CURALINK

Welcome to CuraLink—a newsletter for innovators building a healthier future for all.

Dear Cura Community,

Welcome back to CuraLink, a newsletter and interview series featuring the most pressing issues in human health, unmet medical needs and the emerging innovations and technologies directed to address them.

In March, we spoke to Kelli Kedis Ogborn, a space economy strategist pushing the boundaries of innovation in the cosmos. Ms. Kedis Ogborn shared how developments in outer space are reshaping life and health care on Earth. Read the interview at bit.ly/CuraLink-25.

In late February, some of health care's brightest minds and daring pioneers gathered at the 11th annual Lake Nona Impact Forum. While there, I had the pleasure of sitting down with one of the most prolific thought leaders in health care, Dr. David Feinberg. The pediatric psychiatrist and healthcare tech executive, who previously led Google Health, Cerner as well as UCLA Health and Geisinger Health systems, is harnessing tech for the public good leading Oracle Health.

Robin L. Smith, MD
Founder, President and Chairman, Cura Foundation

While predictions around machine learning, big data and technological innovation are often abstract, Dr. Feinberg's insights are clear: Tech is poised to create a future far better than we can imagine. But it's going to take more than slick new wearables or therapy apps. We need a system-wide approach.

In this month's CuraLink, Dr. Feinberg explains why access to more health data isn't enough to change behavior, the need to move faster toward value-based care and how the path to fixing health care starts with education.

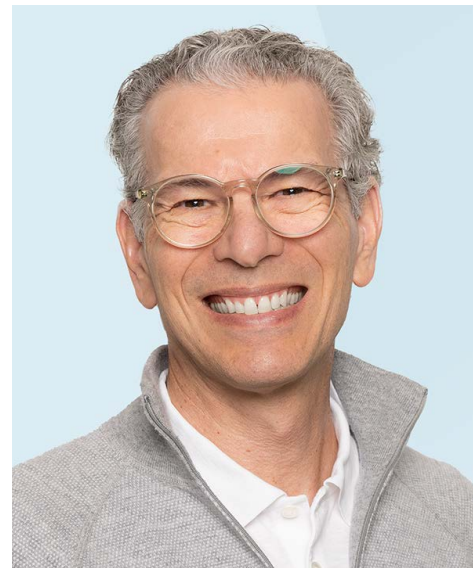**To subscribe, click here**

bit.ly/CuraLink-Subscribe

A conversation with Dr. David Feinberg

Over the last half-century, health care has consistently trended toward automation. Gone are the days of house calls and handwritten prescriptions. Now, health care involves a complex system of tech tools. Patient records are digitized, diagnoses hinge on algorithms and patients tune into their check-ups on Zoom. Technology is taking over. But how can we streamline health care without losing the human touch?

According to healthcare executive and Chairman of Oracle Health Dr. David Feinberg, the answer is simple: keeping human connection at the center of every interaction. He believes that at its core, health care is about people taking care of people. That, Dr. Feinberg says, should be the industry's "true north." In a space "focused on the latest and greatest," this perspective is refreshingly grounded and geared toward lasting change.

David Feinberg, MD, Chairman, Oracle Health

What set you on your path in medicine, and why did you specialize in pediatric psychiatry?

I initially thought I would be a pediatrician because I loved hanging out with kids and wanted to help them, but after my psychiatry rotation, I was left with more questions than answers. It was the one part of medicine that I couldn't figure out, and I wanted to learn more. This led me to specialize in child and adolescent psychiatry.

You shifted from "one patient at a time" medicine to health system and company management. What was the impetus for that change?

Early in my training, I ran a child and adolescent psychiatry clinic. My mom said: "Why are you becoming an administrator? You'll take care of fewer patients." I told her that I could actually take care of more patients if I helped the doctors on my team improve the care they delivered. Today, in my role at Oracle Health, we develop tools and systems to make it easier for patients and their families to have a clearer understanding of what's going on with the patient's disease and the care being delivered. It's been great to do this for more than just one patient at a time.

Dr. David Feinberg presenting at the Lake Nona Impact Forum in 2023. Dr. Feinberg is a thought leader in health care, having previously led Google Health, Cerner as well as UCLA Health and Geisinger Health systems

I also believe it is critical to develop and share authoritative information with the public. This is something we accomplished during the pandemic when I was at Google. Our YouTube COVID-19 information page on vaccine access and symptom management got over 50 billion impressions. Now, it has over 80 billion. It feels good to be able to share information at that scale on such important topics that could impact so many lives.

What is your biggest concern in health care today?

The biggest concern for me is the inequity in care. We're too focused on the latest and greatest, while some people don't even have neighborhoods they can walk in, can't access healthy food, suffer from community violence and are surrounded by terrible substance use and cigarette smoking. We know these situations and behaviors lead to the biggest costs in health care. But often, we are hyper-focused on esoteric new medications that keep people alive for a few weeks longer. I'm not saying this is unimportant, but depending on where you live in the U.S., you could be separated by two stops on the L in Chicago or live on two sides of the city in Palo Alto, see the same doctor and your life expectancy will vary by 25 years. That's unconscionable to me.

"Inequity in the ability to have years in your life and life in your years is terrible."

That's what keeps me up at night. I always say: "Choose your parents wisely. It leads to good outcomes." Obviously, no one gets to pick their parents. Wouldn't it be great if that didn't matter? What if every child could get support, food and a good education; feel safe and have hope and role models that look like them?

If you really want to fix health, fix education. As you get smarter or more educated, you get healthier.

Working at Oracle is the best opportunity I've ever had to impact this at scale because our core competency around infrastructure and data can make this vision a reality. We can improve the provider-patient relationships and people's situations. And we can use real-life data to help build healthier communities. In Qatar, for example, they are using our electronic health records (EHR) and, more specifically, pediatric weights, to curb pediatric obesity. Based on this data, they decide whether a fast-food restaurant or a gymnasium should open in a certain area. Data can be powerful if people use it in the right way to make decisions.

How has big data impacted patients already?

I'm not sure that it has yet. Digitizing the health record was important. We fixed practical problems like not being able to read someone's handwriting or missing charts because someone took them home over the weekend. Ultimately, digitizing the existing workflow isn't enough. It has been helpful, but it's not the real promise of tech in health care.

Now, we're incorporating disparate data sets that go far beyond the EHR. With the latest tech, we can use data to better understand who you are, who other patients like you are, the best way to engage with you and how to ensure that we're improving, not worsening, health equity.

What are the promises and pitfalls of using big data and AI?

When I was at Google, for example, we built a model for the U.K. National Health Service (NHS) around acute kidney injury. Typically, the rapid response team took four hours to diagnose this condition. Then, using our phone app with good user experience design that utilized creatinine levels we were able to decrease the diagnostic time to 14 minutes and reduce cardiac arrests by 30% and overall costs by 17%. This is just one example of how tools can assist caregivers to deliver better care.

Next, we utilized even more data with AI to predict the chances of acute kidney injury: 600,000 variables per patient in a data set of 70,000 patients. With 90% accuracy, the computer predicted that a person would be on dialysis two days before any signs or symptoms appeared. That's anticipatory medicine. That is the power of AI.

Dr. Feinberg speaking at the Oracle Cerner Health Conference in October 2022. Oracle acquired Cerner, a leading provider of digital information systems used in healthcare settings (including electronic health records) in June 2022, leading to the creation of Oracle Health

However, there is a catch. Our training data set was from a research project with Veterans Affairs and was 93% male, so the model didn't work on females. So, what if, in 10 years, after we've incorporated AI and made major developments across our healthcare systems, we've made situations worse for underrepresented groups along the way? That scares me.

My biggest worry is that we will hardwire the bad parts of health care. All of our large language models that use EHRs involve patients who have seen a doctor. They exclude anyone who's never gone due to lack of access or financial ability, for instance. This missing subset can therefore affect and skew our models. Bias in health care can also influence our training models, and we have to be cognizant of that as well.

People also talk about hallucinations in AI models. One example in health care is using ambient listening during a patient visit and then the computer writes a note. The patient was never weighed but the computer puts in a BMI, which shouldn't happen. But in this case, the BMI is close to accurate. This is a hallucination but a helpful one because the doctor should have weighed the patient.

You know the computer is going to be right a thousand times in a row, but the one time it misses, how will we catch that? It is crucial to hone the human-computer interface, know when to use technology and understand that the computer can get it wrong if we train it on the wrong models. We're still untangling the nuances here.

How will emerging technologies influence clinical care?

Whether it is the mom caring for her family, a medical provider, a case manager in the emergency room, a person running a healthcare system or just you caring for yourself, technology shouldn't get in the way of care. But, if you look at current EHRs, it often does. Providers look at the computer, not the patient, straining the patient-physician connection. Ideally, tech should augment and optimize care to easily recall medical history, summarize patient data and incorporate other factors to aid in clinical decision-making and allow for a stronger connection with the patient.

"Health care is about people caring for people. It's built on trust."

Humans are best at connecting with people, and we should rely on technology to do things that humans aren't so good at. Computer vision is a great example of this. Computers can read diabetic retinopathy scans, moles and lab pathology better

than humans. Of course, we need to ensure that data sets are diverse and that we're using the technology on the right patients.

It can take hours for a provider to get up to speed on a complex new case, but they often only have minutes. Computers can bridge this gap by operating like medical students to gather and organize information that is easy to interpret and use. AI can also help the doctor to efficiently review the patient's record, prompting the provider to ask questions and making the patient feel more connected to the provider. Today, computers are not the best at clinical decision-making, but they can play a crucial role in synthesizing medical summaries and suggesting the next steps. Providers can then spend their limited time focusing on the patient, not wading through paperwork.

Providers often think about their patients in between visits. When I was working in psychodynamic psychotherapy, my supervisor encouraged me to share that with my patients. When I did, I realized how therapeutic it can be for a patient to know that. Well, technology can help with that, too. It can help cement the provider-patient bond by giving information to a patient between visits. For example, if some news comes out about a drug, AI can help a doctor easily determine which patients the information applies to and generate a note to those patients sharing the new information. This helps the patient to feel considered, taken care of and looked out for rather than be confused or frustrated. There's no way the provider could do that without technology.

In the short term, tech can free caregivers from the terminal so they can spend more time with patients. Providers will spend 80-90% of their time connecting with patients and leveraging data to help them achieve their goals. Doctors and nurses will be happier, and we'll get better health outcomes, which is also great for business.

How else will emerging AI tools, like Oracle's Clinical Digital Assistant, change medicine?

The digital assistant can quickly summarize patient data. During a visit, with the patient's permission and while the doctor performs an exam, it can take notes, chart things like breathing patterns and prompt the need for further testing.

It can also pull up information that may not be immediately accessible to the provider, like social determinants of health. Using geographical data, it may flag that a patient lives in a food desert. The provider can then ask about food security and help enroll the patient in a food prescription plan to ensure adequate nutrition.

The digital assistant can automatically check drug interactions and potential allergies, send prescriptions to the pharmacy, schedule a follow-up appointment and notify the front desk about necessary future labs. It can even summarize the visit and describe the next steps for the patient. One day, in the not-so-distant future, it might even be able to immediately auto-adjudicate the bill before the patient leaves the office.

Dr. Feinberg demonstrates the use of the Oracle Clinical Digital Assistant on stage at the Oracle Health Conference in 2023

The provider never touches the computer. That is a very different experience than the typical current visit. Providers can easily access the medical history and background, ask good questions and never stop engaging with the patient. That's already in practice today. This process is also beneficial for the caregivers because it's very hard to get a clear story of what happened and what needs to be done if you're not in the room.

Will wearables and real-time health feedback make people better stewards of their own health?

This data is helpful, but it won't make people better stewards of their health. For decades, there's been an abundance of health advice: "Eat low fat. Don't drink alcohol. Reduce sugar. Don't smoke." Yet, smoking rates have just gone up; more people have type 2 diabetes than ever before, and life expectancy has gone down several years in a row. Our current approach isn't working. We need to look for ways to enable better decision-making and affect behavioral change that can impact one's health.

"Tech is an enabler, not the solution."

For the most part, it's not about a lack of information. Every day, people juggle many decision-making variables and sometimes a "healthy choice" slides to the bottom of the list of importance. The mom working two jobs who buys her kids fast food knows it isn't a healthy choice. But she doesn't have time to shop or cook; the meal comes with toys; it's cheap, and she doesn't want to say, "No," again to her children who want to go there.

The question is, how do we better engage the unengaged? As a society and an industry, we make it difficult to do the right thing. We need to focus more on designing for behavioral change than health metrics. We have to design healthier

environments, places where people can work safely, exercise and access healthy food.

At this point, we have enough technology to predict the future of your EHR. Using a large language model and your health data, I could predict when you're going to get sick, your diagnosis and your treatment. When we tell patients, "Your hemoglobin A1C and blood pressure are high," it doesn't change behavior. But if we instead say, "Look, if you don't make this change, you won't be able to work in the garden, dance at your granddaughter's wedding or go on that cruise you have been planning," there is a better chance we will see changes. Providers can elicit behavioral change by having better relationships with patients and focusing on improving their daily lives. It's about aligning health choices to people's goals, not their lab results. We are social beings, and we should leverage this form of motivation.

Dr. David Feinberg at the MedInfo 2023 event held in July 2023 in Australia, which brings together leaders in digital health. Dr. Feinberg thinks that tech can be a great accelerant of change, but his "true north" is "people caring for people, loving your community and developing tools to facilitate understanding and change"

At Geisinger, we ran a program to give diabetics healthy food. One day, a little boy came in who didn't like oranges because he thought they were super bitter. Then I saw him eat an orange like an apple. He didn't know to peel it, and neither did his mom. That's a multigenerational failing of our system to make healthy, unprocessed food accessible and usable. That's what's ailing us. Today, this same boy gets upset when there aren't any blueberries because he loves them in smoothies. So, it is possible to change behavior.

Tech can be a great accelerant of change, but you can only have one 'true north.' To me, it's about people caring for people, loving your community and developing tools to facilitate understanding and change. In personal statements for medical school, most write about how they want to care for patients. We need to unleash that purpose. That's how health care improves.

"With AI and big data, health care will become less transactional and more relationship-based."

How does our payment system affect our approach to care?

It would help if our payment systems shifted faster toward value-based care. Oracle is the biggest EHR company in the world, and, across the board, we see that the United States alone gets caught up on payment. The U.K. NHS would ask: "This system improves quality and costs less? How fast can we get this rolled out?" This allows for preventive services to be more of a priority in the delivery of health care.

In the U.S., the questions are: "Will this decrease our neonatal intensive care unit admissions?" or "Is my competitor across the street using it?" I never hear that when I'm in Sweden or Australia. They just say, "High quality, low cost? That's all we want."
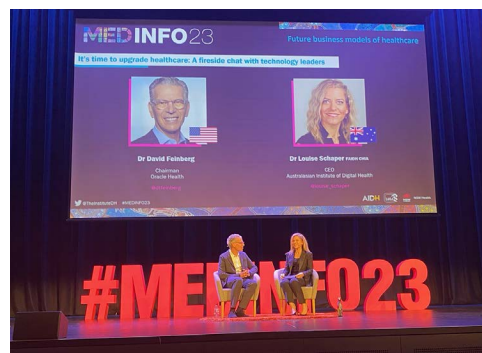
"Everyone is using value-based care besides the United States with a few exceptions within the U.S. That's because shifting toward value-based care is taking away certain people's profit."

In the U.S., there has been a movement toward value-based care and interoperability over the last three presidential administrations, and that's great. Unlike other issues, this has not been politicized. But I would like to see change faster. And the data piece is really important for effective change and to build the necessary tools to move toward value-based care.

Can you describe the "invisible barrier" between research and care delivery? How do we overcome it?

It takes about 17 years from drug discovery to implementation. Enrollment in research trials is often limited to academic centers and care doesn't happen equally across geographies. Oftentimes, providers in one city or county would be using completely outdated medication protocols compared to their counterparts in another area. Ultimately, the invisible barrier holding back clinical research depends on the missing communities left out of clinical trials, limiting findings and making them less comprehensive and accurate.

How do we fix that? The digitized record and real-world evidence help. At Oracle, we created a consortium called the Learning Health Network. Health systems share de-identified data into a collated platform where they can access other systems' data for free. Over a hundred health systems participate representing over 100 million records. The network has three times the diversity of any national database.

We've had great studies come out of that. Patients get an opportunity to participate in clinical research in academic medical centers as well as in community and rural settings. In some cases, this infrastructure helped speed up pharmaceutical approval by two years. When every day of development can cost about $8 million, a two-year reduction is a tremendous gain.

Furthermore, half of the populations involved in this research have never done clinical trials and were never previously represented, like San Joaquin General Hospital in Central California or Osmond General Hospital in Nebraska. Now that these folks have been directly involved, when something comes out, they feel more comfortable using these new medicines.

Every patient's data should become real-world evidence in an effort to improve the next patient's case. How do we go from bench to bedside and bedside to bench much faster, so this barrier disappears?

Dr. David Feinberg, then CEO of Geisinger Health system, visiting a new mom at the hospital. Dr. Feinberg believes that we need to keep human connection at the center of every interaction, especially between the patient and physician

How will this affect healthcare dollars spent?

It will save a lot of wasted healthcare dollars because we often misdiagnose diseases and treat people through trial and error. It will also speed up drug discovery. Now the question is, how does that benefit patients? I don't want to sound too cynical but much of the cost of drug discovery is wasted. It takes a long time and not a lot of drugs make it. So, when they develop a good one, they charge a lot of money. I know I'm simplifying it, but if we can speed up drug discovery, pharmaceuticals should cost less. That would benefit patients.

How will digital innovation impact the youth mental health crisis?

Three things ensure a good outcome for a child with a mental disorder, even a severe case. The first is having average or above-average intelligence. The second is having parents with resources, not rich, but with enough money for public transportation or a copay. And the third is having parents without psychopathology.

So, if you have normal intelligence and bus fare, and your parents aren't psychotic, you're going to do okay even if you are diagnosed with schizophrenia. But if you have mild ADHD and you're from a broken home, your parents have substance abuse issues, there's no money and you're not doing well cognitively, you're going to be a disaster. It's not the mental disorder that dictates the outcome. It's the other factors.

Everyone wants to figure out whether tech is good or bad for mental health. Virtual and digital innovation in mental health care is cool. I'm sure there'll be breakthroughs, and some superstars will emerge. But, fundamentally, people need access to care, and we have to continue to destigmatize mental illness.

Psychiatry was always the stepchild of medicine. And child psychiatry was like a foster child. As managed care emerged in the 1990s, mental health and physical health were separated. But, of course, they are inextricably linked. So, why is care divided? It's insane.

Fifty percent of people post-stroke have issues with mental health. Positive mental health is protective against cardiovascular disease. Meanwhile, every one of our good mental health drugs causes metabolic syndrome. This is part of whole health.

We worry about whether kids have too much screen time or if telepsychiatry works. These are big, interesting questions but not as important as why mental health isn't incorporated into the physical health system.

What is your vision for the future of tech in health?

The future is here from a tech standpoint. It's been a long time coming. The record had to be digitized. COVID-19 helped people get a better understanding of public health. And technology now has this incredible power to take away a lot of the mundane stuff, so we can get back to the important thing, which is connecting with other people.

This interview has been edited for length and clarity.

Insights, Perspectives & Ideas

Why Are So Many Young People Getting Cancer? What the Data Say

Nature, March 2024

Rates for over a dozen early-onset cancers (diagnosed under the age of 50) increased globally and have been predicted to rise by ~30% from 2019 to 2030. This has driven the push for more research and earlier screenings. In the U.S., the rates have increased faster in women than men. Researchers believe that social determinants of health, such as access to healthy foods, lifestyle factors and systemic racism, are likely contributing to early-onset cancer disparities. Early-onset cancers often affect the digestive system including colorectal, pancreatic and stomach cancers. Although rising obesity and processed foods can explain some of the increase, researchers are looking for clues in the gut microbiome and tumor genomes as well.

Patient With Transplanted Pig Kidney Leaves Hospital for Home

The New York Times, April 2024

Richard Slayman, 62, is the first patient to receive a kidney transplant from a genetically modified pig. This transplant and its encouraging outcome represent a significant moment in medicine, possibly heralding an era of cross-species organ transplantation. Two previous transplants from genetically modified pigs failed, with both patients dying soon after. Although Mr. Slayman exhibited signs of cellular rejection on the eighth day after surgery, his doctors were able to reverse it. The kidney is now producing urine, removing waste products, balancing the body's fluids and carrying out other key functions. As over 550,000 Americans have kidney failure, and over 100,000 are on a waiting list for a transplanted kidney from a human donor, the medical potential is tremendous.

Trial of Lixisenatide in Early Parkinson's Disease

The New England Journal of Medicine, April 2024

Parkinson's disease is a common debilitating disorder causing resting tremors, rigidity and slowness. A recent Phase 2 trial found that patients with early-stage Parkinson's taking lixisenatide, an older glucagon-like peptide-1 (GLP-1) receptor agonist drug used for diabetes, experienced no worsening of motor symptoms over a year, in contrast to patients on a placebo. The findings add to a growing body of research that suggests that GLP-1 medications hold the potential to address Parkinson's by reducing inflammation and protecting neurons from dying, which would be a critical new way of treating the disease. The incidence of side effects, however, may be a barrier to the wider use of lixisenatide for Parkinson's disease and further exploration would be valuable.

Health Effects of Fossil Fuel–Derived Endocrine Disruptors

The New England Journal of Medicine, March 2024

Pollution is the leading cause of premature death globally, with over 90% occurring in low- and middle-income countries. Chemical pollution is responsible for at least 1.8 million deaths annually, with less than 5% of ~350,000 chemicals being adequately studied. Fossil fuels contribute to pollution through the production of petrochemicals—endocrine-disrupting chemicals (EDCs) that interfere with hormonal function. EDCs are linked to cancer, neurodevelopmental harm, infertility and many other conditions. EDC-associated risks are higher during fetal and child development and with exposure to multiple EDCs. The greatest challenge to reducing harmful EDC exposures is the lack of legal requirements for comprehensive safety testing before chemicals are used in production and the marketplace.

Stop Misunderstanding the Gender Health Gap

Wired, March 2024

The gender health gap is significant. Women receive worse care, have higher rates of adverse drug reactions, get diagnosed later and suffer more from common mental health conditions. Recognizing the causes and the societal assumptions that may contribute to the disparities may help narrow the gap. Studying social determinants of health, such as diet, stress and societal treatment, is crucial. Researchers are now using data from mobile phones to build personalized pictures of people to understand their complexities. Dr. Sarah Richardson and her team at the GenderSci Lab at Harvard University, for instance, has made progress in breaking down the causes for gender health disparities or "sex contextualism" as she calls it.

The Mothers Who Aren't Waiting To Give Their Children Cystic-Fibrosis Drugs

The Atlantic, March 2024

Cystic fibrosis (CF) is a rare genetic disease that causes slow asphyxiation of the airways, pancreatic insufficiency and nutrient malabsorption and can lead to kidney and liver disease. In 2019, a triple combination of drugs, Trikafta®, was introduced to help 40,000 Americans with CF. The drug has improved the outlook for children with CF and is available to children over the age of 2. However, pancreatic insufficiency is common among newborns with CF and 1 in 5 also develop an intestinal blockage called meconium ileus in utero. This prompted some expectant mothers to use the drug off-label to treat their children in the womb. Although experts initially worried that Trikafta could cause birth defects, hundreds of babies later, there has been no evidence of such.

- Congratulations to Renée Fleming on publishing her new book, *Music and Mind: Harnessing the Arts for Health and Wellness*. Ms. Fleming is an acclaimed American soprano and an advocate for the powerful effects the arts have on our health and well-being. In this anthology, she discusses the impact of music and other arts on various health conditions and the benefits of music education on child development. Learn more and order your copy at bit.ly/Music-and-Mind

- The Medical Society Consortium on Climate and Health held its annual meeting in February. This year's theme was "From the Clinic to the Capitol." The meeting featured over 20 panel sessions, presentations and hands-on workshops on climate change, health and equity with 145 advocates from 30 different states. Learn more at medsocietiesforclimatehealth.org/annual-meeting-2024 and view the sessions at bit.ly/MSCCH2024

- ATMP (Advanced Therapy Medicinal Products) Sweden hosted the "ATMP World Tour 2024" program virtually on April 23-25. The event featured global initiatives and individuals in gene, cell and tissue engineering, with a focus on the models, partnerships, competencies and infrastructures. Learn more at atmpsweden.se/events/atmp-world-tour-2024

- On April 25, the National Academy of Medicine held "Climate and Health Day" with Kaiser Permanente and Climate Group as part of the U.S. Climate Action Summit. Global leaders discussed the impacts of climate change on health, opportunities for collaboration for mitigation and explored ways to create climate-resilient communities. Learn more at nam.edu/event/climate-and-health-day-of-the-us-climate-action-summit

- The 27th annual Milken Institute Global Conference "Shaping a Shared Future" will be held in Los Angeles from May 5 to 8. Thought and industry leaders will confront the challenges from geopolitical hotspots and the ongoing climate crisis to the complexities of artificial intelligence, examining both its potential and impact on global workers, firms and markets. Learn more at milkeninstitute.org/events/global-conference-2024

- The Alliance for Regenerative Medicine will hold a 1.5-day workshop on "Advanced Manufacturing in Cell and Gene Therapies" on May 16-17, 2024, in the Rockville, Maryland, area. The workshop will discuss opportunities and challenges in emerging technologies and innovations in cell and gene therapy manufacturing, including advances in manufacturing/analytics automation, the role of artificial intelligence and machine learning and decentralized manufacturing. Learn more and register at alliancerm.org/arm-event/advanced-manufacturing-in-cell-and-gene-therapies

- The 2024 BIO International Convention will take place in San Diego, California, from June 3 to 6. One of the largest events in biotechnology will feature more than 100 sessions across 18 focus areas with insights and expertise on the latest research, innovative breakthroughs and emerging technologies from companies, investors, service providers, government officials, regulators and patient advocates. Learn more and register at convention.bio.org/about-bio
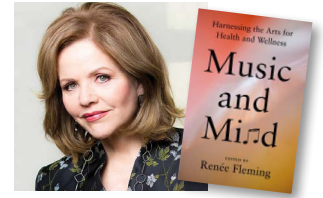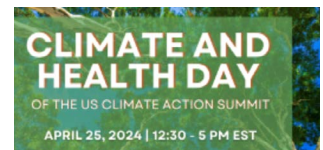
If you have any questions or feedback, please contact: **curalink@thecurafoundation.com**

Newsletter created by health and science reporter and consulting producer for the Cura Foundation, Ali Pattillo, consulting editor, Catherine Tone and associate director at the Cura Foundation, Svetlana Izrailova.