BREAKING NEW GROUND IN THE FIGHT AGAINST CANCER

Announcer 00:00

Please welcome the panel on "Breaking New Ground in the Fight Against Cancer," moderated by Reporter at STAT News, Angus Chen.

Angus Chen 00:40

Thanks to everyone for coming to this panel on the panel on the fight against cancer. We have a great bunch of panelists here. Anjee Davis, CEO of Fight Colorectal Cancer; Helmy Eltoukhy, chairman and co-founder, Guardant Health; Wayne Frederick, currently interim CEO, American Cancer Society; Mark Hurlbert, CEO, Melanoma Research Alliance; and finally, Christian Massacesi, chief medical officer and oncology chief development officer, AstraZeneca. Okay, well, this panel is really about looking at future innovations and breakthroughs in cancer as well as current challenges that, I think you know, our panelists will have some really great insight on. And I want to start by asking everyone to talk about what you think is the—well, I guess I'll frame it by saying, you know, I keep hearing that right now is this time where we know more about cancer and cancer biology than we ever have before. We're at this precipice of these new breakthroughs and innovations that really have the potential to help so many, so many patients with cancer and patients that might get cancer than we ever have before. And so for each of you

—what is the thing that you're looking at next that you're the most excited about? We'll start with Anjee.

Anjee Davis 02:05

Well, that's a tough question. I do agree: cancer treatment is advancing. Cancer screening is advancing specifically for colorectal cancer. I'm really excited about the science. I think what I'm excited about is engaging in a national conversation around how we provide access to these innovations to people, no matter where they live, no matter what zip code they live in. Because, at the end of the day, the innovation has to meet implementation.

Helmy Eltoukhy 02:32

For us, it's a truly extraordinary time right now. We spent the last 12 years developing technology that uses advanced biochemistry, DNA sequencing and AI to basically look into a tube of blood and see disease at its earliest stages. And we've really seen this technology now—not just with us, but with other stakeholders in the field—really transform the oncology space in the late-stage markets where you have stage 3, stage 4 cancer patients, they get diagnosed, they get blindsided by the disease. The next question is, how do you treat these patients? How do you get them best back to health? And our technology is now used in about a third of US cancer patients. A blood draw can essentially help determine which are the best drugs for those patients and put them onto a nice treatment path. On the other end of the spectrum, we've developed the technology with such sensitivity that we can screen for cancer—essentially early detection of cancer and we just got FDA approval for a blood test that essentially can screen for colorectal cancer and now has Medicare coverage. And so it's really exciting that 120 million Americans will now have access to something that can—complement the existing standard of care—colonoscopies, stool testing—with a simple blood test that today screens for colorectal cancer, but tomorrow will screen for many, many more cancers as well, just by turning software onto that same testing platform.

Wayne Frederick 04:07

I'm pretty excited about the fact that some of our individual experiences, we will get into a place where we can really apply them more broadly. So for example, earlier this week, I saw a patient and his wife, a gentleman I operated on October of 2005 for pancreatic cancer. Still alive. I did, well, did a pylorus-preserving Whipple. But what about his disease process? His genetic makeup made him have that outcome, a 20-year survival outcome. And so using AI, we now have the opportunity, I think, to be able to apply some of that data, to get some of the genetic data that folks are collecting, and to apply that so you have companies like Tempus AI, with large databases, lots of information, demographic information, genetic information of the tumor, the normal pancreas, and you could put all of that together and have a lot more predictability. And then the second layer of that, I think, is screening, getting more personalized, precision screening. In other words, you look at Chadwick Boseman, you know, who was an alum at Howard when I was there, had him as my commencement speaker, and two years later, he died of a metastatic colorectal cancer. No screening guideline would have caught his cancer, the screening guidelines that we currently have. But when you look at some of what you'll hear from the panelists, the ability to have him potentially screened at age 30 instead might have been the thing to save that life. And so I'm very excited about how we apply these large data opportunities, you know, to be able to predict what people should be doing for screening and prevention, but also in terms of treatment as well.

Marc Hurlbert 05:50

I would just say a couple of great topics. You know, liquid biopsy. And then, I think, studying exceptional responders, whether it's exceptionally great response or exceptionally poor response, I hope we circle back. In melanoma, we're really excited. It's been an amazing period over the last decade or so, 17 new drugs approved by the FDA since 2011, and I think what's critical is that's five or six different classes of new drugs. So the first in class, checkpoint—inhibitors, BRAF mutation-targeted inhibitors, T-cell engagers, intratumoral oncolytic viruses, and then, most recently, TIL therapy, the first-ever approval for a solid tumor. So I think what's critical is so many

different classes of drugs. There's a lot more on the way as well, and I think understanding who responds, who doesn't, and how do we best guide patients to new treatments or to new clinical trials.

Cristian Massacesi 06:49

So, you know, I don't think has been ever a more exciting moment than now, being in oncology. When I started as a young oncologist, we didn't have almost anything to offer to cancer patients. And today, I think you see also from the survivor curves, that for most of the tumors that we're treating, not all of them, most of them—there is an improvement. Some of them, we are getting closer to the cure. And I think you know there are, for me, three major areas where the new modalities that we have in our hands today. We can bring it to the patients, drugs that are functioning differently, and cancer needs that because it's a heterogeneous disease. It's a disease that requires, often, combinations of drugs, and we have the concept of precision oncology in our hands that increases the benefit we can give to the patient and the personalized approach. And then we have artificial intelligence (AI), with the data science that can speed up the timing with which we can bring this new treatment to the patient. This is an incredible, complex, incredibly exciting moment to be in oncology.

Angus Chen 08:01

So before we go on, I want to let the audience know that we are taking questions from the audience. There's this QR code you can use to submit that question. It'll show up on this iPad here, and I'll be able to weave those in throughout the hour. The panelists just talked a lot about precision oncology, sort of this, I think precision genomics, and precision oncology is this promise of genetic medicine that we people have talked about for so long. I think we're really starting to start to see that now, with a lot of targeted therapies, a lot of immunotherapies, being able to be targeted to patients who you think have the biomarkers that will benefit from those therapies. And I was wondering if some of you could talk about where do you see opportunities there? Are there certain technologies you see coming into play that will accelerate that kind of—benefit for patients?

Helmy Eltoukhy 08:57

One thing we're really excited about is really going beyond this sort of genomics of disease. I've worked in sort of the tail end of the Human Genome Project, got to the $1,000 genome. And we all thought, when we got to that $1,000 genome, it would be this great sort of panacea, like solving all human diseases. And there has been a lot of progress there, but we think the sort of epigenetic layer is where there's a lot of fruit now, and we've built this back. But (and the way to think about epigenetics is, genomics is sort of like the hardware layer. It's, you know, sort of what can be processed, sort of in that organism. Epigenetics is a software layer. It actually tells you what's happening, what program is being loaded into that cell, how the cell is functioning. So we've developed a technology that allows us to see both simultaneously: the genomic layer and the epigenomic layer. And I think there's going to be a wonderful sort of renaissance of drug development, because now we can actually see the sort of function of the cell. We can see the specific subtype of the cell. We can see how it behaves. And it's like going from essentially black and white television to 8k resolution in terms of disease, actually seeing. I'll give you an example: There are certain drugs that work relatively well on certain genotypes. They have a mutation in a certain gene and they work, but they may only have a 50 percent response rate. And why is that? When you actually look

at the underlying layer, you see subtypes there in the epigenetics, you see essentially two or three or four subtypes there where only one or two of them respond to the drug. So this is going to give us that extra layer to do, I think, much more precision oncology, much more precision targeting of disease. And we're very excited about this.

Cristian Massacesi 10:48

Let me build on this, Angus. You know—a genomic was the basis, but it's beyond genomic, it's a proteomic, it's anepigenomic, so it's putting together, fundamentally, a better understanding of the biology of the cancer, and then developing treatments, drugs, products that can tackle it. This is an effort, because this started from the beginning, at the moment in which you engineer the drug, and if you do not have this deep knowledge of the biology of the cancer, your treatment is going to be partially active, and this, for us, for instance, is core strategy. 90 percent—more than 90 percent of our oncology products have a biomarker, you know.

Angus Chen 11:38

It's really interesting to hear you talk about where we are going, sort of expanding our knowledge of cancer biology through a different omics, right? Transcriptomics and that and more. Anjee, it sounded like you had something to say. And then I was also wondering if you could talk a little bit about, from the patient perspective, how much this means for patients to be able to have access to these kinds of technologies.

Anjee Davis 12:02

I think it's incredibly important. You know, Fight Colorectal Cancer over the last year has been looking at claims data, because, I think, it's how do we take advantage of the promise of the science? How do patients take advantage of that? And so we partnered with Komodo, Flatiron and others, Freenome [and] looked at the claims data. We looked at over 5 million data sets. What does this look like? I mean, less than 50 percent of our patients are getting biomarker testing at the right time. How do we know that we can have this promise of precision oncology? We know how we could advance the treatment options, but patients aren't able to take advantage of it. So we really set out to say there's a sequence of care that can really inform how quality of care is implemented for colorectal cancer patients. We see it from screening through treatment. So 80 percent screening is a goal of ours, but then, if our goal is 80 percent screening, and we have advancements in noninvasive screening tests, like Guardant and many others, we have to have a colonoscopy within 90 days. Or these advancements, we can't take advantage of the prevention measures that are there. As it relates to treatment, we want to make sure that patients get treatment within six weeks of diagnosis. We want to make sure that they have biomarker testing no matter where they live. We want to make sure that they have access to genetic testing. Those are fundamental for us to provide quality of care in our country.

Wayne Frederick 13:34

You know, while I think we've made a lot of advances and we have some great outcomes, we still practice in a very crude way. And the best way I could explain that is, I mean, if you look at the operations that I do in terms of the GI cancers, something like pancreas or colorectal, we have a very standard operation that we prescribe for everyone. We're trying to get the same 1-cm margin for everybody. Never made sense to me, primarily because you just look at the biology of how everyone shows up. It's very different. So in somebody like Shaq, for lack of a better description, and probably, you know, somebody who's 4 ft 11, that's two very different people that I'm trying to get a 1-cm margin in. And that, to me, doesn't make sense. I think as we look at AI, we look at all of this, all of these data points, we're going to start getting to a point where we can safely say this is what we need for this particular person, both on treatment, in terms of drugs, but also, I think, even in terms of our surgical approaches. I think it's going to impact that. The other way, I think for patients especially, would be clinical trials. I think we are going to get to a place where, instead of having to recruit hundreds of patients for a clinical trial, we potentially could recruit 20-something patients, but pick the best 20-something patients who represent, based on all of the data that we have, who represent what we need to get out of the information and be able to extrapolate it. And I think those advantages in particular, especially when you think of underrepresented minorities who don't participate in clinical trials in significant numbers, we're going to start getting data and getting to a point where we can really say to patients, "This is what we want you to do, why we want you to participate," etc. And I think especially for trainees now, there's a big opportunity, but also a big gap, which I'm very concerned about. If you look at most medical school curricula, they don't include AI, and that, for me, is a fundamental error that we've been making in our education system. You have students who are going into medical school, coming out and going into training, who are going to be using all these tools within the next five to 10 years, and we're not making any effort to prepare them during medical school. I think that's another gap that I think, from a patient advocacy point of view, we've got to make sure that our education system, as well as keeping up, is keeping abreast.

Marc Hurlbert 15:55

Yeah, and I think I would just add, we're very excited in the melanoma field around measuring cancer burden through blood draws, liquid biopsy, circulating tumor DNA. And I think this is exciting. In melanoma, there's been a few studies, even reported just this week, that if you can detect circulating tumor DNA at the time of diagnosis, that's actually a prognosticator of whether you're likely to have a good outcome or bad, and just the presence is actually not a good indicator. All of us in the audience probably know how we stage cancer: T for the tumor and for whether lymph nodes are involved in M, whether there's any metastasis at the time of diagnosis. We think that soon it will be TNMB. And do you have any blood-based, you know, things that we can measure. The second thing related to that is if you have ctDNA at the time of diagnosis and you start treatment, there's several studies across melanoma, especially in uveal melanoma, a rare type that starts in the eye, that if we see the ctDNA going down over time, within the first six to nine weeks of starting treatment, we can predict whether you're likely to have a good response or not.

Angus Chen 17:05

Yeah, I think there's a lot of audience questions coming in. I think, you know, we are going to talk about AI, we're gonna talk about liquid biopsy in a second. But this one, I think, Wayne, is for you, and it's about access, or my interpretation is kind of about access. How is the American Cancer Society taking the lead in pushing these latest

modalities into practice, considering they greatly expand screening access to many more stakeholders? So really trying to bring advances in treatment, I think, to more people?

Anjee Davis 17:37

I've had the unusual opportunity to serve the American Cancer Society and the American Cancer Action Network, and I think that latter part gets overlooked a lot. I have not met an advocacy arm of an organization that probably has more impact in terms of really bringing issues to state, local, and federal legislators around the issues of access, multi-cancer early detection tests as an example. We really pushed hard when you think of how many people get mobilized, how many messages we get to legislators about the fact that these tests are necessary, and getting that access is important. Right now, one of the elephants in the room is what's going to happen around Medicare and Medicaid. Regardless of all the discussion that's taken place, the reality is that you have a very significant MFA issue, and you have a very significant issue around how you balance tax cuts against the spending. And one of the largest spends we know in this country is around health care, such as Medicaid. And if we cut that, we cut a significant amount of access. So our advocacy, we think, is extremely strong, but that works only because the rest of the population gets mobilized around the issue. The rest of our community gets mobilized around that issue, and that issue is very important. I live in Washington, or have practiced in Washington, DC, and the life expectancy of a Black male in Wards 7 and 8 in Washington DC, is 22 years less than a white woman in Ward 3. That's just a fact, and that's the nation's capital, most of the medical centers are in Northwest, and Ward 7 and 8 are in Southeast. There's a food desert. There's a health desert in the nation's capital. So we don't have to go to any far-flung extreme. Sometimes I hear in these debates about that access: 22 years' less life expectancy in a six-mile radius; DC is as small as can be; and Wards 7 and 8, and Ward 3, and right in the center is Capitol Hill. So we have an issue in our country about access that we have to keep advocating for. We have a lot of Americans who have to travel more than 60 miles to see a specialist. Do we have to advocate for what we do around that? Can we use more telemedicine? Can we bring some of our major centers and our major treatments to patients in a different manner? So there's a lot, I think, for us to still do, but I do think the American Cancer Society, and especially our advocacy arm, does a great job of highlighting these issues to keep it on the front. I was just going to add, speaking to ACS, CAN has done a tremendous job. And I think that what is exciting, and I think really hopeful for me, is that there's a leadership gap right now in the cancer community and advocacy organizations are stepping up, and we're collaborating, and we're thinking about how can we work together across disease types? And I think that that energy and that commitment is there with all the challenges that we're facing. I think many of us in the room know what the challenges are, but I think that that is so critically important, and ACS plays such an important role in that. For organizations like mine, where we're very focused on colorectal cancer, it is really refreshing to be able to lock arms with our friends in pancreatic cancer, lung cancer, and say we have a joint mission to fund cancer research. We have a joint passion to make sure that patients have access to clinical trials and treatment and screening. And I don't think that change will happen unless we collaborate and we're working together, and I think our industry partners are also standing alongside us, which is exciting.

Helmy Eltoukhy 21:29

I just want to second what you guys said. When I first came to this field, being a sort of science nerd and so on, I always thought it was about like the new science fiction, things that we know we need to bring to fruition, bring more innovative technologies in. And what I was just so floored by was the fact that there's such a big gap

between clinical guidelines and clinical practice. And if we just brought clinical practice up, if we just matched patients with drugs that are sitting on shelves that could save their lives, if we could essentially get the millions of people who aren't being screened today. I'll give you an example in colorectal cancer screening, There's 50 million people who are not up to date with screening today, there's about 50,000 people who die every year, and 76 percent of those 50,000 are from the unscreened population. So we can bend mortality curves, we can improve outcomes. But access is a big piece of the puzzle. And one thing that has just been really exciting to see is, you know, some of the work we've done with these organizations, especially the ACS, in terms of passing these state laws. There's now 21 states where state biomarker bills have passed. This essentially requires insurers in those states to essentially cover this type of innovative testing so that essentially no cancer patient is left behind, no cancer patient essentially forced to die without access to the right testing and the right drugs that can save their lives.

Angus Chen 23:01

You know,

it's interesting to be, to be talking to members of the cancer community and hearing about all these incredible innovative breakthroughs where we're diving into proteomics, we're diving into the transcriptome. And yet, there's so many things that it feels like there's a big gap. There's a question here about, you know, smoking cessation, for example, or just bringing people from screening to treatment. For the members of the panel, Anjee, maybe you can start. where do you see some of the biggest gaps remaining in cancer care that—feel like low-hanging fruit, that we can sort of make a lot of progress on, save a lot of lives right now?

Anjee Davis 23:40

Well, I'll start with—just a short story. So I've been running Fight Colorectal Cancer for over 10 years, been fighting for policy change, and I was diagnosed with cancer in 2020. And to give just some color, because I think we talk about sort of the ideal utopian, like, way that this works, but as soon as I entered that hospital building, they didn't care what my title was or what I'd done. I drove four hours for cancer care. Every single treatment was four hours away from me. So I live in a very rural community, and it was very challenging. But I think that what the opportunity is, and I think that it's the implementation of this, and I think that's where AI comes in. I think that there is a lot of opportunity for us to distill how can we be more efficient? How can we identify the gaps? How can we work together as a system to identify what is challenging patients so that they can't receive care? Because we have more screening options than I've ever seen, and there are good options. How do we make sure that we have precision prevention? I think I heard that term. That's the first time I've heard it, but I think it's, there's some truth to that. If we're not one-size-fits-all, there's a lot of opportunity for us to save lives. I think we'll save 33 percent of those who die of colorectal cancer if we hit 80 percent screening rates. So I mean, there's so much opportunity, and I think that AI could play a very important role in that. And hopefully, as we sort of deconstruct some of the systems that are currently in place, we can build something better.

Marc Hurlbert 25:15

And I'd have to weigh in if you talk about smoking cessation, melanoma and skin cancer are probably the most preventable cancers just by practicing sun-safe behaviors. And so still need to do a lot of work and messaging around that—not all melanomas, but the vast majority of them. And I think another critical piece, and it will also blend into the AI discussion, is that in melanoma and skin cancer, there's a lack of trained dermatologists across the country, it's really hard to get access to them. But the same applies. I live in New York City. Same applies neighborhood to neighborhood. So on the Upper East Side of Manhattan, every other corner is a dermatology practice. If you cross any of the bridges to Brooklyn or Queens, these are dermatology deserts, even in the biggest financial center of the world, you know. So a lot more work to do. And I think AI and liquid biopsy and some of these things can really help solve some of these problems, both across the country and even in cities.

Angus Chen 26:07

So attendees, when you leave this dark room, even if it was a cloudy day, remember to put sunscreen on.

Wayne Frederick 26:11

I also think it's a bigger health-care issue, though, right? Are we using all of these great technologies, etc, and applying them to where they're most needed? Right? Just on—I think when you look at the health-care system that we have, I think that's where our challenge is. I'm 53, I'm homozygous for sickle cell anemia. In my lifetime, I have witnessed a cure for sickle cell. This past week, I moderated a panel where I was able to interview two people who actually have had gene therapy and been cured of sickle cell. 100,000 Americans like myself will suffer from the disease with a very different phenotypic expression of it. The reality is, though, the treatment is $2 to $3 million.—Now we have a great opportunity to do it, but at what cost? And then you look at a place like the Democratic Republic of Congo, where the incidence of the gene is through the roof, you could change that country's productivity if you could apply that therapy. But at $2 to $3 million for each person, it's almost impossible, right? So I think when we look at our health-care system more broadly, and we think of some of these treatments, who can get it realistically? Do we really use our resources to the best of our ability? And that's why I think AI is going to be critical around clinical trials, advancing therapy. If you could move that from what is now—an in vivo therapy to in vitro therapy—you'd probably change in vivo therapy, you'd probably change it completely in terms of who can get it, how you can get it to people. I think that's where I think: As a country, we have to start making tough decisions about what therapies we pursue, who we get them to, and really think of our entire community as to how we can elevate. So whether it's getting the right people for screening, whether it's how we interact with our medical records, and if you move across the country, someone can have access. I mean, right now today, somebody who has just had a CT scan in LA could get in a car accident five minutes later; go to a different hospital and have to get another CAT scan, and would never get the result of the prior CAT scan quickly enough to have an intervention. Let's think about that right here, and with all of the technology we have, so there are lots of things I think we can do to really make sure that we're getting access to folks in a better way.

Angus Chen 28:29

I want to know, before we get to laying the panel, I want to address another question I think is on everyone's minds about barriers to innovation right now, which is the significant cuts to research that we've seen in the last

few months, significant cuts, not only to research funding, but also to staff in key federal health agencies. This is also an audience question. How do you reconcile those opportunities with these cuts that we're seeing?

Wayne Frederick 28:56

I run a university, so if I'm going to stay quiet on this one, I might be able to get out of here.

Anjee Davis 29:01

I don't get federal funding, so I guess I can say whatever I want, right? Like, I think it's really challenging. I think it's, you know, I think I've said a couple times, like, we've got little fires everywhere, and it's building up to a big fire. And so as an advocacy organization, I think it's you know, everything from seeing ARC defunded, the Supreme Court ruling on Braidwood versus Kennedy, the potential of the US Preventive task force being restructured. In addition to cuts, there's these big policy issues. And then I think you spoke a little bit about training and that pipeline of scientists and researchers. I think I'm scared for our young scientists. I just sat next to a researcher last night at DDW. So Digestive Disease Week is going on this week, and she had just received a K award. It was a career changer for her, and that week they had retracted it. So you know, those are big issues that we're seeing. And what does she do to sustain a lab so that she can live for that next grant ,with the bureaucracy all tied up? So I think they're really very challenging, and I think it's impacting a lot of our science.

Cristian Massacesi 30:12

You know, the biomedical research is living on an ecosystem. Okay, going from universities, researchers, scientists, biotech, and then, Big Pharma. So it's a problem for everybody, if one piece is going to suffer. So, you know, we are, yeah, bringing medicines that most of the time are coming from ideas or research from academic institutions. And actually we work with academic institutions every single day. We boost academic research. We cannot support all the academic research. This is an important aspects that, because ultimately—everybody values here is innovation. And is innovation is coming through this ecosystem. And, you know, I think what is important to start to speak about is that if the innovation, in terms also of economic benefit, is not recognized, they will make investment in innovation is going to go somewhere else. And this is, this is something that I don't think is fully appreciated. Overall, innovation actually bring back a return of an investment you make. And yeah.

Wayne Frederick 31:42

One of the cornerstones of American exceptionalism has been our higher ed system. Our universities have been the breeding ground for innovation, for new therapies. And a lot of the conversation that we're having today is really misunderstood. It's mis-characterized this thing about capping in direct course as an example. When you work at a university, you look at that FNA and what we use it for, what it actually goes for, how it's calculated. Right now, I think the way we're having a conversation is very, very misguided. It's misleading, to be quite honest. And the infrastructure that's built around that funding is extremely important. And not only, I think, the executive

orders that have come out, but also we have also created a bit of, I would say, an era of fear. Which I think is probably one of the most destructive things around innovation, right? We have a grant diversity in cancer research to help the pipeline, and we've had universities returning that money to us because of the word diversity in that line. Well, the reality is, if you look at the representation across the United States in terms of who does research, there is a significant dearth of a certain kind of talent. I have an 18 year old daughter who is pre med, wants to do research, wants to be an orthopedic surgeon who only operates on female athletes. She's an activist, as you can imagine, but the point is for her to get into one of these programs, that's what she sees, right in terms of that. So we have to be realistic, too about the conversation that we're having. If we attack our universities and we make them less exceptional, we see them as a place where talent does not want to go because of these attacks, we can be in for a danger. And yes, I hear the conversation as well that while those researchers can go elsewhere. The reality is that everybody doesn't have the infrastructure to support those universities, right? Howard University is the only historically Black college and university that's R1. We don't have the type of infrastructure that Harvard would have for certain types of research, right? We have one clean room on our campus. Some of those folks have one clean room per floor. So you have to be realistic about what you're talking about, the endowment. That has been a lot of discussion. Howard is the first historically Black college to have an endowment above a billion, right? Harvard is what, 52 billion? That's a different scale, and we have to be realistic. And don't get me wrong, I'm not suggesting that every institution in our country needs to be there, but we have a very diverse education system that helps support a very wide variety of students, from community college all the way up to our R1 university. So I think that attack on our higher ed system is short-sighted, and just like the tariff thing, it may be a play to get certain types of behaviors. I get that, but you cannot close a lab and reopen it six months later or 12 months later and have the same type of momentum and outcomes that you expect. So I know it's tough to talk about these things, but we have to have that conversation in our country sooner rather than later, before we begin losing significant growth.

Marc Hurlbert 35:09

And I'd just like to add I think it'll be really critical for philanthropy and foundations to do as much as we can. We're a small part of the ecosystem, 4 percent or 5 percent every year, but I think philanthropy will be extremely critical in the short term, and then working with our corporate partners and industry partners. Again, I don't think any one group can fill the gaps that we're hearing about, the potential gaps, but I think it'll be the ecosystem working together more closely over the next few years.

Helmy Eltoukhy 35:37

I have a slightly maybe different view in the sense that, you know, I think if you look over the long term, and you take a step back, not just in research, but let's say, look at health-care spending in the US. And you know, there's a lot of money in the in the system, when you actually think about it in terms of how much is being spent, at least in health care where, like, $15,000 per individual, in terms of GDP cost, $5 trillion of health-care spend, which is more than 2.0-2.5 times any other developed nation in this world. And we're seeing outcomes that are so sort of subpar. They're, you know, I think on par with Vietnam, which ranks, you know, 70th in the world. And so, there's definitely more we can be doing. And I completely hear the challenges with some of these short-term disruptions. And I do agree, private industry, you know, philanthropies, can—step in and help some of those groups. But I think over the long term, I'm very bullish on the fact that we've never been in the era where we have so much data, so

much AI, so much productivity gains. I mean, we're seeing this in our own business, where something like 30 percent of our code is being written by AI. We're simplifying a lot of our processes. Our research has really never been humming as bright. And we're doing work, and you think about the element of time, it's not just data that's exploding right now in terms of getting billions of data points per blood test or per CT scan or MRI scan. But it's also the temporal component. You know, the example you gave about like not having the CT scan you took, you know, a week before, when you get into a car accident. That's all starting to, you know, happen. It's happening slowly. But if you can use that longitudinal data, and correlate—all those pieces of information, we're going to see a sort of explosion of possibilities. I'm very excited about the work we're doing with AstraZeneca. There's a trial where, you know, essentially, reason a lot of—patients unfortunately succumb to cancer is because the cancer evolves. It mutates. It evolves under therapeutic pressure and comes back. What if you could monitor that disease in real time? And as soon as you see the change in that cancer, you change the drug to the next one. And that's what, you know, AZ is pioneering with a very exciting trial. And I think that's the future of medicine, not just oncology. And so we have this backdrop of this explosion that is happening in health care and in many other scientific fields that, I think, will hopefully overcome some of these short-term disruptions. Yeah, let's talk about that for a second. Liquid biopsy is used in so many different contexts in cancer. You were just talking about use, you know, finding ways to monitor patients as they go through their treatment journey. Cristian, can [you] talk a little bit about this, and where you see that starting to come into play and if clinicians can really trust that data?

Cristian Massacesi 38:36

We, we went into this challenge because it was a challenge on the development side many years ago. And we failed because, of course, you need to have a diagnostic that is ready for what you need to show. What was mentioned was to try to have longitudinal monitoring and change the treatment based on a blood test that can tell you the disease is changing, and you want to provide a better treatment to that patient. This seems to be easy to say, not so easy to execute, of course, because you need to have the right diagnostic. You need to identify the right setting for the disease, where you, when you do this, and you need to have also the right timing, because you cannot go too early or too late, the patient cannot wait. So we went through failures. We are resilient. We believe this is the future. What has been said, this is the best way to provide the patients with active, proactive treatment that can prolong the benefit, especially when the disease is still there. And this is [what]we're going to present at the next Annual Meeting of ASCO, in the primary session. The real next frontier will be to actually identify the risk of the patient, upfront, before the surgery or just after the surgery, and then provide the right treatment or nothing. Based on the risk that the patient, because now we have the technology that can help us to do this. This is the next frontier.

Anjee Davis 40:16

I think that's so exciting. I mean, fundamentally, to be able to have organ preservation be a part of the conversation and to improve a patient's quality of life, I think is so important. I think alongside that we have to value diagnostic testing in a way that we reimburse it and support it, because I keep hearing about the wave of the future and that patients are going to have access to it. So we need to be able to have an infrastructure around navigating patients through these tests, supporting them, making sure that there's education around diagnostic testing and surveillance testing, and that it's reimbursable and accessible.

Angus Chen 40:55

So I want to ask the panel—AI has been mentioned so many times in the last 35 or 40 minutes. And I think AI is one of these areas where we see a lot of hype, and also a lot of real promise and real applications that are being used right now. I was wondering if the panel could talk a little bit about places where AI might not be so useful, and specific areas where AI is actually coming into play, something that isn't the hype but in practice?

Cristian Massacesi 41:28

I start with direct development and then—so I mean, I like to cluster AI solutions and the data science solution in three: discovery, clinical development, and then the operation-clinical trial execution, okay? And there are very different—stages of where AI is. In drug discovery, AI is already a reality. You can identify better targets. You can develop your candidates faster. So this is, in my view, can is already tangible and helpful. We are using it. In operations in clinical trial, I think we started tangibly to start to see some benefits. For instance, patient identifications in trying to automate—some of the operations. For instance, why, when you have a patient in a clinical trial, the nurse needs to enter the data in the system, and then the data needs to be taken from a monitor, and then entered in our database. We can have the two systems communicate directly (this seems to be a no-brainer). Everything is more complex, but it's happening. Even if we can do more in the clinical trial—and I truly believe that—when we will exploit AI for clinical trial, I think we will have a leaner—faster clinical trial, less burden for the patients, digital solutions for the patients. Patients hate to go in the clinic and get eight vials of blood. You know we can do better than that. And then—the real opportunity for AI, in my view, is in clinical development. Imagine what a waste is having pivotal studies—registrational studies—that is negative. You know, because you have hundreds of patients in that trial, and huge investments. And I think we start to have tools to better design clinical trial, to have a better inclusion-exclusion criteria, the right patient in the trial. This is the areas where I think AI can bring most of the value, in my view, and we are a little bit behind. There are foundational models that are starting to be developed, but require a bit more time.

Marc Hurlbert 43:51

Yeah, in melanoma, I'd say where it's closest to reality, I think all the treatment things you talked about are viable, but it's on the detection side. So imaging a mole that's changing over time, imaging a spot. And I think what we need, and there are things I do think on the precipice and the cusp that could help a person at home determine, "Is this concerning or not?" Help a primary care doctor and his physician assistants and nursing teams decide "Do I refer to dermatology or not?" And maybe—soon there will be a triage system where you can—maybe cut down on the referral volume—to dermatology, and only the most—concerning cases get to dermatology. And then even dermatologists—today—rely on a dermatoscope, essentially a magnifying glass, that can look a few millimeters under your skin. But there's four or five other technologies that you can apply AI to—monitoring changes in skin over time that are already being utilized, some in the clinical trial setting, some being slowly rolled out into the real world.

Wayne Frederick 44:55

Again, there's a lot of positive clinical information. Okay, I could do a Whipple, biopsy the normal pancreas and the cancer, send that in with blood work to a place like Tempus AI with a large database. And they will give me a printout of the clinical trials the patient should get, the mutations that exist in the cancer versus—the normal pancreas, and also kind of what the outcomes are when you look at the demographics, etc. So clearly, bringing a lot more precision to what we're doing. The downside is I'm not sure we're putting enough social data into it. When I first got back to Howard, I operated for breast cancer on a 40 year old woman with five kids. Great operation. The first day for her chemotherapy, she didn't show up. I called her to try to inquire why, probably was way too paternalistic. And then she calmly said, "Listen, I am a wage worker. It's the end of the month. Rent is due next week, and I couldn't go get my chemo today, right?" How are we applying AI to those social circumstances to influence even what decisions we make around clinical care, because for some people, there may be social barriers, and I'm not sure that we are making as collective an effort to use these tools. That's information I should have had, for instance, up front. But then, how does that then influence what we say. Do we stand and say that everybody goes and gets radiation therapy for, you know, five days a week if you're a wage worker and you don't have a circumstance to do that? That's not a recommendation we can make. And are we really putting that into our information set as well, to come up with information? I think that's one of the areas of potential weakness that I think we need to show up.

Helmy Eltoukhy 46:43

I mean, AI is a very overused word these days. It's, you know, it's like sprinkling salt on your like, french fries or your steak and so on. Everyone's sprinkling it everywhere. And we've built our company on, you know, what used to be called deep convolutional neural networks, or, supervised, unsupervised learning, and obviously generative AI now in terms of what's being done. And what I think was really important, the piece that was missing was having the right data. The reason that you were seeing this explosion in terms of large language models and so on is the quintillion pages on the internet of, you know, every human thought, basically, that sort of was the critical mass, the critical juncture for all of this stuff to take shape and that's, you know, been—, historically, the challenge with health care, it's been data starved. I mean, you look at the large lab companies, 40 percent of their test reports still go out with a fax machine. You know, pagers being used in health care. And so it's [as if] the natural laws of technology diffusion don't work in health care for some reason. And so—that's the opportunity as well. If we can—get these technologies and get the right data, we can actually move this thing—forward. I'll give you an example of what we're doing with our tests. Cancer is really many, many different diseases. And the challenge with approving new diagnostics and these diseases that are actually very small subtypes is you need to run 100,000—patient studies or million person studies and so on, to have enough critical mass for that subtype. But imagine if you could essentially get that data with your test, get sort of real-world evidence—claims data, everything—and create this closed loop infrastructure where every person you test with, you know these—tests they're giving you billions of data points you could correlate them to the next test that you want to develop. And so, you know, if you look at what we're doing, we have a test that's detecting colorectal cancer today, but we'll detect, you know, 10 other cancers very soon, and maybe even hundreds of other diseases, because of this closed loop framework where we can learn by doing, learn from all the data that's coming in, and essentially get it to a high enough grade that we can essentially launch it and help many more people and find those sub diseases and help those you know, those individuals, and then, you know, help some of our pharma partners, as well, in terms of finding those individuals, so we can intervene earlier.

Anjee Davis 48:33

Agree with everyone. I think that AI brings this acceleration to everything that we're doing. The one thing I would say, just to add to what everyone has already said, is we just can't forget about the human experience, and I think that's important as it relates to AI when we're having conversations about it. Because yes, I believe that it will advance the science, and yes, I believe that it will lead us to cures and better diagnostics and all these amazing things. But—it's not a surrogate for our patients' experiences and making sure that we do identify those gaps and what is critical and valuable to patients. I think [it] still is really something that has to be intentionally integrated into those conversations. I hear a lot about AI, and I am a complete geek about it, so I love it, but I am very cautious to say that we are still at a place where we have to remember who we're serving and who we're touching, and that we account for the challenges they're facing.

Angus Chen 50:20

With the last few minutes here, I want to ask a question that's—been on my mind lately, as we see so many changes in the federal government, so many departments—experiencing these reductions in forces, which—people will sometimes tell me, maybe this is an opportunity to rethink how we do things, if at the end of this, we have an opportunity to build back, after all this stuff has been broken. So for the panel, I mean, if you were able to give a priority for the NCI or the NIH or whatever—to help accelerate cancer research and help accelerate our progress against cancer. What would that priority be?

Wayne Frederick 51:05

So I'm happy to go first—I think what we do as a community every day is ultimately amplification of other people's humanity. That's ultimately what we're trying to do: trying to get people help in circumstances that we may never travel in their shoes. Not passively, not say that for this swath of Americans, they have an unusual circumstance that we won't have, and therefore we're not concerned about that. I think what we're trying to do is to make sure that we can meet people where they are and improve that circumstance. So what I would want to see NCI and NIH prioritize is exactly that, that whatever we do, regardless of what type of efficiency we apply to it, what type of metrics around productivity, that ultimately, what we're trying to do is to make sure that we're amplifying Americans' humanity and cancer tends to bring a circumstance to Americans that hurts them in a different way. And so regardless of the cutting and the building back, I would want to see us really make sure that we're emphasizing that, so that our research is holistic. It looks at the various factors that are there. It does advance technology, I believe, in adding the efficiency to it as well, and making sure that we spend our dollars well. But we shouldn't lose sight of the ultimate fact that what we want to do is to make sure that we're making the human experience of every single American better. And this is a disease process that definitely impacts that. And so we want to see that prioritized.

Marc Hurlbert 52:39

Wayne,—I would add the FDA to your list of agencies, and just encourage them to continue to innovate in this new era, this new place that we're all at. Innovate using real-world evidence and synthetic control arms and some clinical trials, doing everything we can to decentralize trials to reach Americans everywhere across the country. These types of activities.

Helmy Eltoukhy 53:01

I'd say for us, remember when we started, I think NCI was only spending maybe $90 million in early cancer research, the rest was later stage. And you look at private industry now, there's billions of dollars being spent in early cancer research. And so I would look at—these public, private partnerships really being an important component. There's a lot more work being done in private industry right now, and I think if we work together, we'll be we'll be much stronger. We've done this in England with the NHS, and we've worked with them [in] truly streamlined testing of lung cancer patients there. We've saved [the NHS], I think, now, like 10-11 million pounds a year seeing better outcomes as a result of the technology. And—that's a sort of shining example for how public-private partnerships can work.—I think we can do that in the US as well.

Cristian Massacesi 53:51

—To be very pragmatic, there are some clinical trials that are very, very important for the public health in oncology that industry will not do because [the trials] are not related to a product or to a drug. And these are the kinds of trials that NIH and the NCI were sponsoring, and I hope that that will not be impacted, because they will be incredibly important to continue to provide benefit and fine tuning some treatments to the patients so—that ultimately, that is not going to be a question that otherwise not going to be answered. So this is for me, I hope will remain as a priority.

Anjee Davis 54:42

I'm hopeful that with all the changes that we're seeing at NIH, NCI, FDA, that we can prioritize transparency, and really I hope the leadership will start to share their goals and their transitions. But I do think ultimately there is an opportunity for us to look at least at the cancer community, the whole continuum of care for patients, and I hope that it expands to survivorship, quality of life, in addition to better treatment options, better preventative services. And so I think there's still opportunity and hope there, but we shall see.

Angus Chen 55:24

Okay, well, we're just about close to the end of our time. I'll end it here. Thank you so much to our panelists for taking part in this. What an interesting conversation.

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