM

FIRESIDE CHAT: Preparing for Fall 2020 and Beyond: Production, Innovation and Optimization

How does a global medical technology and life sciences company respond to the health challenges posed by COVID-19? Mr. Murphy will reflect on how his organization is working to meet the unprecedented demand for life saving medical equipment for diagnosing, treating, and managing coronavirus patients. How does a large manufacturer make adjustments to FDA regulated products and supply chains in time to help lessen the impact of a second wave of COVID-19 infections.

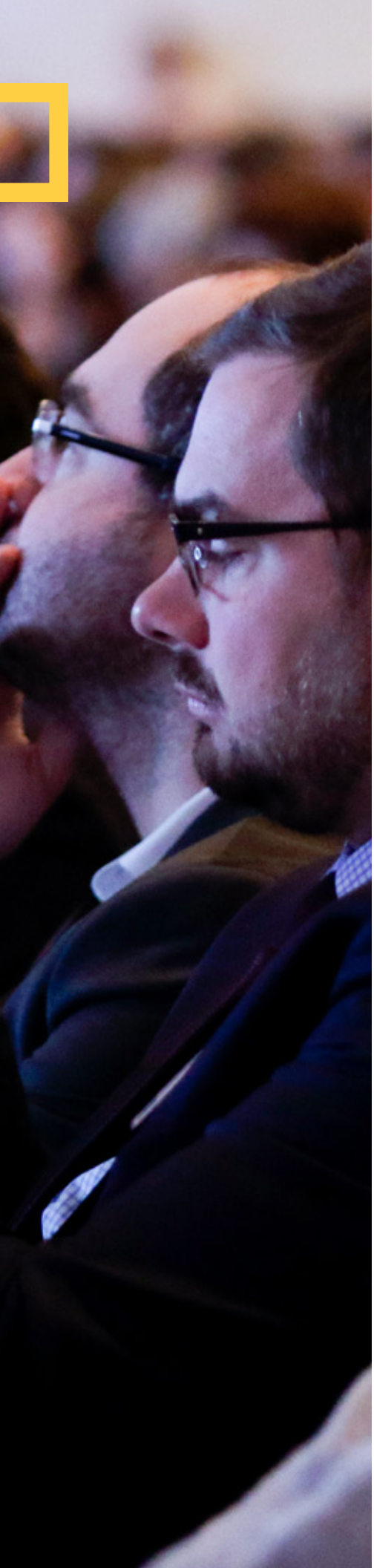
Introduction

Jonathan Kraft, President, The Kraft Group; Chair, Mass General Hospital Board of Trustees

Moderator

Timothy Ferris, MD, CEO, MGPO; Professor, HMS

Kieran Murphy, CEO, GE Healthcare



11:45 AM | 12:10 PM

Big Tech and Digital Health

Tech giants are dedicating their vast resources to aid in the global response to the coronavirus. This panel will highlight how the big data and computational power of major tech companies is being deployed to help contain the current pandemic through new technologies and services, enable return to work, and how it could help prevent future ones.

Moderator

Natasha Singer, Reporter, New York Times

Amanda Goltz, Principal, Business Development, Alexa Health & Wellness, Amazon

Michael Mina, MD, PhD, Associate Medical Director, Molecular Virology, BH; Assistant Professor, Epidemiology, Immunology and Infectious Diseases, Harvard Chan School

Marcus Osborne, VP, Walmart Health, Walmart

Jim Weinstein, MD, SVP, Microsoft

12:10 PM | 12:35 PM

LUNCH BREAK

12:35 PM | 12:55 PM

FIRESIDE CHAT: Insights on Pandemics and Health Care from the National Security Community

General Alexander, a renowned expert on national security as well as pandemics and health care, will reflect on how AI can help identify and predict future global disease outbreaks and enable fully reopening commerce. He will also discuss what health care systems can learn from the response to COVID-19 to ensure preparedness for the next infectious disease challenge.

Moderator

Gregg Meyer, MD, Chief Clinical Officer, Mass General Brigham; Interim President, NWH; Professor of Medicine, HMS; Colonel (Ret.) US Air Force

General (Ret.) US Army Keith Alexander, Co-CEO, IronNet Cybersecurity

12:55 PM | 1:20 PM

Calibrating Innovation Opportunity and Urgency: Medical and Social

The social and medical needs of patients are deeply intertwined, yet there are significant gaps in the tools and technologies being developed to help address those needs. These are especially apparent in the non-uniform impact of COVID-19. Harnessing opportunities, particularly for patients whose needs fall into the low medical complexity/high social complexity category — a group often overlooked by health care innovators.

Moderator

Natasha Singer, Reporter, New York Times

Giles Boland, MD, Chair, Department of Radiology, BH; Philip H. Cook Professor of Radiology, HMS

Amit Phadnis, Chief Digital Officer and GE Company Officer, GE Healthcare

Krishna Yeshwant, MD, General Partner, GV; Instructor in Medicine, BH

1:20 PM | 1:45 PM

FDA Role in Managing the Crisis and Anticipating the Next

The FDA and other regulatory bodies have played a key role in managing the coronavirus pandemic. How will the agency's priorities shift in the coming months as community transmission (ideally) slows? What is the FDA's role in return to work? What is the FDA doing to anticipate future health crises? How will these drive new tools and effect that rate of innovation?

Moderator

Ravi Thadhani, MD, CAO, Mass General Brigham; Professor of Medicine and Faculty Dean for Academic Programs, HMS

Amy Abernethy, MD, PhD, Principal Deputy Commissioner and Acting CIO, FDA

Lindsey Baden, MD, Director, Clinical Research, Division of Infectious Diseases, BH; Professor, HMS

1:45 PM | 2:05 PM

FIRESIDE CHAT: Keeping Priority on the Biggest Diseases

Biogen CEO Michel Vounatsos will discuss how Biogen is tackling some of society's most devastating neurological and neurodegenerative disorders and share his perspective on the impact the global COVID-19 pandemic is having on the biopharmaceutical industry.

Moderator

Jean-François Formela, MD, Partner, Atlas Venture

Michel Vounatsos, CEO, Biogen

2:05 PM | 2:30 PM

Building the Plane While Flying: The Experience of Real-Time Innovation from the Front Line

The COVID-19 crisis has required continuous, real time innovation, impacting the way care is delivered on the front lines and across the care continuum. This panel will present the perspective, innovations and experiences of caregivers interacting directly with patients across the continuum of care – acute, post-acute, rehab and home care.

Moderator

Ann Prestipino, SVP; Incident Commander, MGH; Teaching Associate, HMS

Theresa Gallivan, RN, Associate Chief Nurse, MGH

Karen Reilly, DNP, RN, Associate Chief Nursing Officer, Critical Care, Cardiovascular and Surgical Services, BH

Ross Zafonte, DO, SVP, Research Education and Medical Affairs, SRN; Earle P. and Ida S. Charlton Professor of Physical Medicine and Rehabilitation, HMS

2:30 PM | 2:55 PM

CEO Roundtable: Will the Innovation Model Remain as it Was

As we envision a post-COVID-19 world, how will the model for biomedical innovation change? What lessons have been learned? Was this pandemic a once-in-a-lifetime event or should organizations begin to weave pandemic planning into their business and operations strategies? Panelists will discuss these and other related questions.

Moderator

Janet Wu, Bloomberg

Mike Mahoney, CEO, Boston Scientific

Bernd Montag, PhD, CEO, Siemens Healthineers

2:55 PM | 3:05 PM

BREAK

3:05 PM | 3:30 PM

Emergency and Urgent Care: How COVID-19 Vulnerabilities and Solutions Will Change the Model

How are the roles of emergency medicine and urgent care changing in light of the COVID-19 pandemic? Panelists will discuss this topic as well as how current and anticipated new technologies can aid in the delivery of community, urgent, and emergency care now and in the future.

Moderator

Ron Walls, MD, EVP and Chief Operating Officer, BH; Neskey Family Professor of Emergency Medicine, HMS

Troyen Brennan, MD, EVP and CMO, CVS Health

David Brown, MD, Chair, Department of Emergency Medicine, MGH; MGH Trustees Professor of Emergency Medicine, HMS

Julie Lankiewicz, Head, Clinical Affairs and Health Economics Outcomes Research, Bose Health

Michael VanRooyen, MD, Chairman, Department of Emergency Medicine, BH; Director, Humanitarian Initiative, Harvard University; Professor, HMS

3:30 PM | 3:55 PM

Accelerating Diagnostics – Maintaining the Priority: Lab, Home, and Digital

COVID-19 diagnostics, a linchpin in controlling viral spread. How do the diagnostics industry, and academic medicine, develop the tests that enable group activities? What is the profile of diagnostic tests coming online in the coming months and into next year? What lessons can be learned to guide the global health community in future disease outbreaks? Given the biological complexity, required performance standards, and immense volume is a simple DTC assays possible and if so what are some challenges that would need to be addressed.

Moderator

Jeffrey Golden, MD, Chair, Department of Pathology, BH; Ramzi S. Cotran Professor of Pathology, HMS

Jim Brink, MD, Chief, Department of Radiology, MGH; Juan M. Taveras Professor of Radiology, HMS
John Iafrate, MD, PhD, Director, Center for Integrated Diagnostics, MGH; Professor, Pathology, HMS
Celine Roger-Dalbert, VP Diagnostic Assays R&D – Integrated Diagnostic Solutions, BD Life Sciences
Matt Sause, President and CEO, Roche North America

3:55 PM | 4:15 PM

FIRESIDE CHAT: Return to Work: Understanding the Technologies and Strategies

Diagnostic testing is a linchpin of the worldwide response to the coronavirus. How does a global leader pivot to develop molecular diagnostics for a novel global pathogen? How does it scale, including managing international supply chains, to provide unprecedented levels of products and services. What are the expectations for return to work and a possible disease spike in fall 2020 or beyond. How will the diagnostics industry be permanently changed.

Moderator

Peter Markell, EVP, Finance and Administration, CFO and Treasurer, Mass General Brigham
Marc Casper, CEO, Thermo Fisher Scientific

4:15 PM | 4:40 PM

Digital Therapeutics: Current and Future Opportunities

Digital therapeutics (DTx) represents an emerging class of therapies that is poised for significant growth. Yet already, these software-driven, evidence-based tools for the prevention, management, and/or treatment of disease are already changing patients' lives. This panel will address how existing DTx are having an early impact — in the COVID-19 pandemic — and where current development efforts are headed in the coming years especially if there is an aggressive return of the virus in the fall 2020 or later.

Moderator

Hadine Joffe, MD, Vice Chair for Research, Department of Psychiatry, Executive Director, Mary Horrigan Connors Center for Women's Health and Gender Biology, BH; Paula A. Johnson Professor, Women's Health, HMS

Priya Abani, CEO, AliveCor
Julia Hu, CEO, Lark Health
Dawn Sugarman, PhD, Assistant Psychologist, Division of Alcohol, Drugs, and Addiction, McLean; Assistant Professor, Psychiatry, HMS

4:40 PM | 5:05 PM

Investment During and After the Coronavirus Crisis

The investment environment in life sciences and health care overall was at record levels for most of the last decade. What will this environment look like in the wake of the COVID-19 pandemic – especially over the near to mid-term? Will investor priorities and enthusiasm shift? What is the investor role in developing new coronavirus tests, vaccines, and therapeutics?

Moderator

Roger Kitterman, VP, Venture and Managing Partner, Partners Innovation Fund, Mass General Brigham

Jan Garfinkle, Founder and Manager Partner, Arboretum Ventures
Phillip Gross, Managing Director, Adage Capital Management
Christopher Viehbacher, Managing Partner, Gurnet Point Capital

5:05 PM | 5:10 PM

Closing Remarks

Gregg Meyer, MD, Chief Clinical Officer, Mass General Brigham; Interim President, NWH; Professor of Medicine, HMS (World Forum Co-Chair)
Ravi Thadhani, MD, CAO, Mass General Brigham; Professor of Medicine and Faculty Dean for Academic Programs, HMS (World Forum Co-Chair)

NOTE: Times, panels, speakers and content are subject to change.

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The Innovation Growth Board provides Mass General Brigham with independent guidance on commercial strategy, market potential and collaborative opportunities.

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The Innovation Fellows Program provides short-term, experiential career development opportunities for future leaders in health care focused on accelerating collaborative innovation between science and industry. It facilitates personnel exchanges between Harvard Medical School staff from Mass General Brigham hospitals and participating biopharmaceutical, device, venture capital, digital health, payor and consulting firms. A successful example of open innovation, Fellows and Hosts learn from each other as they collaborate on projects ranging from clinical development to digital health and artificial intelligence to new care delivery models and industry disruption.

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Craig T. Basson, MD, PhD, Chief Medical Officer, Boston Pharmaceuticals, Inc.

We welcome interested Fellow candidates and potential host organizations to learn more at: **innovation.partners.org/about/special-programs/innovation-fellows-program**

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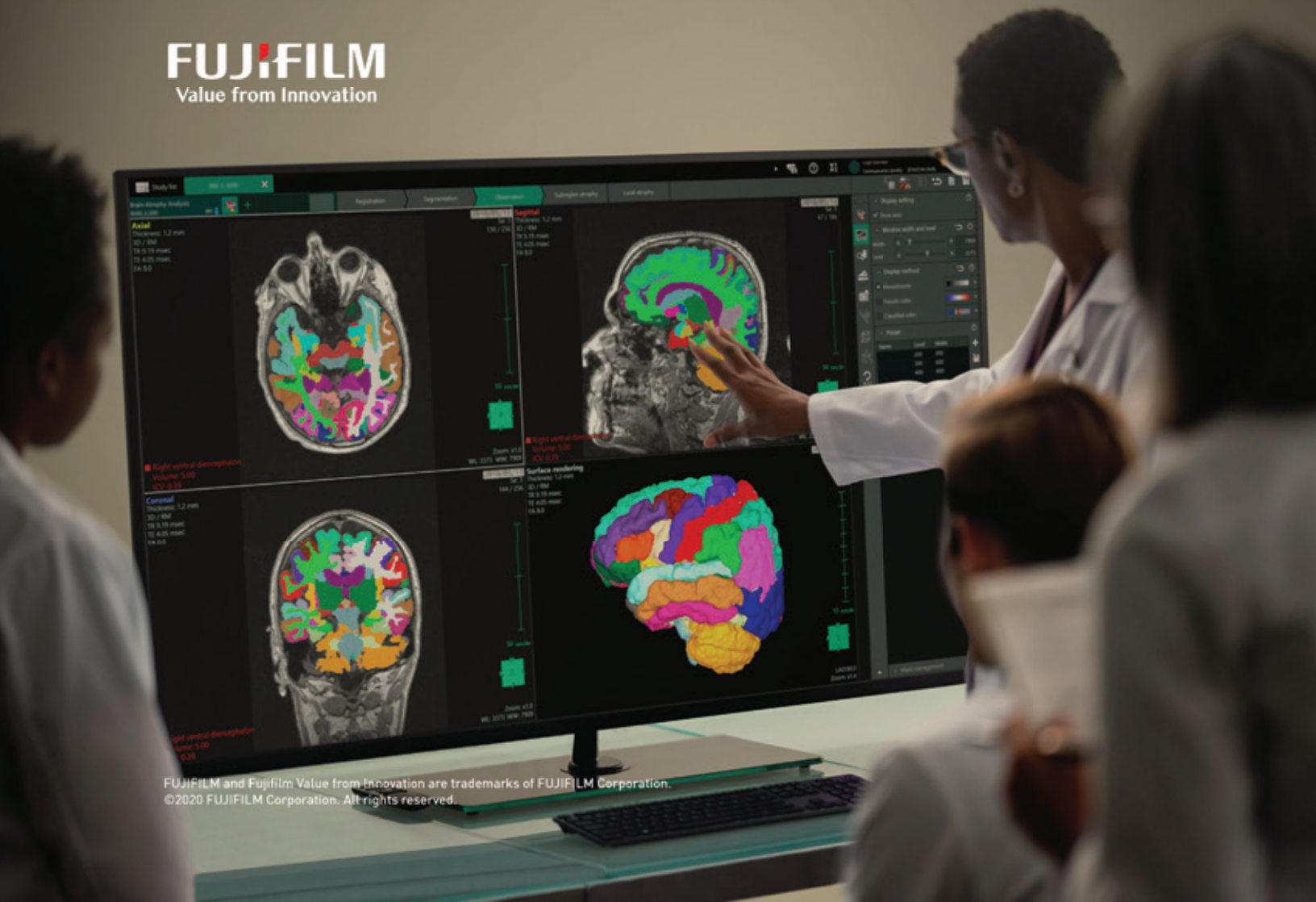

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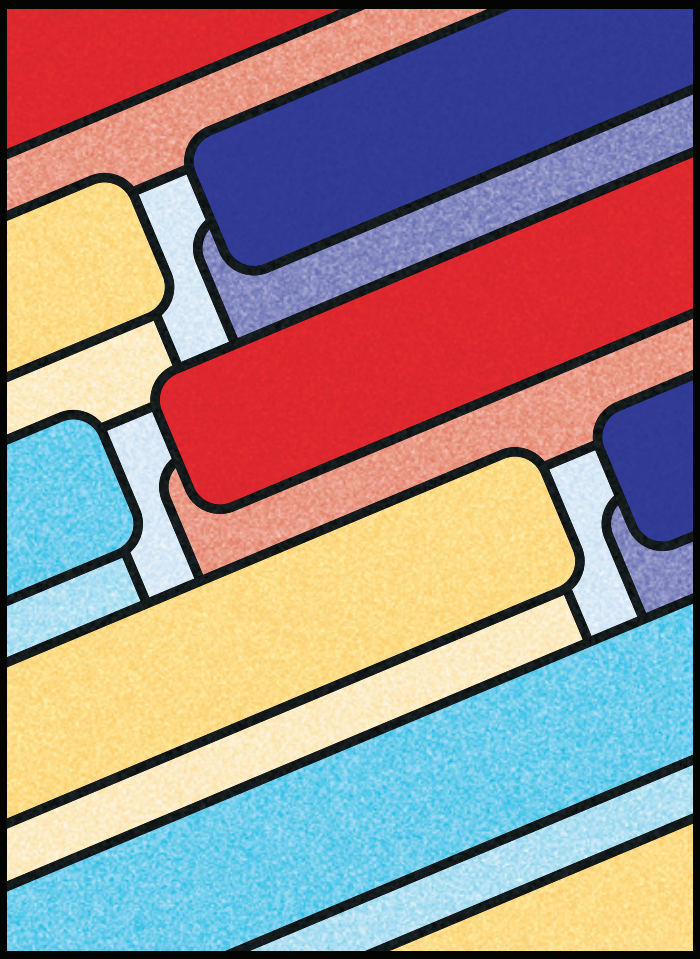

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A special thanks to Innovation's Planning Committee and Event Team for their unstinting commitment over the last 18 months to create the 2020 virtual World Medical Innovation Forum.

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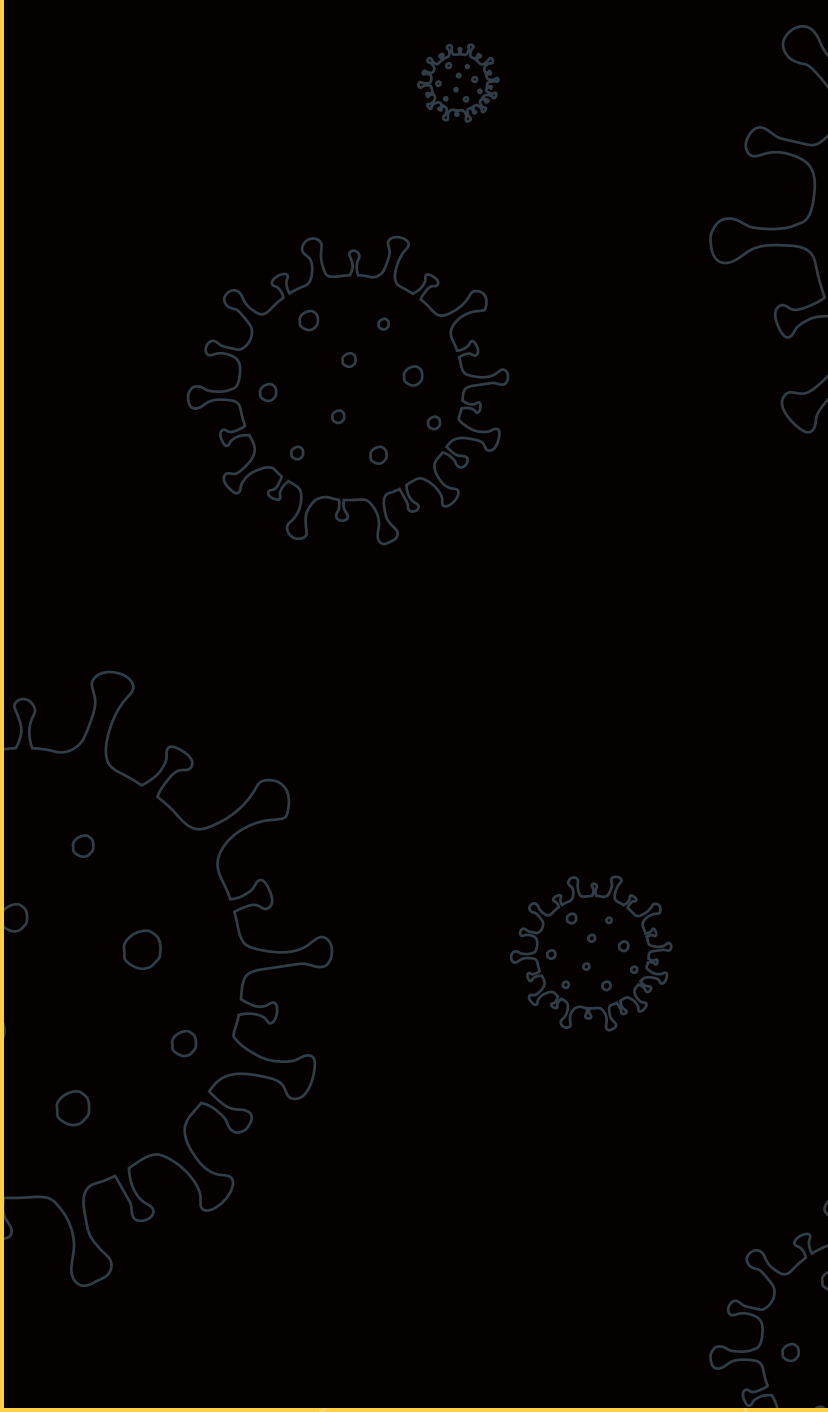

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