ESG Day

December 7, 2023

Lavina:
Good morning, or good afternoon, everyone, and welcome to Moderna's second ESG Day. Today, you will hear from team members across Moderna about progress we've made since last year on important sustainability initiatives. This morning, we issued a press release and presentation slides, both of which can be found on the investor section of our website.
Before we start, please note that this presentation will include forward-looking statements made pursuant to the safe harbor provisions of the Securities Litigation Reform Act of 1995. Please see slide two of our accompanying presentation and our SEC filings for important risk factors that could cause our actual performance or results to differ materially from those expressed or implied in these forward-looking statements. With that, I'm very happy to turn it over to Stephane to start off the day.

Stephane:
Thank you so much, Lavina. Good morning, or good afternoon. Thank you for joining us today. We would really like to welcome you to this important ESG day. Let me start where I should start, which is most important, in what we do with our mission.
As you know, our mission is to deliver the greatest possible impact to people through mRNA medicine, and as you know, Moderna has been built as a platform. Since the beginning, we believed this will be zero drug, or a lot. Well, now we know, because, of course, of Spikevax approval, is that this will be a lot, the ability to build a platform where we can create a lot of medicines for patients. That's why we work every day at the company.
In that framework, if you think about it, we have set up this ESG framework which is, how do you build the best version of Moderna? And we believe, of course, it starts with medicines for patient, that you see at the top of this pictogram. But we think the other elements are really critical, respect of the environment, having amazing employees, being part and fostering our communities, and, of course, strong governance and strong ethics. We believe this ecosystem is what will build the best version of Moderna, and that's what we have been working on for many years now.
If you now double click on each component quickly at a high level before the team will spend time on each topic. Of course, medicines for patients starts with the medicines that we want to bring to patients through our pipeline, and as we've shared at R&D day and give some updates recently, we have several medicines that we're very excited to launch in 2024 and in 2025, as you can see in blue on the top left of the table. But what's truly exciting is what's coming right after. As you can see, modernized [inaudible 00:03:03] on every cylinder for patients, with also latent

viruses, also cancer and rare genetic disease having very strong clinical signal, and we believe those program could be launched in the '26, '27, and '28 timeframe.
But while those are products we believe will drive sales and cashflow for the company so that we can invest in R&D to bring more innovation for patients, there's another side of focus on medicine for patients which is disease X. As you know, Moderna believe that we have a very important role to play to prepare for a potential next pandemic. As you know, the WHO has called this disease X, please to be prepared for whatever nature could throw at us, and as Hamilton will share with you in a while, is we have launched mRNA Access.
MRNA Access is a very important tool in that vision to be able to create an ecosystem where we can partner with the best scientific minds around the world in academia to really help us prepare for disease X so that we are ready from a biology standpoint, and so that if nature for us is a new pathogen, we can very quickly develop a vaccine, scale a vaccine, and bring vaccines to literally hundreds of millions or billions of people very quickly, and I believe even much quicker than what the team was able to realize with COVID.
Let's now talk to the next chapter, which is, of course, the environment. We believe that, like any corporation in the world, Moderna has a societal responsibility to make sure we minimize our impact in the environment, which is why, as you know, we set a goal to be a net-zero carbon emission for Scope 1 and 2 by 2030, and the team will give you an update on that journey. We also want to develop science-based targets for the short-term, and also long-term, for Scope 3. Those are extremely important.
As I like to say, real estate, that issue in business school, is location, location, location, where I believe that business is people, people, people. And since we started the company, we have been obsessed at Moderna to really attract the best people, to grow the best people, and to create an environment where people can all become the best version of themselves. Tracy will, of course, spend time giving you some updates there, but as you can see in term of recognition, our employees continue, for a lot of surveys, to recognize the work of the company. But be assured, we are not done. We keep innovating, we keep inventing new things, we really want to stay one of the best company to work for, so we can do the best science, so we can serve the patients, and be a good actor in the community.
Talking about the community, I like to tell our employees at the onboarding, I welcome new employees when we do Moderna One, which is our onboarding program for new employees, that if all of us do not engage with the community, we should not expect to live in a nice community. And that means, of course, donation, but donation not only of money, donation of time, i.e. volunteering. And so, we have a lot of volunteering efforts at the company, and Kate will give you an update that topic when it's her turn.
And then, last but not least, because, again, it's an ecosystem, there's no ranking of those different aspects, is we want strong governance, and Shannon will give you an update on board governance, executive committee governance, and we keep on strengthening this, we've been talking with a lot of investors in the fall, and we continue to want to have feedback from investors on how do we continue to scale and strengthen our governance so that it's really top-notch, best-in-class in what is done around the world, not only in the US. And, of course, the communication around this journey, all the metrics and all the reporting, is very, very important for us, and Shannon will give you an update on that.
So with that framing at the high level, let me very quickly give you a sense for the agenda, we're going to go and follow this framework. So we're going to have several team members talking to you about medicines for patients, and then Deborah will come and give you an update on the

environment. Tracy will talk about employees, Kate will talk about the community and the work we're doing there, and then, of course, Shannon will talk about governance and ethics. I'll come back with a quick slide to close, and then the team and I will be delighted to take your question. With this, let me now turn to Kyle.

Kyle:
Thank you, Stephane. Good morning, hello. It's really great to be here today. I'm going to talk to you today about one of my passions, which is finding therapies for those affected by rare diseases. As you heard, my name is Kyle Holen, and I'm responsible for the clinical development of our rare disease and oncology portfolios.
On the next slide, I'll repeat the message that Stephane had in his presentation. We have this incredible potential with the platform to create many medicines, using the same technology and manufacturing processes. As proteins are the workhorses for cellular functions, we can change and manipulate these functions by creating proteins through mRNA, either through as evidence that the top are vaccines, or through secreted proteins, or, in the last example, by replacing proteins in cases where they either don't exist or aren't functioning properly.
On the next slide, you can see a variety of ways that we've been able to build our pipeline through the use of our state-of-the-art technology, at the top of this slide, our ID vaccine portfolio, and then next, you'll see our rare disease, oncology, autoimmune, and cardiovascular medicines. For today, I'd like to share with you a little bit more about our rare disease programs.
Now, many people don't realize that rare diseases are actually not rare. As you can see on this slide, there are a large number of patients who are affected by rare diseases, including hundreds of millions of people worldwide. And in fact, one in 10 people in the US are living with some type of rare disease including, rare cancers.
But there's a challenge with these 400 million or so people that are affected by rare diseases. Each rare disease requires a unique therapy. As an example, a treatment for propionic acidemia is not going to be effective for those who are living with GSD1a or other glycogen storage diseases, and thus we need to bring a drug and manufacturing and technology platform that can be used to create many different bespoke treatments for each person affected by a rare disease. Perhaps you can guess what that platform might be. And on this next slide, you can see, with mRNA, we have the ability to create many unique treatments, down to individual patients, which we are doing for INT, for those with diseases that may only affect a few. In this way, I believe that we can bring medicines to all those affected by rare diseases, including the roughly 1,200 different inborn errors of metabolism. We are engaging with global regulators around innovative approaches and innovative ways that we can leverage the platform data across all these different rare diseases. And on the next slide, I'll share with you the reason why we believe this is possible.
Our first three rare disease programs, programs in propionic acidemia, methylmalonic acidemia, and glycogen storage diseases, have already demonstrated impressive improvements in the lives of patients. We have previously released data from our PA program where we observed a greater than 70% reduction in metabolic decompensation events. For MMA, we observed a dose dependent decline in MMA biomarkers. And for GSD1a, patients have been able to sleep through the night without hypoglycemic events. So we're super excited that in all three of our first three rare disease programs, we have proof-of-concept that mRNA can be effective.
And the reason why this is important, as you'll see on the next slide, is that besides the MDEs, the biomarkers, and the reductions in hypoglycemia that I've described, we have heard directly

from the patients that participated in our clinical trials about how these treatments impact their lives. And one quick story that I'd like to share with you that's relevant for this time of year, we heard from one family that told us that, for this past Christmas, it was the first time that their child could join them for a Christmas dinner, because he was able to eat the food that he was unable to eat in the past. And so, it's things like this that inspire us to work harder and to bring these treatments to patients as quickly as possible. And besides the stories of patients that we hear every day who have participated in these trials, I want to share with you that we're not done, we have huge ambitions. As I mentioned, there are over 1,200 inborn errors of metabolism, and we've started three programs, and now we have 1,297 to go. And now, I'd like to you to hear directly from a patient and her family about what life is like living with a rare disease.

Jordan:
I love a lot of things. I love going places. There's lots of places I want to go but haven't gone yet. I like softball, I love swimming in the pool. I guess I just love everything.

Leah:
You're really trying to pull me in?

Jordan:
No, I'm not.

David:
Jordan has a very, very ultra-rare disorder that I wanted to tell you about, so you understood a little bit about Jordan. So in your body is a huge organ right here. Go like this. Right here is one of your largest organs called the liver, and it looks like a big shoe. Your liver has what I'll call an imaginary door, and this door, in most of us, opens and closes.

Leah:
Everything we take into our body turns into glucose in the liver for any of us.

David:
Then when it's ready, it opens up the door and releases the glucose.
In GSD, that door doesn't open, it can't ever let the glucose out. In reality, that door is an enzyme. In Jordan, that enzyme barely exists.

Leah:
That means she needs a glucose, and corn starch is her glucose, that is her long-lasting energy in an entire 24-hour period, and she drinks and has corn starch every three hours in the daytime when she's awake, and every four hours in the night. They said, it's glycogen storage disorder. And I was like, what's that?

David:
We spent 10 days there getting stabilized with everything they had to do.

Leah:

We've become knowledgeable ourselves, which is a tremendous amount of stress of we're her doctor. When I think rare disease, I think, no one cares.

David:
It means you're alone. That's one reason why we want to have another child, so that Jordan wasn't alone when we pass away. We wanted her to have family that understood her needs and could be a loving person that cared for her. What does it mean to have GSD, or be a caretaker of someone that has GSD? No one understands it except another family with GSD. She's alone, she has no one, and she has to take care of herself, and we have to prepare her for that. That's scary.

Patrick Finn:
We're in it for them. We're trying to design and build these therapies to really bring to them and address their needs, their care. What we're trying to provide them is hope, hope that things will get better for them, hope that the future will be easier. Hope that all of the burden of their disease isn't how they define their day-to-day routine, and that they can explore the world just like everyone else. And that's really what we want, that's really what pushes us to bring things to the clinic for these patients, is that we want everyone to be able to experience life the same way we can.

Leah:
Now, everyone knows who Moderna is, and wow, we're going to segue into my kid's rare disorder, and I'm thankful, I am beyond words to know that somebody gives a shit and somebody cares enough.

David:
It's indescribable, knowing that there's hope.

Kyle:
Thank you. Really incredible video. And this is why we're here at Moderna, because we care, we care about kids like Jordan.
Okay, I'd like to turn over the presentation now to my friend and colleague, Jameka Hill, who is doing really incredible work, ensuring that our clinical studies adequately represent the populations that are affected by these diseases. Jameka, it's all yours.

Jameka Hill:
Thank you so much, Kyle. Good morning everyone, good afternoon. As Kyle mentioned, my name is Jameka Hill, and I'm the senior director of patient engagement and clinical trial health equity here at Moderna. And I'm really delighted to discuss Moderna's unwavering commitment and surrounding efforts to advance health equity through inclusive research.
At Moderna, we are working to bring forward mRNA-based treatments and vaccines that are equitable and effective for everyone everywhere, and our approach to develop innovative medicines is fundamentally rooted in the diversity of our clinical trials. For us, diversity is more than a compliance requirement, it's an essential element of scientific excellence. Recognizing that disease manifest and respond to treatments differently across various demographics, we design our clinical trials to mirror the global community, especially those disproportionately affected by the conditions we're researching.

We also acknowledge that, historically, clinical trial participation has been a privilege of circumstance, very often excluding underserved communities. So Moderna has set a standard by where 37% of our participants in our healthy volunteer clinical trials are from ethnic groups, at least half are female, and all age groups are appropriately represented across numerous geographies, extending far beyond the confines of the United States, and underlining our commitment to combat health inequalities and embrace diversity on a global scale.

Today, I'm so proud to share that we are not just meeting industry expectations, we're setting them, and then exceeding expectations in every demographic category. Moderna is consistently reaching out to medically underserved communities and underrepresented populations. In fact, Moderna has enrolled over 120,000 clinical trial participants into our infectious disease trials, ensuring those with the greatest disease burden are included. This commitment to diversity and inclusion is fundamental to our mission at Moderna, and we take immense pride in developing mRNA- based medicines and vaccines that cater to everyone. Yet, attaining diversity is not a matter of coincidence, it's the result of deliberate and strategic efforts.

We, at Moderna, hold the conviction that access to a clinical trial should not be a peripheral consideration, but rather a fundamental aspect of care that offers individuals of all backgrounds the opportunity to benefit from innovative treatments. Therefore, our efforts are anchored in fostering trust, and revolve around three central pillars, increasing awareness, bringing clinical trials into communities, and providing multiple participation options for individuals. So let's take a deeper look at each of these fundamental elements.

So the predominant obstacle to clinical trial participation remains lack of awareness, therefore we believe it's essential to provide individuals with information that not only resonates, but also fosters a sense of engagement and trust. To address this challenge, Moderna prioritizes increasing the public's visibility and understanding of the value of research, including Moderna's clinical trials. We forge lasting partnerships with local community organizations, partner closely with healthcare providers, and employ innovative approaches to increase awareness and education, particularly among groups that have traditionally been underrepresented in research.

Central to our culture here at Moderna, we also strive to make clinical trial participation more accessible. We recognize that logistical barriers are a very common challenge for many, no matter their background. To this end, we implement novel solutions that bring our clinical trials closer to where potential participants live, we form strategic partnerships with retail pharmacies, deploy mobile units, pop-up clinics, and collaborate with numerous service providers. Our methods are carefully designed and continuously refined to address the specific needs of diverse regions and communities, always with the goal of ensuring that our initiatives are convenient for the participants, and truly deliver a substantial, positive impact on the communities we're dedicated to serving. Lastly, we understand that a one-size-fits-all approach does not adequately place clinical trial participants at the forefront, so we strive to design our clinical trials with optionality in mind, and thus ensuring that a broader range of people can access our clinical trials as a viable care option. In 2023, 80% of Moderna's clinical trials included flexibility within their schedule of trial activities. We believe that every participant should be offered the opportunity to decide where and when their assessments are conducted, so long as it's safe, permissible, and in line with regulatory standards. We also aim to empower clinical trial participants with the freedom to choose appointment times that better align with their individual schedules, thereby minimizing cancellations and bolstering adherence to our clinical trials. In fact, we have found that incorporating flexible visit schedules has actually been instrumental in boosting our

enrollment and retention rates across several demographic categories, and to everyone's excitement, we've also seen an increase in participant satisfaction.
This focus on the participants' needs is central to our mission, and the pillars I've outlined play a crucial role, not only in enrolling participants in our clinical trials, but also in ensuring we retain participants through trial completion. Our number one priority is to ensure the robustness of our scientific data, and by keeping a diverse and committed participant group throughout the life of our trials, we can all have confidence that the medicines and vaccines Moderna is developing will in fact be effective and relevant for the diverse populations that will ultimately use our products.
Please know that our commitment to solid scientific evidence is at the very heart of our dedication to providing clinical trials that are innovative, inclusive, and attuned to the needs of people worldwide. Our approach to inclusive research is comprehensive, and we go to great lengths to ensure our clinical trials inspire confidence, cultivates trust, and accurately represents those at greatest risk and most likely to benefit from our products, thereby ensuring all people have access to the potential, and, might I add, very exciting medicines of tomorrow.
It's now my great pleasure to introduce Hamilton Bennett, who will discuss Moderna's strategic vision for pandemic preparedness.

Hamilton Bennett:
Good morning. As Jameka said, my name is Hamilton Bennett, I'm senior director of vaccine access and partnership at Moderna. And this morning, I'll share with you the steps that we are taking to continue to position our prophylactic vaccine platform for pandemic preparedness, outbreak response, and ultimately, global public health.

Hamilton Bennett:
You've heard Kyle talk about an mRNA platform that can deliver many medicines. And while we've seen that play out with incredible science across our modalities, our most notable achievement to date remains our COVID-19 vaccine. Moderna used our platform to rapidly respond to the greatest public health threat of our time. In less than one year, we used our deep understanding of mRNA science, delivery science, and manufacturing to bring our first COVID-19 vaccine to emergency use authorization. And with over 1 billion doses of our vaccine administered, we're proud to say that we have achieved this, with a focus on vaccine equity and access. In 2021 25% of our COVID-19 vaccine was delivered to low and middle income countries. When product was sold to Gavi-eligible countries, it was provided at the lowest tier pricing. And we have maintained a commitment to not enforcing our COVID-19 patents when they're used in and for LMICs.
We are incredibly proud of what we've been able to achieve through our vaccine. And with annual updates to our COVID-19 vaccine sequence, we've demonstrated an ability to respond rapidly to new variants of concern. In 2022, we were able to bring forward a variant containing vaccine in 63 days, the time from strain selection to FDA approval for the updated vaccine. This year, we made that update in 87 days. This reinforces that not only is our technology capable of rapid response, but we have the people, the processes, and the know-how to deploy the technology again and again to address continued public health threats.
So what would it look like to deploy our platform to other respiratory threats like pandemic influenza? Influenza pandemics occur when a novel reassortant virus is introduced to the population. There have been four influenza pandemics since the early 1900s. In 1918, the largest

influenza pandemic on record resulted in more than 50 million deaths worldwide. Over the subsequent decades, in 1957, 1968, and most recently in 2009, novel strains of the virus were introduced and caused between 0.5 and 1.5 million deaths each. The odds are good that we will each see multiple influenza pandemics in our lifetime, but pandemic response begins with pandemic preparedness.

So this summer, Moderna began to build a pandemic response dossier for pandemic influenza. The mRNA-1018 program, currently in phase I-II clinical testing, will test vaccines designed to prevent influenza disease caused by avian influenza viruses of the H5 and H7 subtype. The goal is not simply to respond to these specific viruses, but to create the capability to respond to future threats and to do so quickly. The mRNA-1018 program will pull traditional influenza response into the age of mRNA. Here, I'll use the most recent pandemic influenza event to highlight the potential of mRNA.

In this figure, I'm showing the epidemic curve of lab-confirmed cases of pandemic H1N1 influenza resulting in hospital admissions, in light blue, admissions to the ICU in mid-blue, and deaths in dark blue. This data comes from Public Health Canada, but it's representative of the waves that occurred across the Northern Hemisphere in 2009. The WHO declared a public health emergency of international concern on April 25th. This mobilized the vaccine response community and industry was able to have an approved pandemic vaccine available on September 15th. But when you consider the four- to six-week delay that can occur between vaccine approval to distribution and ultimately administration, it's apparent that despite these incredible efforts, vaccine was not available fast enough to prevent the second wave of influenza that we all experienced that fall.

But what if we could achieve COVID-19-like timelines with pandemic influenza? In 2021, the G7, led by the UK government and in collaboration with CEPI, the Coalition for Epidemic Preparedness Innovation, set the objective of responding to a public health emergency within 100 days. I already shared with you that our COVID-19 program has responded in less than this in the last two years. But think about the public health impact that we could have had in 2009 if a vaccine was available six weeks earlier.

This is the future of pandemic influenza in the age of mRNA. But ultimately, the threats to public health extend beyond COVID-19 and beyond influenza. They extend to Disease X. As you heard Stephane say, Disease X represents the knowledge that a serious international epidemic can be caused by a pathogen currently unknown to cause human disease. And while the potential sources of Disease X may seem vast, through focused R&D on priority pathogens and collaborative exploration via our mRNA Access program, we are building the pipeline to enable a future response. Shortly, you will hear hear from one of our collaborators in this space, but first, I'll take a few additional minutes to talk through our global health portfolio more broadly. On the next slide, I'll share with you our priority pathogen portfolio.

In 2022, we formally launched our global public health portfolio. The current status of that portfolio is displayed here. The original list of pathogens was created in response to the WHO R&D Blueprint priority pathogens and CEPI's priority pathogens. Our objective remains to create a portfolio of vaccines that are able to leverage our scale of manufacture and the growing safety database to more rapidly respond to outbreaks in the future. We have advanced clinical candidate vaccines against COVID-19, Zika, chikungunya, HIV, and Nipah. This year, as I mentioned previously, we launched our phase I-II clinical study for pandemic influenza, now shown here in addition to the original global public health portfolio. And this summer, we began

our phase I-II clinical study of the Mpox vaccine, a program that we launched in response to recent outbreaks caused by vaccine shortage and inequitable access.
You may also notice that a number of these programs are progressing via public-private partnerships. We believe that collaborations are absolutely critical to developing public health vaccines that will have an impact. And we engage diverse stakeholders as a key pillar of our global public health strategy. And as I'll discuss on our next slide, our mRNA Access program is becoming quickly the vehicle through which we deploy our platform and continue to reflect the priorities of our research community.
The mRNA Access program opens our preclinical production capabilities to academic institutions around the world to decentralize research and development of mRNA vaccines. Our primary mission is to create novel, life-saving medicines against emerging and neglected infectious diseases. The value in mRNA Access is that the exploratory research that our academic collaborators are conducting is taking place on a platform and a platform that is built in early development engine, an engine that can accelerate products not only into the clinic, but to licensure. It's this kind of collaborative model for innovative research and the type of bold approach that Moderna is willing to take in our mission to advance the greatest impact on public health. In the last year, we've nearly doubled the size of our mRNA Access network, now 16 institutions strong. Through the program, our technology is placed in the hands of world-leading experts, allowing them to conduct cutting-edge research. And I'm excited to introduce you to one such researcher, Professor Teresa Lambe of the University of Oxford. Professor Lambe is the Calleva Head of Vaccine Immunology at the University of Oxford's Pandemic Sciences Institute and the Oxford Vaccine Group, one of the leading institutions in the world dedicated to vaccine research. She's made a significant contribution to the field of immunology, with a particular focus on designing and developing vaccines for infectious diseases of outbreak concern. Professor Lambe was instrumental in the development of the Oxford AstraZeneca COVID-19 vaccine and played a key role in both its early design and clinical development. In 2021, she was appointed as an honorary officer of the British Empire for her services to public health. Throughout her career, she has demonstrated a commitment to scientific excellence and has widely been recognized for her contributions to global health. Recently, she was awarded a CEPI grant to develop AI-informed vaccines against novel pathogens with programmable technologies like mRNA and the viral vector platform known as ChAdOx1. I'll now turn the floor over to Professor Lambe to speak a bit more about her work in global health and the paradigm shift that we will collectively enable towards better pandemic preparedness and response.

Lavina:
Hi, thank you so much for inviting me here today to speak about vaccine platform development for pandemic preparedness. I'm Professor Teresa Lambe, and I'm from the University of Oxford. So as many of you will know, there was an Ebola virus outbreak in Western Africa that started towards the end of 2013 and was culminated in 2016. It is thought that approximately 11,000 individuals lost their life during this outbreak, a number that is thought to be a vast underestimate of what actually happened on the ground. Regardless, the WHO and government bodies generated a hit list of those pathogens that they thought might cause the next pandemic or the next outbreak of concern.
And many of these viruses will be known to the audience. So likely you have heard of Zika virus and you've heard of Ebola virus, but you may not have heard of Rift Valley fever or Crimean-Congo haemorrhagic fever. These are all viruses that we at the University of Oxford have tried to

make vaccines against. And I've been involved in most if not all of these programs. And they're at different stages of development. We've used our viral vector platform to make vaccines against these pathogens. We're not the only ones to have done so. There have been many people in many organizations. It's been a global effort.

And really, when we were looking at the development process and timeline to make a vaccine, it typically takes five to 10 years to get a vaccine from concept all the way to licensure. And that's because normally each of these steps are done sequentially. And that was certainly the scenario that we were looking at when we started to design a candidate vaccine against Middle Eastern Respiratory Syndrome. MERS is a coronavirus, and it's a vaccine that we've designed, tested in our preclinical studies, demonstrated efficacy in animal studies, went on to do a phase I GMP manufacture, and then demonstrated in our phase I clinical trials that the vaccine was immunogenic and safe.

So these were data that we had prior to SARS-CoV-II's outbreak happening in 2019, 2020. And when that outbreak happened, we looked at the typical development process and timeline, and we realized that we couldn't do each of these steps sequentially because too many people would die. And this was a global realization. It was not a eureka moment for the University of Oxford alone. And what many manufacturers did to enable vaccines to get to licensure rapidly was to stack these studies. So we didn't skip anything. We delivered everything that you would normally do in a five- to 10-year program, but we took a risk. And the risk that we took was a financial risk.

So before we knew that we had a vaccine that was effective or efficacious, we'd already scaled up our manufacture so that we could go on to license. And without the support of the UK government, Serum Institute and AstraZeneca, we could have not have taken that risk. And that underpins some of the lessons that I have learned through this development process and timeline across the COVID pandemic.

So the first lesson that I've learned is that you need to plan for the future, and you need to plan many steps ahead. You'll have plan A, B, C, D, E, and by the time you've got to F or G, you might have something that is tenable, you might have something that is deliverable. I absolutely believe that you need to partner with pharma early. Academics are great at blue skies thinking, they're great at pivoting, they're great at changing the direction of travel at speed. But what we're not great at is having the manpower or womanpower to get a product all the way through to licensure.

I don't think that's appropriate for university. And we really need to align with pharma early so that we are both pulling in the same direction. As I've said, one of the biggest lessons I've learned is you need to work at risk. It goes without saying you never put the safety of your volunteers at risk. And the last lesson that I've learned is that collaboration is absolutely key. Unique collaboration across government, regulatory authorities, international bodies, academics, charities and government bodies, and pharma, of course, to be able to develop and deliver a vaccine in less than a year.

And this was what underpinned that successful journey that we at the University of Oxford and AstraZeneca, Moderna and others have had across the last year. We were able to design, develop, test and deliver a vaccine against SARS-CoV-CoV-II in less than a year. We have a number of other programs ongoing. Currently at the moment, I have a vaccine against Sudan ebolavirus, Crimean-Congo haemorrhagic fever, and Marburg virus, a phyllovirus, in phase I clinical development, or close to phase I. And the difficulty with those programs is that we've used the old development process and timeline. And really what I think we need to do now, we're

at a unique point where we can take the lessons that we have learned from COVID and really use those lessons to speed up the development of these types of vaccines and all of those other vaccines that we need against emerging and outbreak pathogens.
So how do we do that? How do we enable those lessons that we have learned to allow us to deliver vaccines against a wide range of pathogens that could cause a pandemic? So for me, the success factors for a proactive approach towards vaccine design, the simplest pillar but the most important is people, places and processes. You absolutely need an established alignment of global collaborators. And in fact, without this pillar, you won't be able to deliver the other three. You need an open, enabling dialogue across government, regs, industry, academia and charities to achieve what we've done across the last couple of years, and to continue to be able to deliver in that manner. I firmly believe that you need long-term investment that is sustainable and joined up. And that investment needs to be in those countries where these pandemics happen most frequently. You will also need rapid access or surge funding when that next pandemic happens. But actually, if we enable these four pillars, we're going to be able to create a bedrock of impactful clinical research and health outcomes. So when you have these types of eureka moments, it's not atypical for you to realize that other people who've gone through similar experience also have come to very similar lessons. And in my case, they frequently put it far more eloquently. So in 2021, the G7 leaders welcomed the 100 Days Mission, and this was a report that was authored by scientific, government and industrial experts. And there is a number of recommendations within this report to enable readiness for diagnostics, therapeutics and vaccines for the next pandemic.
And one of those recommendations that I'm going to focus on in the last couple of slides is to produce libraries of prototype vaccines. Why should we do that? Why is that important? Well, it will allow a paradigm shift. So really, what we're talking about is before a public health emergency of international concern or a pandemic is declared by the WHO, we actually have this enabling science already completed, that we have generated vaccines against potential pandemic threats so that when that pandemic comes, hopefully we will have a wealth of knowledge around the types of antigens we need, the appropriate vaccine platforms, and other enabling research to implement more readily, more rapidly these types of clinical trials, so that we can have a vaccine more rapidly than a year. Do I think 100 days is achievable? I think 100 days is both inspirational and aspirational. Do I think it will be tough? Absolutely. But most of the good things in life are tough. And it doesn't make me shy away from the challenge.
It's not the only thing we need to focus on. We absolutely need to focus on strengthening global surveillance. We need improvements to clinical trial capacity. We also need improvements to reg processes. We absolutely need regionalized diagnostic, therapeutic and vaccine manufacturing, because without this, what will happen during COVID will happen again. LMICs will be left behind and we cannot allow that to happen. LMICs refer to low and middle income countries. We need sustainable pandemic financing, as I've already alluded to. We can think of this as almost a safety blanket, an insurance policy. And if we invest a little now, it means we won't lose all those trillions that we have lost across the last handful of years, let alone the human life. We need to invest in a rigorous global health governance system as well.
So these are all the types of enabling processes, technologies and ecosystem that we need to make sure we have so that we can have a truly 100 Day Mission compliance system. But as I'm a vaccinologist and an immunologist, I'm going to focus on why I think the libraries of prototype vaccines are important. So CEPI has recently published a long list of viral families known to infect people. And the UK Vaccine Network has also generated a list of those pathogens they

think could cause the next pandemic or outbreak of international concern. And the list from the WHO is expected early next year. So what should we do with this information? What should we do next?
I firmly believe that we should collaborate towards Disease X readiness. And this is a vision that is shared across the sector and certainly a vision that is shared within Moderna. So I believe that you need to plan for the future and plan many steps ahead, as I've already said. I think you need to generate preclinical and clinical data during an inter-pandemic period. You need to partner with pharma early. And that partnership, combining academic rigor with scaled programmable platforms, is critical. And the mRNA Access program that Moderna have enabled has been a game-changer. It's been absolutely transformational, in my opinion.
You do need to work at risk. You're not going to know which one of these viral families may cause the next pandemic, and indeed it may be a bacteria and/or other pathogen. So you need to invest in developing prototype vaccines against a number of viral families, knowing that not all of them are the ones that you are going to need for the next pandemic, but using the knowledge that you've accumulated to help ready for the next pandemic, so to make the ecosystem, the people and the processes in the best shape for the next outbreak and/or pandemic.
And again, as I've already alluded to, collaboration is key. Oxford and Moderna have a very successful relationship ongoing that at the moment is centered around the RNA access facility and a grant that has recently been awarded that I will talk to in the next slide. And together, we are collaborating to advance outbreak research with a validated, scalable platform, and to prioritize health outcomes. And that's why that partnership for me is so important. We're working together with the same ethos to develop and deliver better health outcomes that are scalable for the world.
So there's been a recent award to Oxford and Moderna and a number of other collaborators that have been made by CEPI. We are working on a vaccine library against arenaviruses. Arena viruses that have been identified as having pandemic potential. We are going to use AI with our partners to speed up vaccine development to help identify novel antigens that we can stick into our vaccine platform technologies. We're going to use the RNA technology from Moderna and the viral vector technology from the University of Oxford and AstraZeneca. And what we're going to do is test these technologies all the way through to phase I. And in that way, we will have accumulated both knowledge and data that will help us if the next outbreak were to be an arenavirus. And this I see as a stepping stone towards better preparedness, and it will help us if there is an outbreak across a wide array of different viruses. There are a number of different innovative steps that are involved in this application that will have wide-reaching consequences across pandemic preparedness.
So it just remains for me to thank everybody involved in this amazing amount of work across the years. I don't name anybody because I always forget somebody and cause offense. But what I would like to do is end on a photo of the wonderful people that I work with on a day-to-day basis. These are people who are dedicated to helping improve human health. And this was a visit that we had from the IPPS state committee. So I hope the rest of your day is wonderful, and thank you very much for listening to me.

Hamilton Bennett:
Great. I hope you can appreciate why we are so thrilled to call Professor Lambe a collaborator. She's truly enabling transformational work. I want to leave you with one slide that I think captures the progress that we've made with our platform. Before you is a map adapted from CEPI

that plots a number of emerging and re-emerging infectious diseases. You might note that all corners of the world are at risk of emerging and re-emerging infectious diseases, and also that some of these pathogens are found in multiple regions. I hope this helps reinforce the importance of global collaboration towards global health security; and again, a concept that informs our approach to public health at Moderna, collaboration.
If we click forward, now in red, I'm showing pathogens where we have built or are building preclinical and clinical data sets that will allow us to bring novel vaccines and therapeutics forward quickly using our mRNA technology. It's truly remarkable progress for public health, and we look forward to continuing to expand our effort through strategic collaborations in the years to come. I'll now hand it over to my colleague, Debbie, to talk about Moderna's commitment to the environment and sustainability. Thank you.

Debbie Donovan:
Thanks so much, Hamilton. I'm Debbie Donovan. I lead the environment, health and safety function here at Moderna. And I'm excited to give you an update on our environmental sustainability activities. According to the Copernicus Climate Change Service, 2023 is on track to be the warmest year since we began keeping records. In 2023, what you see in the photo is some of the devastating wildfires in Canada, smog affecting east, flooding, severe droughts. And consensus of scientists that study climate change are that these global events are the result of human activities. Climate change and air pollution can have a significant impact on human health. And the cost of climate change on human health

Debbie Donovan:
Health is estimated to grow to between two and four billion a year by 2030. And we support the scientific community's consensus that climate change is exacerbated by human activity. And we feel it's our responsibility as a healthcare company to protect planetary health and therefore human health.
For many years, the scientific community has provided information on climate change that international organizations, NGOs and some governments have used to create voluntary frameworks and requirements for companies to implement. But more recently, global warming trends indicated that much more action is needed and that action is needed more quickly. And as a result, there has been an increase in new and proposed regulations that will then require companies to take formal actions, such as to disclose on their activities and risks related to climate change. This shift is most apparent in the recent European Union Corporate Sustainability Reporting Directive, CSRD, and the proposed rules from the United States Securities and Exchange Commission on climate degrade related disclosures. Currently, the SEC rule is only proposed, but if it were adopted as is, it would formalize disclosure requirements for large accelerated filers like Moderna, where tracking, reporting and ultimately lowering carbon emissions has gone from voluntary towards the mandatory. As a young company, we are in a very unique position to support climate action as we grow and expand around the globe. Our sustainability strategy is based on three key pillars: Sustainability by Design, Natural Resource Conservation and Decarbonizing our Value Chain. And these three pillars are built on a foundation of information collection, metrics and reporting, monitoring and continual improvement. Before I speak to some of the activities we've accomplished in 2023 on those strategic pillars, I wanted to highlight some activities related to the overall sustainability program.

In June of this year, we initiated a climate and risk scenario project with the aim of enhancing our understanding of climate related risks and opportunities and developing initiatives to mitigate those top risks. This work will continue into 2024. Information on our Scope 3 emissions, and those are emissions in our value chain, water use and waste generation for both '21 and '22 are now available to the public on our website. And this is in addition to the previously reported information on energy consumption and our Scope 1 and 2 greenhouse gas emissions. In July of this year, I'm also excited to report, that we did our first CDP Climate Change Survey and we've shared with the CDP investor community our climate related governance, strategy, risk management and metrics and targets programs. And we've also increased our data assurance level for environmental sustainability data from limited to reasonable in preparation of stakeholder expectations on the robustness of data verification.

Now I'd like to discuss the first of our three strategic sustainability pillars, what we call, Sustainability by Design. This enables us to avoid emissions before they occur, and what we've done is we've incorporated sustainability elements into facility design reviews. So, at each gate in the design process, sustainability questions are raised and addressed, and this helps ensure that sustainability initiatives are built into the facility before it's actually constructed. A primary example is the inclusion of heat pump technologies to reduce thermal energy, sorry, to produce thermal energy, which will reduce our reliance on fossil fuel. We've also incorporated LEED standards in new facilities and LEED incorporates energy and water efficiency to avoid and reduce energy and water consumption.

On the right-hand side of this slide you'll see five new construction projects that are underway. The first one scheduled for completion next year is our new corporate headquarters at 325 Binney Street here in Cambridge, Massachusetts. Together with our partner, Alexandria Real Estate, Moderna has designed our new corporate headquarters to be the most energy efficient building currently constructed in Cambridge. This new facility incorporates a number of innovative technologies from heat pumps, to onsite solar, to rainwater harvesting. In addition, our four new manufacturing facilities will also incorporate heat pump for thermal energy, with one caveat being our facility in Laval, Canada, which will use an electric boiler. And that's exciting because the electricity in that local grid is predominantly from hydroelectric power and is near greenhouse gas free. Our new facility in Marlborough, Massachusetts will also utilize heat pumps, but it will have a backup natural gas boiler for when weather conditions are below optimal temperatures for heat pump operation. So, although the facility does include a natural gas boiler, we anticipate those emissions to be a minor source and it's for business resilience at this new facility.

While significant efforts have been directed at incorporating sustainability in new projects as we're expanding around the globe, we want to avoid greenhouse gas emissions in our current operations as well. And in 2023, we've done a number of things at the Norwood Manufacturing facility in order to assess our energy and water use, to identify opportunities to reduce energy consumption and transition away from fossil fuels. We've also initiated My Green Lab assessments to understand awareness, behaviors and energy consumption within our laboratory spaces. And My Green Labs is a globally recognized organization that assists many companies in improving laboratory sustainability performance. And in addition, we've also completed a waste assessment in Norwood to understand waste generation and mapping to identify improvements both in the collection and the disposal methods for the waste that we generate.

As with many of our peers, a significant portion of our greenhouse gas emissions fall within our Scope 3 category and are associated with our upstream and downstream value chains. Now

available on moderna. com are those Scope 3 emissions for '21 and '22. And understanding this information allows us to identify hotspots for greenhouse gas emissions so that we can target key suppliers to engage with and partner on reductions in their Scope 1 and 2 emissions, which will ultimately benefit our Scope 3 emission reduction efforts. Also, as mentioned last year, we continue to offer subsidized green transportation to the majority of our employees to enable them to make greener choices and reduce greenhouse gas emissions associated with employee commuting.
So, I'm proud to say we've made significant efforts and enhancements to our sustainability program and we'll continue these efforts in 2024. We will incorporate the learnings from the Climate and Risk Scenario Analysis into our overall risk management program. We'll submit our Greenhouse Gas Reduction Roadmap for official validation by the Science-Based Target Initiative, and we'll continue to advance our energy and greenhouse gas programs.
Also, as a member of the World Economic Forums Alliance for Clean Air, we'll be working to enhance our disclosure of air pollutants, which are in addition to our disclosure on greenhouse gas emissions. We'll also formalize our UK carbon reduction plan and the net-zero challenge in Canada. And lastly, we'll progress our water and waste programs to enhance our understanding of opportunities for reduction and efficiency improvements. And with that, I thank you and I'd like to turn the program over to Tracey Franklin.

Tracey Franklin:
Thanks, Debbie. Hi everyone, I'm Tracey. I lead human resources for Moderna. I'm happy to be here again this year to talk about our employee efforts and the sustained activity we've made in this space. You've heard from and met some of our incredible employees already, but I thought I would start with a video just to bring some of the spirit of our employees to life for you all.

Speaker 1:
We are mRNA.

Speaker 2:
And mRNA is us.

Speaker 3:
Every day we create the blueprints needed-

Speaker 4:
To fight and eradicate diseases-

Speaker 5:
And help people live healthier lives.

Speaker 6:
The world has witnessed the powerful benefits of this life-saving technology.

Speaker 7:
We've done it by completely re-imagining-

Speaker 8:
How medicines are created-

Speaker 9:
And delivered.

Speaker 10:
In the process, we've launched an entirely new industry-

Speaker 11:
One fueled by deep care for our team-

Speaker 12:
As well as for others.

Speaker 13:
Our belief, if we can solve one problem-

Speaker 14:
We can solve them all.

Speaker 15:
Through the power of mRNA-

Speaker 16:
We aim to impact human health-

Speaker 6:
And change the world.

Speaker 17:
And change the world.

Speaker 9:
[foreign language 01:03:47].

Speaker 11:
[foreign language 01:03:49].

Speaker 15:
[foreign language 01:03:50].

Speaker 16:
[foreign language 01:03:52].

Speaker 2:

[foreign language 01:03:53].

Speaker 18:
[foreign language 01:03:54].

Speaker X:
And change the world.

Tracey Franklin:
Thanks. We're incredibly committed to building an environment where our people thrive. As Stefan said in the beginning, "Our people are everything for us." And so, what I like to do is really look at data. And so, we do internal surveys where we highly focus on engagement, culture, belonging. We believe those are three critical ingredients for people to feel engaged and do their best work. In addition to that, though, I read through every single OpenText comment to get the context behind what people thrive. What type of environment? What can we do better? So, we use our internal survey. As well, as Stefan mentioned, we participate in a lot of external surveys. Yes, it's nice to get the recognition, but more importantly, we learn. We learn so much about our workforce, about our employees and what we can do better. So, happy to continue to focus in this area from an environment perspective.
Last year we introduced one of the key ingredients that really unites our people is our mission, our values, our mindsets, and we use this from a belonging, diversity and inclusion perspective, as well as in terms of how we scale our culture. It's really that underpinning to what it feels like to thrive in our company. I'll first focus on our workforce demographics. As you can see, from a gender perspective, we're 49% all employee-based females, as well as 39% from a female executive perspective. That dropped slightly. We'll continue to monitor that, but overall, fairly proud of those numbers.
We make progress in terms of race and ethnicity, and one of the things that we've been focused on is really the early talent pipeline. So, how do we continue to hire and grow and embed? This year we had our first MBA program that was highly diverse, highly female. And so how do we make sure that we're continuing to build those pipelines to grow in our environment? The thing I continue to be most proud of is our pay equity. We provide equal pay for equal work. This is the second year in a row and we're committed to monitoring that moving forward.
And then when I think about scaling our culture, we've introduced this concept of a people platform. I showed our mission values and our mindsets in the previous slide, but this concept is really, how do I look at our HR programs, our systems that underlie those programs, as well as the data? And how do I make sure that when we scale the company, no matter what level you are, where you are in the world, you're essentially having the same employee experience and that our culture is really embedded throughout that employee lifecycle journey.
So, before you even join the company, we are talking about our mindsets and what it's like to work in our company. We bring our employees together for onboarding, several day onboarding, where we really do a mindsets immersion during that course. And then the last thing I'll touch on in this slide is learning and development. We have a Moderna University and two of the colleges that I'll highlight. One is the College of Leadership and Culture, where we do a lot of case studies, we've written internal case studies for our employees to really understand what makes us thrive. As well as our digital college. So, we have a lot of investment in really making sure our employees have the most modern, up-to-date skills in terms of AI and technology and what they

need. So again, continuing to work on the underlying system for how we scale our environment and our culture.
And then in addition to that, we focus highly on the individual. So, we have the system, which I talked about in terms of the programs, but then what does it actually feel like in terms of individuality in our company? And so, my strategy for diversity and inclusion starts with belonging. And why do we do that? One, I can hire diverse. I can include you at the table, but if you don't feel like you belong, you're not going to thrive in our environment. You're not going to be able to be your authentic self and be able to innovate for so many patients that need our medicine. And so, that sense of belonging is something that we really focus on in the company and our mindsets are really a uniter around that.
And the second thing is wellbeing. We care deeply about our employees and recognize, though, that our employees are all different and what they need at different points in their life, whether it's a financial, whether it's from a mental health or family support, it all changes. As you all know, our lives are quite dynamic and change a lot, and so we provide programs that can really meet you where you are from an employee perspective. And so, before I turn it over to Kate, I just wanted to show a quick video highlighting some of the benefits that our employees appreciate most.

Speaker 19:
One of the benefits that I enjoy the most is BenePass.

Speaker 20:
I've never had an employer that actually invested in its employees the way Moderna does. It's given me the option to travel, to get outside, go exercise, and take the financial burden off of doing those activities.

Speaker 19:
I'm able to use it how I like, when I like, how much I want to spend each month.

Speaker 21:
I can also use it for self-care, which makes me really happy and I can come to work and come home with a very positive energy, because I took care of myself. To me has been a huge positive impact for not just me, but for my family.

Speaker 22:
The Baby Bonding Policy that Moderna offers really just made me feel safe. Becoming a new mother is quite the transition, I would say.

Speaker 23:
Having six months of baby bonding is crucial and important to being able to bond with your child and your newborn baby and learn about all of the new parts of being a mom.

Speaker 24:
Spring Health makes it really easy to find a therapist, which is what you need when you're struggling with mental health. Everything is overwhelming.

Speaker 25:
Spring Health offers a lot of services. Having all of those in one place is totally helpful.

Speaker 20:
Honestly, the benefits here are second to none.

Speaker 23:
I feel really lucky to be at Moderna and have this opportunity to take advantage of the benefit.

Tracey Franklin:
I focused a lot on the internal employee. Kate is my dear partner who focuses a lot on the external, which employees love as well. So, it's that internal-external communication that really drives engagement. So, I'll pass it over to Kate.

Lavina:
Thanks, Tracey. And hello everyone. I'm Kate O'Malley, Executive Director of Communications at Moderna. I'm pleased to be here today to share a bit more about our commitment to giving back in our communities. As Stefan mentioned in his introduction, we constantly strive to extend our impact on society and our commitment to our communities is just one example of how we do this. We continue to diversify and add more programs to our giving strategy and have achieved important milestones in the last few years.
On this slide, you can see our four current areas of focus. First, our Corporate Volunteering Program. As we speak, our teams around the world are still celebrating all that was achieved during our fifth annual volunteer week. We continue to promote charity work throughout the year, and our employees benefit from annual paid leave for volunteering. The second program in our giving strategy is Employee Gift Matching. Newly launched in 2022, our Employee Matching Gifts Program and Dollars for Doers Program match monetary donations and time volunteered back to the nonprofit organization. Both of these new programs are funded by the Moderna Charitable Foundation. As Stefan also shared in his introduction, we are immensely proud to support so many impactful nonprofits around the world.
The third program is Philanthropic Giving. In April 2022, we launched the Moderna Charitable Foundation to further support Philanthropic Giving at Moderna. Less than a year after becoming a commercial organization, our board of directors approved an initial upfront endowment of $50 million to support the foundation and its mission. The fourth program in our giving strategy is Humanitarian Relief. One example of this is the $1 million donation that our foundation made to the International Medical Corps to support medical and mental health services, as well as the delivery of vital supplies to those affected by the tragic earthquakes in Turkey and Syria.
Just a few moments ago, my colleague, Debbie, discussed the impacts of climate change on people and our environment. This year, we have witnessed an increased need to support communities being affected by natural disasters, including fires and flooding. Our foundation has engaged in relief efforts to support these communities, and we are thankful to our employees who generously lend both their voices and resources during these times of humanitarian need.
These four fundamental pillars of our giving strategy have further engaged our workforce, extended our support to communities and grown our partnerships with NGOs and organizations helping underserved populations.

For the remainder of my time today, I'll share additional highlights from two of these pillars: Corporate Volunteering and Philanthropic Giving. As we work to maximize our positive impact on patients and society, we recognize that some of the most vulnerable communities continue to be disproportionately affected by inequalities that prevent them from accessing quality and essential healthcare services. Defined by the World Health Organization, social determinants of health are the non-medical factors that influence health outcomes. There are conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life. Research shows that these social determinants can be more important than healthcare or lifestyle choices in influencing health. For example, numerous studies suggest that social determinants of health account for between 30% and 55% of health and outcomes. We also know that the repercussions of the COVID-19 pandemic will be felt for generations to come. And on this slide, you can see some of the insights from the WHO about the influence of the pandemic on the social determinants of health.

As we at Moderna execute our giving strategy to address some of these issues, our commitment to serve communities where we live and work remains stronger than ever. This is a continuation of our journey and core to our mission to deliver the greatest impact possible. Through corporate volunteering, we're not only engaging and responding to the needs of our communities, but also enabling our employees to give back to their communities in support of our mission. As Tracey alluded to in her comments a few moments ago, our team members are the driving force behind our scientific progress and our culture. We're proud to attract purpose-driven employees who believe in Moderna's mission. Their dedication to extending our impact by giving back to our communities was only strengthened during the pandemic. And our charitable initiatives have evolved to meet their needs, including more global volunteer opportunities, as well as the Matching Gifts Program I mentioned a moment ago.

Moderna is fortunate to work with dozens of community partners that welcome our employees to contribute to their causes and the causes that matter most to them. This year, we've seen a significant increase in the number of Moderna locations hosting volunteer events, allowing us to reach even more people as we scale. As you know, we believe that mRNA can transform medicine, and we are passionate about our science. We feel responsible to share our mission, promote education, an important social determinant of health, as well as innovation and curiosity, which is one of our core values. Sparking interest in science from a young age means investing in future scientists, just as one example of where we're focusing our volunteer efforts. The pictures you can see on the slide illustrate the passion and the gratitude for which our employees volunteer in support of different causes around the world.

Now, turning to Philanthropic Giving, the Moderna Charitable Foundation was established in 2022 to support organizations that promote public health, further access to quality healthcare, advanced scientific education and innovation, and advocate for diversity and inclusion, particularly in underserved populations. We are so proud that in 2022, the foundation supported organizations around the world with $7.8 million in grants, $4 million of which were focused on improving health systems and healthcare in Sub-Saharan Africa. Although we're a young foundation, we feel extremely privileged to have already established partnerships with organizations that are having a profound impact in local and global communities. I'll spend the next few minutes walking you through some of their stories.

We are excited about our investments in STEM and partners like Science Club for Girls in Boston, which has a vision of a fully inclusive and innovative STEM ecosystem populated by diverse and talented individuals. Education, of course, is an important social determinant of

health and an important investment in the scientists of the future. We also believe in the importance of using digital channels to educate society and increase health literacy, especially in communities that may lack the opportunity to learn about their health in a meaningful and enduring way. The Unbiased Science Podcast is an innovative means to reach communities on their health in a way that's digestible and that meets their needs. We believe this is important for people to make informed decisions about their health.
As mentioned before, the most vulnerable communities are still suffering from inequalities that were greatly exacerbated by the pandemic. And as a result, access to mental health support may be more important than ever. We're proud to support an award-winning evidence-based campaign designed and led collaboratively by the Centers for Disease Control and Prevention and the CDC Foundation in the US. The campaign provides tailored mental health resources, tools and support to promote and strengthen the emotional wellbeing and resilience of K through 12 teachers and school staff who experienced chronic stress, grief and loss during the pandemic. And shifting geographies, we're also supporting an ongoing project from Imperial College London and their partners to reach children who were orphaned after losing a parent or caregiver during the pandemic. The pilot program, being conducted in Columbia, aims to identify effective, policy-driven tools for helping children with a goal of setting these insights and expanding to other countries.
And for our final partner highlight,

Kate:
[inaudible 01:21:01] Last year, we began an amazing partnership with Amref Health Africa, an organization working to transform the health outcomes through investing in well-being and lives of women and children as agents of change in African communities. The Moderna Foundation supported a project across four counties in Kenya that used innovative approaches to engage communities on the uptake of COVID-19 vaccination. Also, to increase access to COVID-19 vaccines through mobile vaccination clinics and outreach events, and to integrate non-communicable disease education and screening with COVID vaccination. The impressive milestones achieved by Amref during our partnership this year speak for themselves, and we are grateful for their important work and the positive impact on communities in Kenya. Let's watch a short video of Amref's team in action.

Speaker 26:
[Foreign Language 01:22:07].

Kate:
We believe that working to tackle vaccine hesitancy and investing in resilient, equitable, and integrated primary care services is essential to responding to disease outbreaks. We're grateful for our partnership with AMREF and all that we have accomplished together thus far. With that, I'm happy to hand the presentation to Shannon Klinger, our chief legal officer who will walk us through our governance and ethics section. Thank you.

Shannon Klinger:
Thank you, Kate. My name is Shannon Klinger, and I'm the Chief Legal Officer for Moderna, as well as the president of the Moderna Charitable Foundation. If we think about governance, we start with our board of directors, and we believe that sound governance practices and policies

provide the foundation for establishing Moderna as a responsible corporate citizen, maintaining the trust of our stakeholders, and ensuring the success of our company. We have nine individuals with deep experience in our industry and in groundbreaking innovation that enable us to do what we do every day. I'd like to highlight just a few characteristics of our board. If we look at our board of directors, of the nine directors, three are women, and all three women on our board chair, one of our standing committees of which there are five.

The board and our committees meet regularly throughout the year, and we have an incredibly engaged board with the high level of attendance and engagement that allows us, as a management team, to leverage their expertise. For example, deep experience in information security, which is critical, as we think about things like cybersecurity, deep experience in the healthcare industry, deep international experience. We continue to expand our footprint around the world and, of course, manufacturing and supply chain expertise to make sure we deliver our products to the people who need them. ESG oversight starts with our board and committees for Moderna, and a true commitment requires engagement at every level of our organization.

The Board's Nominating and Corporate Governance Committee has principle oversight for ESG, its practices, our metrics, the ESG report that we talked about earlier that you've been able to see, and even the content and the items that we talk about today. In addition, that committee is responsible for board succession and identifying new board candidates, as we continue to ensure the right board for Moderna as we move forward. But there are a number of other committees who also have responsibility for important ESG topics. For example, the audit committee has oversight responsibility for our enterprise risk management program, as well as for cybersecurity.

Our Compensation and Talent Committee focuses on human capital management and oversees the great work you heard about that Tracy talked about today around belonging, inclusion, and diversity. Our product development committee focuses on overseeing matters related to product safety, clinical trial design, and the work that Jamika talked to us about around clinical trial diversity. Finally, our Science and Technology Committee oversees our IP strategy. As an executive committee, we have ESG accountability broadly dispersed amongst all of us, if you see this slide. Jerh Collins, our Chief Technical and Operations officer leads our carbon reduction efforts.

Arpa Garay leads our access initiatives from a commercial perspective. Tracey, as we mentioned, leads our human capital initiatives, and Stephen Hoge has oversight for clinical trials, including the diversity in clinical trials. When it comes to incentives, our annual bonus programs have ESG metrics and are related to human capital, and we want how we believe ESG as our value to be reflected also in how we as a team are rewarded and incentivized. To go to the next slide, as we continue our ESG journey, it's important that we continuously engage with our stakeholders and validate our understanding of those topics that are most important for Moderna. With this objective in mind, earlier this year, we launched a materiality assessment, which included an assessment of our double materiality.

Double materiality takes into account both financial and non-financial material impacts of a company's ESG factors. Our assessment is being done across two dimensions; an outside in assessment, which looks at how ESG factors impact our financial performance and value creation, as well as an inside out version, which looks at how Moderna's activities, products, and services impact society and the environment. You heard us mention several times today that we are focused on delivering the greatest impact to people through mRNA medicines. We believe

that conducting this double materiality assessment is an important step in our journey to understand how ESG factors are connected and drive our impact as a company.
And also to better understand how we can enhance our communication and engagement with our stakeholders, like all of you who are listening today, in addition to complying with new regulatory requirements and reporting standards. So this year, we launched a double materiality analysis with certain characteristics which we think will best help Moderna gain insights that are relevant to us. First, we've chosen a methodology and a platform that allows us to analyze a vast amount of data, and we leverage AI to access information on the potential material topics for Moderna. Some of this information includes, for example, the latest industry trends, new regulations, news and media, as well as information about our peers.
Second, we're compiling this data with a stakeholder survey where we've engaged key groups. With this information, we'll be able to complete our double materiality analysis, which will inform our next report. It's been super exciting to see that across each of our stakeholder groups on the outside that we've engaged, the response rate has exceeded what we understand to be industry benchmark, and we thank all of you who participated this year and look forward to your continuing contributions going forward. Finally, one of the key characteristics of the process that we are building is that we'll be able to continuously monitor material changes to our analysis and engage meaningfully with our stakeholders in real time about those ESG topics that are both most relevant to you and most relevant to Moderna.
When it comes to our ethics and compliance program, we're continuing to evolve that program to evolve as Moderna itself is evolving, and you can see the key elements of that program on our slide. One example is moving to principle-based policies that can guide our employees in their decisions. Also, we continue to build risk-based due diligence and monitoring processes and embed a patient-centered culture in all of our trainings and communications, and we do all of this with a digital first mindset in terms of our supply chain, we're continuing to enhance sustainability across our third parties as well. Since our call last year, we have launched our sustainable and responsible procurement program, as well as our third-party code of conduct. We've continued to engage with our partners and suppliers to build a supply chain that reflects Moderna's values. We are integrating our expectations of third parties throughout our procurement process, and recently launched an assessment of our suppliers by spend, on the various topics that you see at the bottom of the slide, to make sure that their performance in each of these areas mirrors Moderna's commitment and values in each of those areas. And we're also engaging with our peers in PSCI to learn and align on best practices that can maximize the impact collectively we can have on our industry, on our environment, in our communities, and we're continuing to work in the most important forms to be part of that shared solution going forward.
Finally, we've remained committed to transparency about our ESG efforts. We've reflected this in our second annual ESG report that was issued earlier this year. I invite all of you to take a look at it if you have not had a chance to do so, as well as the ESG event that we're having today, and we're continuing to focus on enhancing our disclosures across our website, so that in real time you also can see where are we, how are we measuring ourselves, how are we holding ourselves accountable and watch us continue to improve as we move through our journey. An important highlight this year was already shared by Devon.
We published our environmental 2021 and 2022 data that had third-party assurance as an example of how we're accelerating our journey and preparing to comply with new regulatory and disclosure requirements around our environmental efforts. We know that we cannot create the

most impactful version of Moderna in isolation. Your continuous input into our purpose is critical for us and helps us anticipate your needs to ensure we create long-term value. We are excited about the opportunity to continue our dialogue and demonstrate Moderna's accountability to our overall ESG strategy. We look forward to engaging in our Q&A today and after this event, and with that, I hand it over to Stéphane for closing.

Stephane:
Well, Shannon and team, thank you so much for those exciting presentations. I hope everybody understands that this framework, that I described in my introduction, is really key to how we think about building the company. We're not taking a short term view on this company. We've always thought in five, ten year increments, and how do we build the best version of Moderna that impact the most number of people? That is really the driving force behind everything we do. I hope you have seen today what the team has shown you in terms of progress, but also through every different participants, the commitment, and we didn't pick the only people at Moderna that are very committed to all those ESG topics.
This is a representation of the team, and what is exciting is a bit of the snowball effect, which is the more we engage people, the more people can engage with a company in the different topics that they're passionate about. Everybody is [inaudible 01:34:35] by different things, and we're trying to really find the best fit, so that really all talent is able to take the company to the next level to challenge all of us, including the management team, including the board, so that we build the best version of Moderna. There is no objective that we have, but to bring the greatest possible impact to people through mRNA medicine, we build this amazing platform and want to make sure that we maximize its impact. So with this, I would like to call the team to join me, please, for our Q&A session. Operator, let's move to Q&A. Thank you. I can't hear you.

Lavina:
Okay, excellent. Thank you, everyone, for all those great presentations. As a reminder, viewers can submit their questions through the portal on the webcast, and we will wait for those questions to in. I do see some questions coming in that have already been submitted, so let me kick it off with those. The first one is a broad question on ESG, and I'll ask Stéphane to answer this one, please. Please comment on how you view the intersection of ESG and its role in Moderna's business strategy. Stéphane?

Stephane:
Yeah. Thank you, Lavina. I think it goes back to what I shared in my introduction, which is we always start with the end game, which is we have this amazing information-powered molecule platform, and the question is, how do we maximize the impact on patients if you take a 5, 10, 20 year view on the company? And that has always been our mindset since we started 12, 13 years ago, and every day we ask ourselves the same question, which is, how do we maximize the impact on patients? It's the Moderna mission that I presented twice today, is actually painted in every conference room of a company, and I can tell you we point to it several times per meeting. That's really our true north, and so the ESG framework for us is just a way to think about the impact and how do we build a sustainable business that is the best version of Moderna, that is responsible about the environment, that, of course, is deeply caring about the employees who build the business and run the business every day? Without them, there is nothing. And how the different stakeholders of a company are involved in the design of this best version of Moderna,

that's what we care about, which is why, as Shannon said, we're very pleased through all the investor feedback we got during the fall, and want to continue to have that feedback coming in so that we can figure out what's the best path, but that's really why we think it's so important for Moderna.

Lavina:
Great. There are several questions in the queue about our commitment to developing emerging pathogens by 2025. Can you elaborate? This question will be for Hamilton, on the selection of viruses to develop vaccines against, and can research from mRNA access contribute to the selection process? Hamilton?

Hamilton Bennett:
Yeah, thank you very much for the question. As I mentioned during the presentation, our initial list was formed by information that we were collecting from global stakeholders, the WHO, CEPI, NIH, and that formed the initial prioritization of the pathogens that we called colloquially the 15 by 2025 pathogens. But we are also looking to mRNA access, and continued engagement with those external stakeholders, to tell us what the next wave of programs should be. Where can we use our technology to have the greatest public health impact? Where do we see promise for mRNA science, and where can we really deploy our technology uniquely to have a positive impact on public health? So it is a portfolio of programs that we continue to evaluate, continue to reprioritize, and we do that through ongoing dialogue with our external stakeholders and external scientists.

Lavina:
Great. Thank you, Hamilton. A technical question for Deborah Donovan, please. What are the next steps with SBTI?

Debbie Donovan:
Thanks for the question. The next steps for us are to submit our short-term and long-term goals, along with our roadmap for SBTI to evaluate. What they do at SBTI is they look at those goals and the rate of decarbonization to make sure it's in line with the Paris climate Accord, which was based on the international panel on climate change scientists, the one-and-a-half degree scenario, they call it, to make sure that we keep warming below one-and-a-half degrees C. So the science-based target initiatives make sure that our targets at Moderna are aggressive enough and that they are in line with the latest climate science, and we'll submit that in early next year and get validation of those targets hopefully by mid-year.

Lavina:
Great. One more for Debbie. Could you provide us a time horizon by which you will have finished the auditing process of Scope 3 emissions?

Debbie Donovan:
So in Scope 3 emissions, I wouldn't call it an auditing process, but the way we've calculated Scope 3 emissions is we've engaged external support. We use the spend-based method as well as some of the modeling that's available that gets into the details of the different categories of upstream and downstream emissions, and we have a third-party verifier that assures both the

process and the data. So I am not sure if that's what the question was referring to in terms of the audit, but we have a third-party verification of that data and of our process, and if there are any improvement opportunities in the process, we get that from the verifier, and then we obviously continuously improve our internal mechanisms.

Lavina:
Great. Thank you. A question on culture for Tracey. Tracey, can you please highlight measurement metrics that you use internally, whether they are of off-the-shelf measurement testing processes, or if they are custom-made from Moderna?

Tracey Franklin:
Thank you. We do a combination of both, and so like I said in the presentation, data is our friend and it's something that we seek, so there are mechanisms and surveys that we use internally that we have the ability to customize, but we also look at best practices and combinations of things that we should ask, and then the external recognition and surveys that we participate in also give us data back so we can look at benchmarks and monitor those as well. In addition to hard data, we have eight employee resource groups, we have the voice of the employee, and they provide us ongoing subjective feedback. Then, one other one, we do do total rewards optimization surveys, so like you saw, we have the customization in terms of how we think about benefits. We really do a lot of research around what might be beneficial for folks and what they actually want before we implement them. Thanks for the question.

Lavina:
Great. Thank you, Tracey. A question on governance for Shannon. Can you speak to the board's skill set, experience, and how it contributes to ESG oversight?

Shannon Klinger:
I think we talked about that also during the presentation, in terms of having a board with a diverse background, who've worked all over the world, with deep experience in areas like information security, when we think about cyber security as a risk from an ESG perspective, and we think about living and working globally and helping ensure that we have the right access programs as we continue our ambition to launch 15 programs over the next 5 years, if we think about the experience that they have running other companies, overseeing things like environmental, social, and governance programs to help us be the best version of ourselves. And so, for us, we think we have the right oversight, starting with the nomination and governance committee, but really as we talked about earlier in this presentation, every single committee on our board plays a role in ensuring that we execute on our ESG strategy to be the best version of Moderna.

Lavina:
Great. Thank you for that. And this is a broader question that I'll open it up to the panel, because I'm sure each of you will have something that you want to discuss. What is an exciting area of Moderna's ESG efforts that you think investors don't ask enough about? What is missing from the conversations you have and that you wish investors could even be of help on, on the process of the process of your important ESG work? So let's kick that off with Stéphane first.

Stephane:
So how long do you have Lavina? No. Seriously, I think it's around all the chapters for me, because ESG is not one magic bullet, the environment, people, or culture of a community. It's really about how do we build the company, and thinking about all the stakeholders, and is raising the bar every day, every day, every day. This obsession about learning, that we have as part of our mindset, is essential, not only in the work we do in science, but just how we run the business. We talked about it with the use of AI, recent digital there, and it's the same thing around ESG, which is it's always part of a discussion, which is how do we raise a bar on those topics, which is why, when we meet with investors, there's so much to talk about with product, financials, and science, that there's not enough time to talk about ESG, and so I really welcome opportunities to learn from other companies. We do a lot of benchmark ourselves, try to compare ourselves to the best across industries. Of course, not biopharma, across industries, but I think that input to how do we keep raising the bar and how do we prioritize the roadmaps to make sure that we keep becoming the best version of Moderna.

Lavina:
Great. Thank you for that, and as it seems we are at time. There aren't any additional questions submitted through the portal, but as everyone knows, please do contact the IR team. We are happy to take all of your questions, and with that, I wish everyone a great day and thank you to all of our presenters and the audience as well.