GSK plc

GSK plc - Special Call - GSK plc

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Event Participants

Executives 18

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James Gordon, Jo Walton, Unknown Analyst, Steve Scala, Dominic Lunn, Seamus Fernandez, Graham Parry, Emmanuel Papadakis, Timothy Anderson, Michael Leuchten, Colin White, Boran Wang, Peter Welford, Andrew Baum, Kerry Holford

Nick Stone Executive

[Audio Gap] Ahead of Infectious Disease Event with GSK management, as usual, the presentations were e-mailed to our distribution list earlier today and is available on gsk.com.

Please turn to Slide 2. This is the usual safe harbor statement, and we'll now move to the next slide. Today's speakers are Emma Walmsley, Tony Wood, Luke Miels and Deborah Waterhouse and leaders across our R&D and commercial organizations, who will join us through 1 of our 4 breakout sessions a little bit later.

On this slide, you'll see today's presentation is going to be hosted by Emma, then will be joined by Tony and Luke, and this presentation will last for about 30 minutes, followed by 4 mini, 30-minute breakout sessions, including Q&A. We'll then run each of these breakout sessions twice so that participants can attend 2 of their choosing. We'll then return for a final Q&A session with Tony, Luke and Deborah and the broader team before closing.

After the event, all presentations and materials will be available on demand on gsk.com. Turning to Slide 5. I'll now hand the call over to Emma.

Emma Walmsley Executive

Thanks very much, Nick, and a really warm welcome to everyone. Please turn to Slide 6. GSK is a focused, global biopharma company with strong momentum and big ambitions to get ahead of disease by uniting the best of science, technology and talent. We have a unique strategy focused on prevention as well as treatment with an exciting portfolio and pipeline

across 4 therapeutic areas based on our deep understanding of the science of the immune system and advanced technologies.

We are committed to delivering our competitive medium-term sales and profit outlooks and are confident in our ability to sustain profitable growth through the decade and beyond to deliver human health impact at serious scale.

Today, we're hosting the first of a series of meet the management events. This session will focus on our progress, capabilities and growth prospects as a world leader in infectious diseases. And you also have a chance to meet some of our impressive R&D and commercial talent during the breakouts this afternoon.

Next slide, please. For more than 70 years, GSK has pioneered in infectious disease innovation. Our infectious disease portfolio is the broadest in the industry and represents 2/3 of our pipeline. In 2022, sales from infectious diseases, including HIV and pandemic solutions, amounted to nearly GBP 16 billion, over half of GSK's total sales, and we expect this therapy area to be a major source of future sales and profit growth.

Our vaccines business is a key driver of this, and our innovation in shingles, meningitis and pediatrics is unparalleled. We're now adding to this following the ACIP recommendation last week with the launch of the world's first approved RSV vaccine for older adults, our latest innovation, Arexvy. With the launch of this vaccine, GSK will be the world's leading biopharma company for adult immunizations.

And as you'll see today, we have further substantial innovation in clinical development with new vaccines and medicines for seasonal respiratory infections, bacterial, fungal and chronic viral infections. You'll also hear about our plans to continue leading in global health and in the fight against antimicrobial resistance. All of these are areas of high medical need, and GSK is needed. Infectious diseases remain a significant societal burden responsible for 1 in 6 deaths globally. Governments and health care systems increasingly recognize this, now placing increasing value and focus on early intervention through vaccination and of course, effective treatment.

Getting ahead of disease is better for patients and society, and we are very much committed to it. Of the more than 2.5 billion people, we will reach this decade, the significant majority will be through our infectious disease portfolio, and it is equally financially attractive.

The market for infectious diseases is expected to exceed GBP 100 billion by 2028. With a world-class pipeline and portfolio underpinned by proven-technical expertise in manufacturing, regulatory and commercialization, we're confident that GSK will deliver competitive, profitable growth in infectious diseases through this decade and beyond.

So I'm now going to hand over to Tony, who's going to highlight our R&D focus here and his priorities, including the high unmet medical need associated with infectious disease. Slide 8, please.

Tony Wood Executive

Thank you, Emma, and welcome, everyone. Please turn to Slide 9. We have an exciting

portfolio of 69 assets in clinical development with a focus on prevention and treatment in our 4 core therapeutic areas, shaped by the sciences, immune system, advanced technologies and outstanding people. The combination of which helps us to get ahead with disease. We're confident that this pipeline will strongly offset the loss of exclusivity from dolutegravir at the end of the decade, enabling GSK to deliver competitive, profitable growth to 2026 and beyond.

Please turn to Slide 10. When I took on the role of Chief Scientific Officer in August last year, I set 3 clear priorities: One, a focus on execution and acceleration, which will increase our vaccines and specialty medicines pipeline; two, doubling down on technology to deliver innovation, better and faster; and three, to build a culture that is ambitious for patients and where talented people thrive.

Please turn to Slide 11. With this framework established, the increase in infection is a major concern for patients and society. To illustrate this, you will see on the slide there are approximately 1 billion people are affected annually by seasonal respiratory viruses, such as RSV, influenza and COVID and many require hospitalization. Millions of individuals are also struggling with bacterial and fungal infections, while hundreds of millions live with chronic viral conditions like hepatitis B.

Our objective is to revolutionize the prevention and treatment of infection to enhance the quality of life of billions globally, representing a significant market opportunity. Please go to Slide 12. We have a rich tradition of innovation leadership in infectious diseases. We've entered the forefront of developing novel science and technologies that safeguard people from diseases caused by bacteria, viruses and parasites. Over the past 2 decades, we've introduced over 15 new vaccines and medicines.

We expect to have 22 data readouts and 25 launches by 2031. Later this afternoon, you'll hear from some of my R&D colleagues about how we address the challenges of seasonal respiratory viruses, bacterial, fungal and chronic viral infections.

Importantly, you'll also hear from Deborah Waterhouse about delivering health and impacted scale and how GBP 1 billion allocated over 10 years will accelerate research and development to prevent infectious diseases that disproportionately impact lower-income countries.

Next slide, please. 44 of the 69 assets in our portfolio tackle infectious diseases. Among the mid- to late-stage development opportunities, we have several potential first or best-in-class vaccine candidates, which address high unmet medical need and have an attractive commercial potential. Our vaccines franchise is getting even stronger, thanks to the great success of Shingrix. On the right-hand side of the slide, you'll see some recent pipeline developments.

The first one listed is Arexvy. We have a huge opportunity with Arexvy, our RSV vaccine, the world's first approved vaccine for older adults. Our goal is to become the leader in RSV with our exceptional data. And last week at ACIP, we presented second season data, which showed Arexvy continues to provide efficacy against lower respiratory tract infection and severe disease over 2 full RSV seasons.

Moreover, we're on track to be the first vaccine to have data in adults aged 50 to 59 in second

half of 2023, which will provide additional information about the vaccine's efficacy and safety.

Next example is an invasive meningococcal disease, which is an uncommon but serious infection, which can cause life-threatening complications and death. Five serogroups are responsible for most meningococcal infections and no single approved vaccine can protect against all 5 of these. MenABCWY could provide the broadest coverage against the most prevalent serogroups leading to a simplified immunization schedule and increased vaccine uptake. We're working closely with regulatory agencies to review the complete Phase III data before U.S. regulatory submission in 2024.

Antimicrobial resistance proposes a significant danger to global health and the well-being of many individuals. It causes over 1 million deaths yearly and is projected to increase to GBP 10 million by 2050. In the U.S., there are about 15 million uncomplicated urinary tract infection episodes each year, with approximately 1/4 of these being resistant to current treatments.

A third example in our portfolio is gepotidacin, which has the potential to be the first oral antibiotic for uncomplicated urinary tract infections in over 20 years. The U.S. FDA has granted gepotidacin in qualified infectious disease product designation, 4 in complicated urinary tract infection and urogenital gonorrhea with the latter also receiving Fast Track designation. You may recall that EAGLE-2 and 3 Phase III trials were stopped early for efficacy following a preplanned interim analysis.

The data we recently presented at ECCMID. An oral antibiotic for uncomplicated urinary tract infections has not been approved by the FDA in over 20 years. So we're working with them on the totality of the information that is needed for a thorough review. To complement our UTI portfolio and gepotidacin, we added tebipenem an oral carbapenem, a novel late-stage antibiotic for complicated urinary tract infections. If approved, tebipenem will address a high unmet medical need caused by rising levels of antibiotic resistance.

The U.S. FDA has also granted tebipenem, qualified infectious disease product and Fast Track Designations. An additional Phase III trials to support the regulatory submission are ongoing. We also recently obtained rights to Brexafemme, a unique antifungal treatment that inhibits oral glucan synthesis and is the first of its kind. This medication has been proved for the treatment of both of vaginal candidiasis.

With the growing concern of invasive candidiasis and resistance to fungal pathogens, Brexafemme is a valuable addition to our portfolio of anti-infective therapies. It addresses a critical medical need, especially for patients in ICU hospitals with underlying health issues.

So what's coming next? Let's turn to the next slide to highlight some interesting opportunities. We are committed to delivering the next wave of vaccines to address infectious disease. And this slide highlights 2 first or best-in-class opportunities in Phase I or Phase II clinical development in the coming years. GSK104 is a recombinant protein that is enhanced with an adjuvant for herpes simplex virus.

Around 500 million people across the world are infected with herpes simplex virus or HSV. 1/3 of patients with genital herpes suffer frequent outbreaks. Beyond the physical outbreaks, genital herpes is also associated with significant psychological morbidity, stigma, low quality of life and a three-fold increase in the risk of acquiring HIV.

GSK413 is in clinical development to present -- to prevent Neisseria gonorrhoeae infections in individuals aged 16 years and older, regardless of previous infection history. It's a very common sexually-transmitted infectious disease with more than half of cases occurring among young people aged 15 to 24. Untreated gonorrhea can cause serious and permanent health problems and can increase the risk of getting and transmitting HIV in both women and men. This asset has been granted Fast Track Designation by the U.S. FDA, underlying the pressing medical need for this vaccine.

Please turn to Slide 15. My second priority is doubling down on technology to deliver innovation better and faster. We have a leading suite of platform technologies, which will advance our infectious disease pipeline, unlock potential and go beyond existing modalities. Our focus is to deliver results from this platform. Our adjuvant platform is a particular area of strength for GSK.

We're applying the ASO1 adjuvant used in Shingrix in several pipeline opportunities, including Arexvy, our RSV vaccine for older adults. The second key platform is mRNA, where we are pursuing advances through our collaboration with CureVac and increasing our internal capabilities.

CureVac is developing a second-generation mRNA backbone. Illustrating this, we've received promising Phase I results from modified monovalent mRNA vaccine candidates that target COVID-19 and flu. A next step is testing these in multivalent format. We're currently developing a next-generation multivalent flu vaccine that can protect against multiple influenza strains. Phase I/II trials are underway, and we're encouraged by what we've seen so far.

We anticipate having the multivalent data by the end of 2023.

Our third key platform was acquired through the acquisition of Affinivax. The multiple antigen presentation system supports higher valency than conventional conjugation technologies, potentially enabling broader coverage against prevalent pneumococcal serotypes. It introduces an additional form of immunity. Specifically, T-cell mediated disease-specific anti-protein immunity, complementing the disease-specific anti-polysaccharide immunity. This allows us to develop multivalent vaccines for complex bacterial infections.

A first example is our next-generation 24-valent pneumococcal vaccine candidate. That's in Phase II development and utilizes this highly innovative MAPS platform technology. It's designed to prevent invasive disease and pneumonia in children aged 6 to 17 years and in adults of 50 years and older. Our aim is to be the first to market with a 24-valent vaccine, which is currently in Phase II development. And we plan to start the Phase III program in 2024.

The 30-plus valent vaccine is anticipated to extend coverage to more than 90% of all serotypes currently in preclinical development, and we plan to advance it into the clinic in 2024. We're also diversifying into RNA oligonucleotides, a promising technology platform. We're excited to explore the potential of our antisense oligonucleotide, bepirovirsen, as the first functional cure for chronic hepatitis B. Bepirovirsen or bepi has a unique triple mechanism of action. It inhibits viral replication, reducing viral DNA and thus the production of viral proteins, including the hepatitis B surface antigen.

And importantly, it stimulates the body's innate immune system. We believe this triple mechanism of action is the reason for bepi's unique profile as potentially the first clinically meaningful functional cure for hepatitis B.

Please turn to Slide 16. The use of data technology is revolutionizing the field of human biological science. Through advances in genetics, functional genomics, AI/ML and real-world evidence, we can now improve targeting patient choice, clinical trial design and recruitment. Our collaboration with industry leaders provides us access to some of the richest and largest data sets available, which enables us to improve target validation and translation.

Our partnership with Tempus, for instance, has given us access to one of the world's largest sources of the identified patient data, accelerating drug discovery, and we also collaborate with the UK Biobank. Data technology is critical to the future of drug discovery, empowering scientists to interact with and interrogate rich proprietary, biology, chemistry and clinical data sets efficiently.

Our world-leading AI function vertically integrates with our laboratory sciences and clinical research and development organizations. Machine learning has proven to be a valuable tool in characterizing disease and accelerating the discovery of novel medicines. Our research with bepi is a prime example of how machine learning can generate deep insights. Our algorithms identify patient profiles, indicative of clinical and biological trajectories and predict future responses to bepi. This has led us to uncover 5 distinct patient subtypes in response to treatment, almost doubling our patient response prediction compared to traditional virological markers such as the HB surface antigen.

We since published positive B-Clear Phase IIb results of bepi with B-Together Phase IIb data expected later this year. The combination of these technologies allows us to better predict the future outcome of our treatments, starting with bepi Phase III trials, where we're targeting a functional cure response rate of 20%.

Please turn to Slide 17. I firmly believe the convergence of science and technology is key to transforming medical discovery. Our investment in platform and data technology has resulted in encouraging improvements in pipeline productivity, leading to the discovery of new treatments. Since 2016, our end-to-end cycle times have improved by 20% or 3.7 years compared to median industry benchmarks.

In Phase II, our probability of success has improved by 10 percentage points since 2016, bringing us in line with the industry median of 26%. At the same time, our success rate in Phase III and registration remain upper quartile, driven by recent vaccine successes. Despite the sector's lengthening cycle times, our consistent performance improvement has led us to surpass the industry average in bringing innovation to the market. We're now competitive and reached this goal in 9.6 years compared to the industry average of 11.4 years. All of this is only possible with our scientists and partners.

We have considerable existing expertise and a strong diverse talent pipeline that is building future capabilities, creating our ambitious culture for patients, investing in our teams and disciplined capital allocation will give us the greatest potential to raise the bar for patients.

I'll now hand it over to Luke. Please turn to Slide 18.

Luke Miels Executive

Thanks, Tony, and hello, everyone. Thanks for joining us. Please turn to Slide 19. So you can see on this slide that we have the broadest infectious disease portfolio in the industry with double-digit growth. And our infectious disease sales in 2022 reached an impressive GBP 16 billion, more than half of GSK sales.

From 2016 to 2022, we delivered a 12% CAGR across our infectious disease portfolio, with our core growth drivers, HIV, meningitis and shingles, delivering GBP 10.5 billion in sales in 2022 with double-digit compound growth and high margins.

Please turn to Slide 20. So the infectious disease market is expected to grow to more than 100 billion by 2028 on the slide. And there's significant unmet medical needs and growth opportunities across respiratory viruses, bacterial, fungal and of course, chronic infections. And we're already leading in several segments. As you heard from Tony, there are several first-in-class and best-in-class opportunities in clinical development that will enable us to compete in attractive markets like Pneumococcal.

Please turn to the next slide, which is 21. Our industry-leading experience, commercial capabilities and execution in multiple categories such as shingles, meningitis, and pediatrics has enabled us to deliver competitive launches and drive mid-life cycle product growth. We've improved the effectiveness of our sales force across key markets, including China, and used our commercial capabilities and disease area synergies across our operations whilst deploying digital and predictive analytics to enhance commercial results.

For example, Shingrix has shown 5 consecutive quarters of growth, including record sales last year, with increasing contributions across all geographies and is now available in 31 countries, with 39% of sales now coming from outside the U.S. And for meningitis, sales increased 16%, driven by Bexsero, which achieved blockbuster status with more than GBP 1 billion in annual sales. This experience and track record of success will play an essential role as we launch the next generation of vaccines coming through the pipeline.

If you'd now please turn to the next slide. Now we're committed to delivering profitable growth to 2026 and beyond, and I remain confident -- very confident to deliver the ambition that we laid out in June of 2021. Arexvy is the first U.S. FDA now approved, European approved vaccine for RSV with peak sales potential of greater than GBP 3 billion. And our launch preparations are well underway in the U.S.

and Europe before the next RSV season.

And as you heard earlier, we presented the second season data at ACIP last week.

Next, we anticipate additional flu co-admin data and Phase III data for high-risk adults for 50 to 59 years of age, plus the regulatory approval of Arexvy in Japan during the second half of this year. Full 2026 sales for Influenza increased to [GBP 714 million]. We started Phase I and Phase II clinical trials for COVID a multivalent mRNA flu vaccine candidates. And we believe that there is a significant future opportunity for seasonal doublet flu COVID mRNA combinations, which could potentially deliver more than GBP 3 billion in peak year sales.

In contrast, we expect RSV with insight from the second season data will be dominated by protein-based multiseason vaccines.

For meningitis, we recently announced positive Phase III data for MenABCWY, which met all primary endpoints, and this is the only 5-in-1 vaccine to demonstrate immunological effectiveness across 110 MenB -- Diverse MenB invasive strands with potential peak sales between GBP 1 billion and GBP 2 billion. With a highly innovative MAPS technology and access to next-generation pneumococcal prophylaxis vaccine candidates, we'll realize the value of the 24 and 30-plus valent candidates in a market estimated to be greater than [GBP 7 billion] by 2028, where pediatric is around 75% of the opportunity. We estimate peak sales being greater than GBP 4 billion with launches targeted for later in the decade.

Our growing anti-infectious portfolio now features gepotidacin to treat uncomplicated UTIs, tebipenem to treat complicated UTIs and Brexafemme, which treats vulvovaginal candidiasis and reduces the incidence of recurrent VVC. Gepotidacin is the first in a new class of oral antibiotics in over 20 years has peaked year sales potential of between GBP 0.5 billion and GBP 1 billion.

Tebipenem has Phase III data expected in 2025 plus and is combined -- when combined with Brexafemme, it offers additional benefits to underserved populations with the potential to generate significant sales in a synergistic fashion. We estimate our anti-infectious portfolio could reach peak year sales about to GBP 2 billion.

In 2022, Shingrix delivered record sales of nearly GBP 3 billion, and we're well on our way to doubling Shingrix's revenue by 2026. We will be in 35 markets by 2024 and are exploring life cycle management opportunities, including the need for a booster, and the early but growing body of published evidence that suggests shingles vaccination is associated with a risk -- with a reduction in the risk of dementia.

And lastly, bepirovirsen could be a functional cure for chronic hepatitis B with potential peak year sales of more than GBP 2 billion. Our Phase III confirmatory trials will assess patients who are stable on nucleotides and nucleosides, and we remain excited about the promise of bepirovirsen as a potential cornerstone therapy and sequential combination or monotherapy treatment.

Next slide, please. And as you've already heard, the infectious disease market is forecast to grow to more than GBP 100 billion, and we've delivered continued momentum with sales of GBP 16 billion. And as Tony highlighted, we have a strong and exciting infectious disease pipeline, including many first-in-class and best-in-class opportunities with around 22 data readouts and 25 regulatory decisions between now and 2031. We understand the significant and growing burden of infectious diseases for patients and society, and we are confident that we can deliver our ambition to transform the prevention and treatment of infectious diseases for billions of people. Our world-leading infectious disease pipeline, coupled with our continued strong commercial execution and momentum will deliver strong revenues, higher margins and profitable growth for GSK from 2026 and beyond.

And thank you. Back to you Nick.

Nick Stone Executive

Thanks very much, Luke. Sorry, just my slide is refusing to change. So just for everyone's benefit, we now have a couple of minutes to join one of the virtual breakout sessions, which starts at 2:30. So as I say, a couple of minutes. Just as a reminder, we will run each of these breakout sessions twice so that participants can attend if they're choosing.

We'll then come back together with a larger group, returning for a final Q&A session with Tony, Luke and Deborah and then the broader teams that participated in the breakouts. Details are available on the Zoom events landing page or via the e-mail that you'll have received when you registered. After the event, as we said earlier, all of the presentations, materials and on-demand videos will be available on gsk.com.

And finally, let me take the opportunity to thank Emma, Tony and Luke for their presentations and to all of you for your interest in GSK. We'll see you back here a little bit later, but please disconnect now, and we'll see you in one of the breakout sessions. Thank you very much.

Jeff McLaughlin Executive

Just going to give a minute or 2 for a number of attendees to join in here. Yes, we are live now. So okay, I see we have a number of attendees. So we're going to get started in the interest of time. Hello, everyone.

Welcome to breakout session on seasonal respiratory viruses. I'm Jeff McLaughlin from the Investor Relations team. And I have with me Phil Dormitzer, the Senior Vice President and Global Head of Vaccines R&D; and Christi Kelsey, who is the Senior Vice President and Global Head of Vaccines Commercial. If we move to this next slide is our usual safe harbor statement. And as a reminder, this event is also being recorded.

And the purpose of this session is to give you a chance to ask questions but first, we have a brief introduction from Phil and Christi about some of the exciting work we are doing specifically to help prevent seasonal respiratory viruses. I will now hand over to Phil for Slide 4.

Phil Dormitzer Executive

Thank you, Jeff. So GSK has novel research methods and technologies, help infectious disease for the last 70 years. We have a strong track record of successful commercial innovations. What are we referring to when we talk about seasonal respiratory viruses. By seasonally, respiratory virus is externally at about the same time every year.

Today, we're focused on RSV, that's respiratory syncytial virus, influenza virus, virus 1 and virus 2 because of COVID-19. Respiratory syncytial virus, RSVs is talking about a lot by the way because, first, it was a very bad RSV season in '22, '23. Second, for the first time ever, we now have vaccines approved to help prevent this common virus, which can nevertheless cause devastating disease especially for senior adults, such as those with weaker immune systems or those who have comorbidities as is the case in many of older people. Each year in the United States, RSV is responsible for about 177,000 hospitalizations among adults, 65 older and 14,000 deaths. Furthermore, adults with underlying conditions are more likely to

seek medical services, have higher hospitalization rates than those without comorbidities.

According to the CDC, more than 90% of adults hospitalized for RSV have underlying medical conditions. Influenza is caused by another common respiratory virus, that one affects approximately 1 billion people annually and can lead to severe complications, including pneumonia, heart failure and death. And of course, SARS coronavirus 2 has caused over 750 million confirmed cases of COVID-19 worldwide and has caused millions of death. One important distinction among these 3 seasonal respiratory viruses is an RSV unlike influenza virus or SARS coronavirus 2 is genetically stable. It comes in 2 varieties, subtype A and B, but these are also stable, and it does not change over time, the way influenza virus or SARS coronavirus 2 does, so we do not anticipate a need for regular strain changes.

So I'll now pass on to Christi to outline the opportunity.

Christi Kelsey Executive

Hello, Phil and I get a chance to join together. So thank you, Jeff, and thank you, Phil, for the opportunity that we want to discuss today. So as I'm sure you're all aware, Arexvy was the world's first approved respiratory syncytial virus vaccine for older adults and at pivotal Phase III clinical study, Arexvy had exceptional efficacy with an impressive 94.6% efficacy in people with at least one comorbidity and 82.6% overall efficacy against lower respiratory tract disease caused by RSV. Now we know patients with underlying medical conditions are those that actually suffer the most but more importantly, drive significant cost to the health care system. And talking with our customers since approval, we see this as a key differentiator for Arexvy.

We've shared many times, we have leadership ambition and we believe Arexvy's profile is matched to this leadership ambition. This will be a multibillion annual sales potential vaccine. And as you heard from the introductory comments from both Emma and Tony, this further strengthens our presence in the very important and growing adult vaccination space. So if we go to the next slide, I want to give a bit of a voiceover of our more recent events that we've had for Arexvy. And you would have seen last week at the CDC's Advisory Committee on Immunization Practices, or ACIP, we presented the much-anticipated Season 2 data, indicating that Arexvy provides protection over 2 full RSV seasons.

We also saw a consistent tolerability profile. Importantly, GSK's follow-up period was 18 months. And based on the evidence that I spoke about in the last slide as well as the safety and continued efficacy demonstrated over 2 complete seasons, the committee voted to recommend the use of Arexvy for the prevention of RSV disease in adults, age 60 and above, with shared clinical decision-making. What this means that -- in the U.S., there is 77 million older adults that now have access to this vaccine, and we are very excited to get going. It's important also to note, while this is a significant milestone, we are just getting started.

Arexvy has a very robust life cycle management plan with additional data forthcoming. We presented our flu co-administration data, which we have co-ad data in our label, and we also presented to ACIP flu co-ad data with adjuvant and high-dose flu. And our Phase III study in patients, 50 to 59 is fully enrolled, and that data will file shortly. We also expect additional regulatory decisions in the back half of the year. So for now, with our current

recommendation for patients 60 and above, our launch efforts are well advanced, stock is in the distribution center, and we are ready to launch.

Phil Dormitzer Executive

Thanks, Christi. Currently, available flu vaccines are suboptimal. One reason for this is that the viral antigens of flu drift on circulating strains. In fact, they drift so quickly that you can't see a change from the time that manufacturers start to make doses for a seasonal flu vaccine campaign until when they're administered, so there's a high risk of mismatch antigens. Now mRNA vaccines have the potential to disrupt the flu market, which is estimated to be more than GBP 8 billion by 2028.

mRNA can be manufactured quickly and easily and it can be readily adapted to keep up with the changes in the virus, making it an ideal technology for responding to emerging and changing influenza strains. Along with our collaboration partners at CureVac, we announced preliminary positive Phase I data from monovalent flu mRNA vaccine that showed a strong functional antibody response, and that's even at the lowest dose level tested. We suffer a good tolerability at much higher dose levels. So we're now developing a next-generation multivalent mRNA flu vaccine that can be used to protect against multiple influenza strains. The Phase I/II trials are now underway.

And we're encouraged by what we've seen with the CureVac platform thus far, and we look forward to the multivalent data at the end of this year or beginning of 2024. Next slide, please. So we're also pursuing a SARS coronavirus' flu mRNA vaccine using a nucleoside-modified RNA on CureVac's [indiscernible] optimized platform, we believe that, that combination relates to nucleoside modification and the CureVac platform really give us the potential to combine strong immune responses and an acceptable tolerability profile which is going to be particularly important for differentiation and essential for consumer acceptance, especially as we get as [indiscernible]. With this, we're well positioned to introduce mRNA combination vaccine to help protect against these variable seasonal respiratory viruses, and it is we get to a more convenient and effective [indiscernible] and that could lead to higher immunization rates. Next slide, please.

Now we have invested significantly in our mRNA capabilities and R&D to have a commercially ready manufacturing capabilities. And as you can see from our clinical development program at the bottom of this slide, we have plans to introduce mRNA vaccines that can contribute to profitable growth in the second half of this decade. Next slide, please.

So in summary, key upcoming events include launching Arexvy and building further clinical evidence to support its profile. Next steps include acquiring additional flu coadministration data, data in the 50- to 59-year-old include high-risk adults. There will be a Phase III study and for the regulatory submissions such as a recent decision from Japan as well. And on mRNA, the focus is on developing the optimal platform for multivalent combination of seasonal respiratory disease vaccines with ongoing work to support a profile that can achieve the needed efficacy with good tolerability. As a reminder, we look forward to the multivalent data by the end of this year or the beginning of 2024.

We're committed to develop the innovative vaccines that can help protect people from

respiratory viruses, building from our long and successful history in both vaccines and respiratory health. As our pipeline emerges, we can continue to make significant and positive contributions to help prevent infectious diseases worldwide. And now we'll move to the session to adjust and moderate the Q&A.

Jeff McLaughlin Executive

Great. Thanks, Phil. We'll now go to Q&A. [Operator Instructions] Additionally, as you can see, Luke Miels, our Chief Commercial Officer, has joined this breakout session and may also offer some additional comments during the Q&A session. We will now take our first question, and it will be from James Gordon.

James, I'm going to allow you to ask a question now.

James Gordon Analyst

Can you hear me okay?

Christi Kelsey Executive

Yes, we hear you, James.

James Gordon Analyst

Lovely. First question on RSV vaccine then. The GBP 3 billion-plus peak sales was reiterated and I think you're also saying GBP 5 billion-plus market. But just curious, given there didn't seem to be a revaccination benefit for the second year, maybe was the ACIP recommendation a little bit lukewarm in that they noted moderate efficacy and SCDM status. Does that reduce the market potential at all versus what you were originally hoping for?

And if not, why not, is it because of higher pricing? Or is there another offset that we've missed? And you also said more than GBP 3 billion that would appear to assume more than 50% market share, just to think of the updated thinking around your market share and why you'd have more than half the market.

Christi Kelsey Executive

Yes, absolutely, James, and thanks for the question. So as far as market size, I think the way we're looking at the shared clinical decision making recommendation is this will not slow us down. We expect a significant ramp-up in the first year too. We know there is a significant unmet need. We're very, quite frankly, familiar with this clinical pathway with our work on Bexsero.

And just given that RSV happens in this kind of tripledemic season, we are hearing both from consumers and HCPs that they're ready and willing to vaccinate. So that's -- the awareness piece doesn't change our view on market size. As far as your question on revaccination. Of course, we'll have to wait for further data to know what the revaccination profile will look like. That will take a few seasons before we can state that.

But for now, our view is market remains large, what we lose on volume because of the multi-season profile, we will make up on price, and you would have seen our price statement that

we made at ACIP, we're ready to go. We have experience here with Bexsero and we're very familiar with the plight of the respiratory patient. So we still see it as a multibillion-dollar opportunity. Luke, I don't know if there's any builds you have.

Luke Miels Executive

Yes, I think just to -- thanks, Christi. And I think James, also the other way to look at this is, this is going to place it in the realm of the infrastructure we have in terms of Trelegy and Shingrix to interact with health care professionals, physicians, nurses. These are people who qualify as HCPs under the ACIP classification and the fact that we have the secondary data in our label. And can you use that and we intend to use that very actively. I think the other thing is the fact that you've got 2 seasons coverage, it is going to be very compelling for physicians and patients.

So if you can be very confident, we'll adjust for that on the price. And that's just going to be net-net, I think, quite compelling for individuals at high risk of respiratory infection.

Christi Kelsey Executive

And maybe, James, the only other build I would add is if you start to benchmark other vaccines that fall into shared clinical decision-making, the Inflation Reduction Act is certainly a new component now that we have in the marketplace. We know that this largely -- this vaccine will be covered with 0 out-of-pocket co-pay and that certainly factors into uptake as well.

Jeff McLaughlin Executive

Great. Thanks for the question, James. We're going to just move it along here. I'm going to go with Jo Walton, next. Jo, may allow you to talk now.

If you would like to unmute.

Jo Walton Analyst

Thank you. I'm afraid I'm going to go back to the same topic as James. In ACIP, the experts did seem to be surprised that there didn't appear to be any benefit of giving an additional dose in the second year and they seem to query whether this might in fact be a one-off opportunity. So it wasn't something that you would come and have year after year. Can you give us a time frame on which we'll have data where we can be confident that you do need to be boosted every 2 years and the extra dosing coming in is going to give you -- it's going to reboost you so that you get a real benefit from this because that, to me, appeared to be one of the areas of concern that they had.

So the time line to put that one safely to bed, please?

Christi Kelsey Executive

Yes. Thanks, Jo, for the question. And I would say it's certainly an area of curiosity. We have to remember with this being the world's first vaccine. We're still learning this pathogen.

So it will take time to assess duration of protection, and I'll hand over to Phil, who's right next

to me to talk about how we're continuing to evaluate this in our clinical trial program.

Phil Dormitzer Executive

So the study, this is our pivotal study. We'll go on for an additional season, and we'll be testing what it looks like to boost after 2 years and our probability to look at what it will boost like after -- what a boost will look like after 3 years. So this is a case where [indiscernible] will take some time because we need to allow the time to allow from the last boost. That's the next boost we get, so you can look at that space. And those plans are evolving since we've seen these data.

Jeff McLaughlin Executive

Great. Thanks for the question, Jo. We're going to go around to the next question, and it will be from Evan Wang, Evan, I'm allowing you to talk now.

Unknown Analyst Analyst

This is Evan Wang on for Seamus. Can you walk through some of your influenza clinical development strategy and time line. So I think you highlighted clinical development through '26 and through '27. So I know you guys are evaluating a few of the different contracts. So can you talk through some of the advantage of the types of contracts that you guys are looking at and some of your assumptions in terms of, I guess, what's needed to get to Phase III in terms of, I guess, some of the study design features and whether it's likely to require multiple season to kind of look at efficacy.

Phil Dormitzer Executive

So we really are doing this in a couple of stages. The first stage was to get the platform right, to make sure that we saw, that we could get that gap between the minimum immunogenic dose and even Jack actually looks quite good and a well-tolerated dose knowing that you'd have to get up to at least 4 valent and possibly higher. So we've now moved on to -- now we are now in the clinic with our multivalent study, where we're actually trying a variety of different formulations to find the optimal one. Then once we pick the optimal formulation, then we'll move into the Phase III trials, and initially testing for safety and immunogenicity and likely moving on to efficacy as well. Now the exact time lines, I don't think we released the time.

It's all the way forward, but we can say we're in the clinic now with multivalent formulations. I should also say we have a COVID-19 program that's going on as well. And then we also intend to move on to combinations of RSV and -- influenza and COVID-19 vaccines. So we'll have this on the first day, we'll start to see at the end this year or the beginning of next year.

Jeff McLaughlin Executive

Great. Thanks, Phil. I'm going to remove you, Evan from permission. We have next question is from Steve Scala from Cowen -- from TD Cowen that is, right, Steve, I'm going to allow you to talk here.

Steve Scala Analyst

Thank you, Jeff. So question is, do you expect pharmacies will stock both the GSK and Pfizer RSV vaccines or only one? And what do you anticipate will be the deciding factors? Will it be anything more than price? And related to that, Roger, as a medical doctor, if you worked in a clinic that had only the Pfizer RSV vaccine, what would you do?

Christi Kelsey Executive

Maybe I'll take that. So I think, first of all, what we are hearing, and we've actually done some research since ACIP is 90% of pharmacists are actually ready and willing to recommend this vaccine. So that does speak to the importance of the awareness that is out there in the marketplace. As far as -- well pharmacy stock 1, our view is if they stock 1, it should be ours for a few reasons. We know largely, especially with the shared clinical decision-making recommendation, there's a lot of interest to make sure that we vaccinate patients with comorbidities first.

I mentioned earlier, they have the highest burden on the health care system. And we have the strongest data set in that very important population. I think secondly, when you look at our administration, we have -- as far as the steps to administer, it's what pharmacists are very familiar with. It's similar to Shingrix. So there is and additional training that needs.

Price is always considered, of course, and we have a very -- a price that is, one, it's from a health economic perspective, it offers value and also was recommended and valued by the ACIP as being a good use of resources. So I think if they do stock 1, I think we're well positioned for that to be our vaccine and those conversations are actively ongoing as we speak. And I think there was a second part to your question, Steve, I may have missed it as far as -- I think if I was a physician.

Steve Scala Analyst

Well, Dr. Dormitzer is a physician, so I thought I would ask him.

Phil Dormitzer Executive

We're very careful with this answer here because I'm a physician, and I sign a statement where I practice that I will not do anything that has to do with my employment with GSK in my prescribing decisions. So what I would say it is important that older adults get immunized against RSV, and I have tremendous confidence that we have a great RSV vaccine from GSK.

Jeff McLaughlin Executive

Thanks, Steve. I'm not seeing any additional questions. So just if anybody would like to ask a question, as a reminder, we have about 5 minutes to go before we will break from this session. But you can please raise your hand. I see a new question come up here from Dominic Lunn.

Dominic, I'm going to allow you to talk here, and you can ask your question. If you unmute.

Dominic Lunn Analyst

I just had 1 question on Shingrix life cycle management. And you talked about the dementia reduction potential. So I was just talking about -- I was wondering if you could talk a bit more -- about exactly what you've seen there, how significant this life cycle management could be

and talk about any incremental work you may be doing to do this and the potential time lines?

Phil Dormitzer Executive

So maybe I'll address the sort of scientific aspects of the question. And it's an observational study that came out that takes advantage of a very unusual circumstances when not Shingrix, but ZOSTAVAX was introduced really almost at a moment in a population and a reduction in eventual we see. It's a fascinating finding. And there are a number of potential explanations for it. But empirically, in an observational study, you do see a decrease in dementia and one thing I can say that we're doing now is interrogating the data that we can find observationally using even machine learning algorithms, et cetera, to really try to understand this finding.

I don't think observational studies will give us a mechanism, but to some degree, from a public health perspective, it doesn't matter what the mechanism is if -- whether it is improving the overall health of older adults, makes them less prone, for example, subclinical dementia to become full-blown dementia, or whether the herpes viruses, the neurotropic herpes viruses have a fundamental pathogenic role in dementia, I don't think any of us know. But in any case, it does appear that at least was ZOSTAVAX and it will be very interesting to see if the same is true for Shingrix that immunization is associated with reduced dementia in this study.

Jeff McLaughlin Executive

Thanks for that question, Dominic. I'm going to fly through. We got a number of additional hands that just were raised. And keep in mind, although -- the team here is obviously highly capable of addressing the Shingrix questions. There's another breakout session that touches on Shingrix in chronic viral conditions.

So if you have further questions on that subject matter, that could be a good option for breakout session, the second 30-minute block. We're going to go. It looks like Harry Gilles who has a question. So Harry, I'm going to go to you, allow you to talk.

Unknown Analyst Analyst

So just a quick one. I was wondering if you are looking at any RSV combinations with hMPV or PIV because we've seen a number of competitors are looking at these combos?

Phil Dormitzer Executive

No, I don't know that we've made any announcements to that effect. But I can tell you from a scientific perspective, it certainly makes a lot of sense. Knowing how to make an RSV vaccine same principles to make the hMPV vaccine and is certainly a logical combination. So sort of saying exactly what we're doing, we [indiscernible].

Christi Kelsey Executive

And Harry, my only build commercially as we obviously know our amount about the dynamics of combination vaccine marketplaces from our experience in the pediatric setting. So we know the software is tremendous convenience over time. I think given the questions about revaccination timing, between kind of stable viruses, less stable viruses, we need to let the

data continue to evolve so that we can actually have the right combination with the right frequency, and that will take some time. And certainly while we're watching quite closely.

Jeff McLaughlin Executive

Great. Thanks for the question, Harry. We've got just maybe 1 minute to go and several other individuals are back in the queue, who've already had a question. So Jo, I saw you first. So I'm going to go to Jo Walton for 1 final question here.

Jo Walton Analyst

Thank you. So I'm going back to ACIP and your confidence that you have a better vaccine than Pfizer. So the independent people at ACIP said that if you were to give 1 million vaccinations in the over 65, you would avoid 25,000 outpatient visits with the Pfizer one, only 23,000 outpatient visits with the Glaxo one. There also appeared to be some concern about the possible use of the adjuvant given that there is, in their view, an excessive neurology effect in using the adjuvant in Shingrix. So my question is, how do you counter that?

And presumably, Pfizer can go out and just hand that, that was an independent ACIP at research. Here a pharmacist, I can tell you that ACIP thinks that ours will work slightly better than Glaxo's for whatever reason. And secondly, do you think that there is any concern that you would not be allowed to do coadministration at any point at the Shingrix given that you are adding that extra adjuvant, which may have an adverse effect?

Christi Kelsey Executive

No, it's a great question. So I think I'll defer to Phil on the adjuvant question and kind of our co-ad thoughts when we're starting to think about Shingrix and RSV vaccine. As far as the health economic discussion at ACIP, I think what's important to note is that the analysis that was run, obviously, independently you have to really understand what you're looking at as far as different case definitions that were used in the model. So on balance, if you look at the conclusions, ACIP did demonstrate that both offered efficient allocation of resources. But if you look -- dig deeper into the case definitions, you're definitely not looking at apples-to-apples comparison.

So that's important to note. I think the other important distinction when you're into the modeling is understanding that our follow-up time was longer at 18 months up to 21 months, which we should take into consideration, a virus that ultimately weighed. So I think that's an important distinction of the analysis that was done. I know in our press release that we put out there, we showed the different efficacy endpoints over time, both season 1 and season 2 as far as the midpoint that I think offers some interesting data to help make independent comparisons. But I'll defer to Phil on the adjuvant.

Phil Dormitzer Executive

Well, I would say that the AS01 adjuvant is an adjuvant with which we have a tremendous amount of experience, particularly to Shingrix. The RSV vaccine has half the dose of adjuvant that the Shingrix has and Shingrix has an outstanding safety record. In addition, what we've really seen is consistent high efficacy, especially high in those with comorbidities and

particularly high against the severe disease as this is a vaccine for older adults, where immunosenescence can be an issue. We think that the adjuvant is a contributor to that very consistent high efficacy and we're confident in the safety record that we've seen from Shingrix. And thus far, to have no reason to question that we have elected to see something similar, although, of course, we will continue to monitor as we always do after launch.

Christi Kelsey Executive

And the only -- the last thing I would add is we'll need to see how this plays out. But one thing we have seen over time is Shingrix does not have to be administered during flu season. So having Shingrix administered earlier in the year does open up more space now that we have RSV coming in. So the lack of co-administration with Shingrix, we don't see as a barrier at this time.

Jeff McLaughlin Executive

Thanks, Phil and Christi. Luke, any final remarks from you? Or shall I close things off? Okay. Well, thank you, everybody.

Great session. Great discussion. You now have about 15 minutes to join the next virtual breakout session, which will start at 15:15 for the U.K. timing or 10:15 on the East Coast or you can do the math from there. Details are available on the Zoom events landing page or via the email that you have received.

All presentation and event recordings from each breakout session will be available on gsk.com. So if you didn't catch something and you want to go back and listen again, you'll have that opportunity. And just thank you to the panelist and for all the attendees for your interest in GSK. You may now disconnect and find your way to the next breakout session.

Christi Kelsey Executive

Thanks, everyone.

Josh Williams Executive

So hello, everyone. Welcome to the session focused on invasive bacterial and fungal infections. I'm Josh Williams from the Investor Relations team. And today, I'm joined by Kumaran Vadivelu, the Head of Vaccines R&D Development; and Rob Bowers, the Head of General Medicines Commercial. On our Slide 2 is our usual safe harbor statement.

And the purpose of the session is to give you the opportunity to ask questions. But we'll start with around a 10-minute presentation from Kumaran and Rob on some of the exciting work that is happening in the bacterial infections and fungal infection space. So Kumaran, over to you.

Kumaran Vadivelu Executive

Thank you, Josh. I'm thrilled to join you this afternoon to share some of the exciting work in Vaccines R&D. As a global healthcare company committed to finding new ways to prevent and treat disease. One of our focus areas is bacterial and fungal infections. On this Slide, you can see some of the common infections that continue to significantly impact patients

worldwide.

For example, vaccine-preventable diseases like meningitis and pneumococcal continue to hospitalize and kill people every year. In the U.S., more than 150,000 people are hospitalized from pneumococcal pneumonia every year. And even with antibiotic treatment, 10% to 15% of people infected with meningococcal disease died. These statistics underscore the urgent need for improved vaccines to address this pressing medical need. Over to Rob.

Rob Bowers Executive

Thanks, Kumaran. There also remains a significant unmet need for patients affected by common community infections like urinary tract infections and vulvovaginal candidiasis, which I'll refer to as VVC. These diseases are amongst the most common infections that women will experience, but their impact on quality of life for patients is often overlooked, especially given the burden of resistance and recurrence in these patients, combined with the lack of innovation for decades. For example, the lack of new oral options for complicated UTI means that patients with resistant infections have to be treated hospital with IV antibiotics. Over the next few slides, we'll give you an overview of our key pipeline products in this space and then we'll open up for Q&A.

Next Slide, please. And over to you, Kumaran.

Kumaran Vadivelu Executive

Yes. Thanks, Rob. The first program I would like to share with you is our pentavalent ABCWY meningococcal vaccine, a vaccine designed for the broadest meningococcal disease coverage. Our 5-in-1 ABCWY vaccine built on the legacy of Bexsero, our market-leading meningitis B vaccine and integrates Menveo covering ACWY strains. There is an opportunity to improve immunization rates among U.S.

adolescents for MenB, which currently only had around 30% penetration. Recently, we presented preliminary pivotal data on our 5-in-1 vaccine candidate, which met all primary endpoints, demonstrating statistical non-inferiority compared to Bexsero and Menveo with an acceptable safety profile. Further, our pentavalent is the only investigation vaccine to have shown immunological effectiveness against a panel of 110 diverse MenB strains, which account for 95% of those circulating in the U.S. We are on track for a U.S. regulatory submission in 2024 and our lifecycle management efforts feature additional work to pursue global licensures outside the U.S.

and expansion into infant population. We expect combination vaccines to drive incremental growth in the overall meningitis market by improving compliance and immunization rates. As illustrated in the table on the Slide, the introduction of a pentavalent meningitis vaccine for U.S. adolescents could potentially reduce number of required doses for those aged 16 to 18. Please turn to the next Slide.

Before the Affinivax acquisition, we had a gap in our vaccines R&D portfolio as we were limited in our assets for pneumococcal disease, a GBP 7 billion market opportunity. Despite the routine recommendation and widespread use of pneumococcal conjugate vaccines, we know there is still a considerable disease burden among older adults and young infants.

Current conjugate vaccine technology limits potential coverage to 20 out of the 100 known pneumococcal serotypes and provide suboptimal protection for some serotypes such as serotype 3. The most successful next-generation pneumococcal vaccine will provide both higher serotype coverage and broader immune responses. Referring to the bar chart on the right side of the Slide, you can see that introducing a 24-valent pneumococcal vaccine developed using our MAPS technology, could boost coverage to above 60% of the disease and further an expansion to a 30 valent plus formulation could increase coverage to over 90% of the disease.

Next Slide. This figure represents the differences between MAPS technology on the left panel and conventional conjugate technology on the right panel. MAPS technology uses high-affinity biotin reserving binding interactions to present immunogenic epitopes of both pneumococcal polysaccharide and pneumococcal antigens to induce B cell and T cell responses for robust immune protection. B cell-initiated response to the polysaccharides and B and T cells respond to the protein antigen. MAPS offers 2 distinct advantages over traditional pneumococcal conjugate vaccines.

First, MAPS facilitate higher valency, this means that expanding coverage beyond 20 to 30 serotypes is much easier proposition compared to chemical conjugation. Another key differentiator is that MAPS complex is more immunogenic and introduces an additional form of immunity, specifically T cell-mediated pneumococcal-specific anti-protein immunity. This is unique to MAPS technology. Traditional glycoconjugate vaccines like PCV employ a protein carrier CRM197, that's completely unrelated to pneumococcal disease and therefore, do not stimulate pneumococcal specific anti-protein immunity. Next Slide.

This Slide presents the results of Phase II involving older adults, demonstrating the clinical proof of concept for the technology as well as the MAPS 24-valent candidate, which forms the foundation for proceeding to Phase III. We are confident that our vaccine candidate, leveraging MAPS technology holds significant promise to reshape the pneumococcal vaccine landscape due to: number one, it's high valency; number two, robust anti-polysaccharide immunity as shown in Phase II data presented on this Slide, including higher response for more serotypes particularly for serotype 3 against PCV13. And third, a broader immune response facilitated by the inclusion of pneumococcal protein, which is unique to MAPS technology. Collectively, MAPS technology attributes are critical for number one, improved disease coverage; number two, potentially enhancing efficacy against invasive diseases; and third, offering greater impact on mucosal diseases like pneumonia and otitis media. We are making progress in advancing our development with the aim to be the first to market with the 24-valent vaccine.

We expect Phase III trials for adults to start in 2024 and targeting the launch of a pediatric vaccine before the end of this decade. Additionally, we are on track to advance MAPS 30 plus valent formulation into the clinic in 2024. At this point, I would like to pass the presentation over to Rob.

Rob Bowers Executive

Thanks, Kumaran. So in addition to preventing infections, we must continue researching and developing new treatments for bacterial and fungal infections including those at the

community level. ESBL-producing bacteria can negate the effect of commonly used beta-lactam antibiotics. As you can see from the chart on the top left here, rates of ESBL-producing bacteria are increasing in complicated urinary tract infections in the U.S. Majority of these bacteria are multidrug resistant to any oral treatment.

Hence, the reason they are deemed a priority pathogen by both the WHO and the U.S. Centers for Disease Control. This necessitates IV therapy for a condition that would previously have been treated with oral therapy in the community setting. For VVC, our market research shows HCPs see about 30% of their patients as complicated or challenging to treat due to the impact of resistance or recurrence with no other oral options for patients after fluconazole. On the right-hand side of the Slide, we've outlined what we see as the key criteria that are essential to developing a successful portfolio and becoming commercial leadership space.

First, we're focused primarily on infections with large populations and significant unmet needs. By focusing on the portion of these patients with the highest unmet need, for example, patients with resistance or recurrence on existing therapy, which is about 1/3 per group. We have a portfolio with a potential to reach GBP 2 billion in peak year sales. Additionally, we're focused only on novel first-in-class assets that are differentiated and have efficacy against resistant pathogens. All of our assets address or have the potential to address WHO priority pathogens.

Now this designation is an important signifier of high and increasing unmet need and is commonly used as a key qualifying criteria for future pull incentive policies are being developed in the U.S., Europe and the U.K. and are designed to incentivize and reward antibiotic innovation. And finally, we know that bringing oral outpatient treatments for common community infections has strong commercial value, which is aligned to outcome-driven impacts like reducing hospitalizations and reducing pressure on the hospital system. So we see a significant opportunity to lead in this space and to build a unique portfolio of first-in-class, best-in-class medicines with synergistic strategies. This large unmet need in a market with decreasing competition matched with our commercial and R&D capabilities in this space, makes us confident that we'll be a key leader in this area.

With new policy incentives and pull incentives emerging, GSK is well positioned for the significant upside should they come to fruition. Next Slide, please. So on this slide, you can see an overview of the anti-infective assets we've invested in with near-term potential. All these assets are novel or first-in-class oral options for community or outpatient infections with growing resistance. Starting on the left with Gepotidacin.

This is a first-in-class triazaacenaphthylene or TZP antibiotic and its distinct mechanism of action provides activity and broad coverage against most strains of E. coli, including those resistant to current antibiotics such as fluoroquinolones and ESBL producers.

In November, we announced that our Phase III studies were stopped early for efficacy following a preplanned interim analysis by an independent [indiscernible] . Data was then presented at met, demonstrating non-inferiority against the most commonly used first-line treatment nitrofurantoin, in both Phase III trials and additional superiority in one of those trials. Gepo showed a consistent treatment effect in patients with the highest unmet medical

need, both with resistance, a history of recurrence or aged greater than 50 years. Despite black box warnings and FDA guidance to reserve their use in UTIs only for patients with no alternative options, fluoroquinolones are still commonly used as second-line antibiotics in the U.S. with close to 25% market share.

Gepo has the potential to provide a valuable new treatment option that can displace for fluroquinolones, preserving fluoroquinolone use for other serious infections and in line with good antibiotic stewardship practice. Gepo only needs to displace 1/5 of current fluroquinolone use to become a $1 billion medicine in the U.S. We're currently preparing the U.S. submission. Given the opportunity we see in this space and in order to build out a world-leading infectious diseases portfolio, we announced an exclusive license agreement with Spero Therapeutics for tebipenem, a late-stage antibiotic that may treat complicated urinary tract infections.

Tebipenem has a clear U.S. FDA regulatory path to potential approval with Phase III clinical trials starting in 2023, following encouraging U.S. FDA regulatory feedback on the proposed clinical trial design. And then finally on the right, with Brexafemme. In March, we added a third asset to our portfolio through an exclusive agreement with Synexis to commercialize and further develop Brexafemme, a novel approved antifungal medicine with a broad spectrum of activity against existing and emerging resistant strains of fungi including VVC and with potential and invasive candidiasis.

Brexafemme has a distinct mechanism of action, whereby it kills the fungus as opposed to some antifungals, which inhibit fungal growth. It is the only oral antifungal U.S. FDA-approved treatment for VVC and reduction in the incidence of recurrent VVC. GSK plans to relaunch the VVC indication and it's planned to launch are underway. We also have a Phase III program in invasive candidiasis.

Candida auris is an emerging multidrug resistant fungus cited as an urgent threat by the U.S. CDC, alongside other serious drug-resistant Candida species. We're developing Brexafemme to address this emerging market. Next Slide, please. So we are looking forward to the opportunities we have for our bacterial and fungal infection assets, including meningitis, streptococcus pneumoniae and our anti-infective portfolio.

For meningitis, we're working closely with regulatory agencies to review the complete Phase III data before U.S. regulatory submission in 2024. On pneumococcal disease, we plan to start our 24-valent vaccine Phase III program in 2024 and move our 30-plus valent into the clinic in 2024. And finally, on our anti-infectives portfolio, we're excited about the significant opportunity to lead in this space and to build a unique portfolio of first-in-class, best-in-class medicines with synergistic strategies. With that, we'll move to the discussion, I'll hand it back to Josh to moderate the Q&A.

Josh Williams Executive

That's great. Thank you very much, Rob. We will now go to Q&A where we are also joined by David Redfern, President of Corporate Development. [Operator Instructions] We will now take the first question from Seamus Fernandez of Guggenheim.

Seamus Fernandez Analyst

Okay. Great. My question really is on the pneumococcal vaccine and the MAPS technology. Just hoping you could give us a little bit more color on when we'll see the Phase II data from in peds and then the pediatric Phase II data and also, where -- when you say that you're starting your programs next year, I believe there were some issues with regard to manufacturing for a full sort of pediatric Phase III clinical trial being initiated. Can you just update us on what the manufacturing issues are and those time lines it seems a little bit confusing that the adult trials can begin, but the pediatric trials are delayed?

Kumaran Vadivelu Executive

Yes. Thanks a lot for the question. I can provide a bit more color on our pneumococcal program. First thing is Phase I for the pediatric population has been completed with it for the 24-valent vaccine candidate. The ongoing Phase II trial, which started in June 2022, is temporarily paused following an audit finding regarding the fill and finish presentation of the vaccine.

The emerging data received from the pediatric population is very reassuring about the technology's potential in this age group. And we are working diligently to resolve this matter to resume the study as soon as possible. So Phase II trial in pediatric population. And as I communicated earlier, we plan to start Phase III trials in adult population in 2024 and we remain committed to bring the pediatric vaccine to the market before end of this decade.

Josh Williams Executive

I think I saw Graham Glyn Parry from Bank of America raised his hand.

Graham Parry Analyst

So as a follow-up question actually on the pneumococcal. Just in terms of the Phase III trial design that you'd expect in adults. So would you expect to use as the comparator there? So do you see Prevnar 20 and Pneumovax 23 as being best comparators there, although prior trials have been read against Prevnar 13? And then separately, just going back to the pediatric just any kind of time line you can give us on when you expect to be able to resume the study.

So I think that was slated for data, I think in 2024. So is that realistically going to be a post-2024 readout in that Phase II study now? Or do you think we should be able to see some data in pediatrics in 2024?

Kumaran Vadivelu Executive

Yes. So first thing is I'll take the question on pediatric data first. So as I said earlier, the ongoing Phase II trial, which started in June 2022 is temporarily paused. And we are working to resolve this matter as soon as possible so that we can resume steady start. And we will provide more guidance later on the Phase II data readout time line as soon as we have more clarity on the study start time lines.

And with regard to Phase III adult program, earlier during the Phase II, we compare the

vaccine against Prevnar 13, which is a highly immunogenic vaccine. And we still demonstrate a robust immune response outperforming PCV13 for several serotypes, including serotype 3. And we know today, PCV20 is the new standard of care. At the same time, it's a less immunogenic vaccine. So we are confident of demonstrating robust immune response when we go head-to-head against PCV20 in our adult Phase III program.

Josh Williams Executive

Just looking at Q&A panel. Seamus, I saw your hand up, is that another question that you'd like to ask? Or is that a hangover from the first round.

Seamus Fernandez Analyst

No, I can -- yes, I'll just have one follow-up question on the pneumococcal vaccine. Just wanted to get a better sense of the number of serotypes that you're pursuing. I think you're talking about a 30-plus vaccine. It's our understanding that the target was somewhere between 33% and 36% as a possibility. So I was just hoping if you could help us understand what the number of potential serotypes you believe is possible to pursue?

And separately, just as an additional question and then I'll drop my hand. The serotypes themselves are 1 piece of the puzzle but can you also clarify if the technology is using novel proteins, it's our understanding that this is not based on the CRM protein, but perhaps 2 novel proteins and why that was done and if you think that, that is a potential advantage of this vaccine or a potential risk from a regulatory perspective?

Kumaran Vadivelu Executive

Yes. So first, let me tackle the second question first. I think broadly, we're excited about the technology for 3 main reasons. Number one, is ability to make high valency, you have seen the Phase II clinical data with the 24 valent vaccine. I think for the first time, we have reversed the trend of declining immune response with increasing valency.

And this will be followed by a 30-plus valent candidate going into Phase I in 2024. And second thing is the MAPS complex is highly immunogenic. We have seen strong antibody response against polysaccharide based on Phase II data. And I would like to draw your attention to serotype 3, possibly one of the most challenging serotype to tackle with existing PCV technology. We have demonstrated threefold increase compared to PCV13, which is a more immunogenic vaccine compared to PCV20.

And third thing is what's really unique is we are not using CRM197 as a carrier protein. Here, we are using native pneumococcal protein, which is going to contribute to broad immune response both T-cell-mediated anti-protein immunity as well as B-cell response towards this protein. And we think that's possibly the ex-factor that could go on to have potential impact on non-vaccine types and may contribute synergistically together with the higher polysaccharide response to tackle serotype 3. So we feel confident that pneumococcal protein will show its benefit in the post-licensure space in further differentiating our candidate vaccine both 24 valent and we are adding additional pneumococcal proteins for the 30 plus formulation. So we are not disclosing the composition of 30-plus formulation right now for competitive reasons, it's competitively sensitive information.

We are planning to enter the clinic in 2024 and you will hear more from us next year.

Josh Williams Executive

Thank you, Seamus. Just kind of put on see if there are any more coming through. If not, I will look back to Graham -- in which case, Graham, back to you.

Graham Parry Analyst

Great. So if I can just follow up actually on MenABCWY. Just talk through the different formulations that you're looking at across Europe and the U.S. under different age cohorts just where you expect your products to fit in and how you leverage having the pentavalent in that setting? And then just in terms of pneumococcal vaccine, I guess, the original Prevnar 7 was actually approved on vaccine efficacy.

And all these subsequent vaccines have been approved based on immunogenicity measures. Is there any discussion as to sort of how you can show an overall efficacy benefit, whether it be sort of some kind of total immunogenicity versus the existing vaccines that are out there? Because I guess one of the questions that comes up from KOLs and the recent ACIP meetings is are we actually just sort of diluting the immunogenicity against the existing strains to add them, but where is the net overall aggregate benefit coming from? Is there a way to measure that, that you would think about targeting in a pivotal trial?

Kumaran Vadivelu Executive

Yes. Thanks for your excellent questions. I think you would have seen in our pipeline, there are 2 MenABCWY candidates. The first candidate is a first-generation MenABCWY where we just announced Phase III results. And the candidate is built on the legacy of Bexsero and together with the Menveo which covers ABCWY strain.

And the immediate goal is to bring the vaccine to the U.S. market as soon as possible. We are in advanced conversation with the regulatory authorities with the target to file MenABCWY candidate in the U.S. in 2024. And soon after that, we intend to pursue license outside the U.S.

targeting adolescence and then as part of lifecycle management also to go down the age group to tackle the infant age group. In addition to that, you would have seen we also have second-generation MenABCWY candidate in our pipeline. Right now, that's in Phase II. As leaders in the field of meningococcal vaccines, we aim to stay on top of the evolving epidemiology our second-generation candidate includes additional MenB components and aims to provide broad MenB coverage and we will communicate more as we gather more data with the second-generation candidate. For now, we are extremely pleased with the Phase III results we have seen with our MenABCWY results.

It has the only vaccine that has demonstrated very high immunological effectiveness against a panel of 110 MenB strains. And we think MenB is going to be the key factor differentiating between products. Coming back to your question about pneumococcal vaccine. As you would have seen traditional placebo-controlled efficacy trials may not be feasible anymore, certainly not feasible in the pediatric population. So the licensure is going to be via immune correlates, which has been well established for pneumococcal disease, that would be the

primary pathway for licensure.

The most important medical need is to expand the serotype coverage. That's the reason we are targeting 24 valent, which will provide disease coverage close to 60% and then a 30-plus formulation will take it past the 90% disease coverage. In addition to that, we are discussing internally at this point in time whether we should further supplement the program with pre-licensure trials to take additional indications and we will disclose more details as we get closer to the Phase III start.

Josh Williams Executive

Conscious we're just up against time, but mindful are there any final quick questions perhaps for Rob, around the anti-infective space, if not, we will close the call before quickly inform you how to get to the next session. Thank you. Okay. In which case, thank you very much, everyone, for joining this session. You now have approximately 15 minutes to join the next virtual breakout, which starts at 3:15 BST.

Details are available on the Zoom events landing page that you use to get to this one or via that you received. All presentation and event recordings from each breakout session will be available in gsk.com at a later date. So thank you. Thank you very much to our panelists and thank you for your interest in GSK. Enjoy the rest of the session.

Thank you very much.

Christopher Corsico Executive

Viral infection in more than 300 million people globally and finally, herpes simplex virus, a lifelong and curable infection responsible for genital herpes. It is my pleasure to introduce Lizzie Champion, who will provide an overview of Shingrix and the exciting future of this important vaccine.

Lizzie Champion Executive

Right. Thanks very much, Chris. I'm delighted to be here. So it goes without saying that Shingrix is absolutely a flagship vaccine in our portfolio. And if I start with just the vaccine itself, over on the left of the screen, so unprecedented in terms of efficacy delivers and duration of protection.

So 97% efficacy in pivotal clinical trials and that efficacy, we know now sustained at more than 80% over 10 years and counting. If I talk next to performance to date, we're 5 years post Shingrix launch, and Shingrix is already growing to be a GBP 3 billion product. Much of the success we've seen to date has been in the U.S. and already of the 120 million Americans eligible to receive Shingrix, we've penetrated to around 30% of that figure leaving around 85 million Americans still unvaccinated and remaining eligible for Shingrix.

Next U.S., we have accelerated very fast. So you can see on the screen that we've now, as of today, launched in 31 markets well on track to be in 35 by '24. And those 31 markets represent just around 90% of global vaccines market by volume. unconstrained on supply and this geographic expansion, you can see from the chart is starting to deliver significant growth, so as of '22 last year, ex U.S. was over 30% of our revenue and more than 50% of

global Shingrix growth.

So looking ahead now, we are firmly on track to deliver the commitment to double Shingrix sales reaching GBP 4 million by 2026, and we expect Shingrix to be a multibillion product through the decade. On the right, I wanted to give some flavor of some of the opportunities we're looking at for continued expansion of Shingrix. And I'll now start with population expansion.

So we already have a very broad label with Shingrix that there's opportunity to go broader. A good example of this, a recent example was only this week, you may have seen we've announced an expanded indication for Shingrix in Japan to prevent shingles in adults 18 and over who were increased risk. So that's a build of a new segment, 18 to 49 year olds at increased risk in Japan. Beyond that, another cohort that I wanted to talk about is healthy people under 50. So we know there are significant numbers of shingles cases in the 40 to 49 cohort, this cohort in the U.S.

alone represents around 40 million people. And in that cohort, we know there are more than around 100,000 shingles cases per year. So there is an unmet need. With the duration of protection that Shingrix has demonstrated, which is shown on the left of the chart, we're able now to consider the benefit of vaccination in this younger group. And at the moment, we're focused on better categorizing the burden of disease and public health impact in this group to then initiate discussions with regulators and public health bodies.

Second, I'm going to talk briefly about Booster. So again, referencing the chart on the left, you can see the sustained protection over 80% that Shingrix delivers up to 10 years so far. What you can see on the chart is there is some very limited waning of efficacy to date, so of course, we are considering the need for a Booster.

And the 1 thing I would say there is it's reasonable to assume that not all populations will have the same need for a Booster. So we know it's early still, but descriptive data in immunocompromised patients, which we reckon is about 10% of our total patient pool show some breakthroughs earlier than 10 years. And this group, we believe, will be the first to benefit from a booster rechallenge. Now what's important to say is that we continue to track the long-term data, and that data will be what informs the need for a booster and in which populations. Third, I wanted to talk about some very interesting emerging science linked to shingles vaccination.

So some of you may have seen, there's a growing body of evidence which suggests shingles vaccination is associated with the reduction in the risk of dementia. This includes a particularly interesting recent observational studies. I want to note that the study is not yet peer reviewed, but it has gained significant attention. So I'm sure some of you will have seen it which shows a 19% reduction in the risk of dementia following shingles vaccination. It's emerging science and there remains significant unanswered questions as to what underpins this potential association.

But of course, it goes without saying that any risk reduction here is incredibly meaningful and therefore, a reason for us to be excited and put focus. I'll now hand back to Chris, who will share more about the science we've seen on chronic hepatitis B, herpes zoster and Herpes

simplex. Over to you, Chris.

Christopher Corsico Executive

Thank you, Lizzie. Next slide, please. Chronic hepatitis B, a viral infection of the liver is associated with both acute and chronic liver injury and disease when the immune system is unable to clear the virus, the virus actually is harbored in the liver and can be detected in the blood. There are approximately, as you can see on the left, 300 million people with chronic hepatitis B and it results in nearly 900,000 related deaths. And those deaths are typically due to liver failure, advancing cirrhosis and liver cancer.

All patients living with hepatitis B need to be regularly monitored because they're at increased risk of developing long-term liver sequelae even if at the time they are feeling well. The desired goal of treatment is something called functional cure. That's clearance of both hepatitis B surface antigen and hepatitis B viral DNA from the blood after being off all therapies for at least 6 months and longer. Therefore, to be a successful treatment, not only do you have to suppress HB DNA, you also have to help zero clear hepatitis B surface antigen, which in turn enables the body's own immune system to clear the virus. Current treatments include nucleoside or nucleotide analogs, which I'll refer to as NAs moving forward; and immune therapy, specifically pegylated-interferon or PEG interferon.

Despite these therapies, very few patients attained functional cure. On average, treatment with NAs typically result in functional cure rates of less than 2%.

More importantly, patients on NAs usually require lifelong therapy because one treatment has stopped most patients rebound. The ability to achieve functional cure when peg-interferon is added to the regimen increases functional cure rates but comes with significant and systemic side effects, making it difficult for patients to complete 48 weeks of therapy. In fact, about 1/3 of patients are unable to complete a full course of treatment. Hence, better treatments are needed for patients given the unmet need. Chronic hepatitis B infection remains a global public health issue, and diagnosis remains low.

In the U.S., it's estimated that only about 35% of infections are diagnosed and only about 25% in Europe. In Japan, those rates are about double, but they also mandate screening of the virus. This past year, the CDC published guidelines that suggest that adults should be tested for hepatitis B. And this was to raise awareness, both about the disease and to increase diagnosis rates given the long-term sequela. As part of our continued mission to get ahead of disease and develop innovative medicines to treat more than 2.5 billion people, GSK is committed to finding a functional cure for hepatitis B to complement our prophylactic hepatitis B vaccine.

We are excited to discuss Bepirovirsen, or Bepi, a new agent that could advance the treatment of chronic hepatitis B potentially providing functional cure for patients. Bepi is an antisense oligonucleotide that was designed to inhibit translation of hepatitis B viral proteins from its messenger RNA. Based on our evolving data, Bepi distinguishes itself from other investigational therapies by its unique triple mechanism of action. It inhibits production of viral proteins, including HB surface antigen, it reduces vial replication as measured by reducing hepatitis B DNA and it stimulates the body's nat immune system to suppress the

virus. It is this unique triple mechanism that we believe offers the potential for Bepi to change the treatment paradigm in chronic hepatitis B by potentially offering patients functional cure.

Next slide, please. Last November, data from the Phase II B-CLEAR trial was published in the New England Journal of Medicine. The study demonstrated that at the end of study period, 9% to 10% of patients on a background of nucleosides and not on a background of nucleosides, were able to achieve sustained loss of both hepatitis B surface antigen and hepatitis B viral DNA following 300 milligrams of Bepi for 24 weeks and then followed for an additional 24 weeks off of their therapy unless the patients were on NAs. For patients with antigen levels of 3,000 and below at study entry, 12% of patients receiving NAs and 25% of patients not receiving NAs met the conditions for functional cure. In patients with the lowest surface antigen levels, less than 1,000 at baseline, Bepi resulted in even stronger response rates of 16% for the NA treated group and again, 25% for those not on NAs.

The B-CLEAR study helped us identify the patient population most likely to achieve functional cure, those patients with a baseline surface antigen of less than 3,000, and this helped us inform the design of our Phase III pivotal B-well studies, which are actively enrolling patients. The B-CLEAR data also demonstrated that Bepi in combination with other therapies will be needed to treat patients with hepatitis B surface antigen levels at baseline greater than 3,000. Specifically, sequential combination therapy to further reduce baseline HB surface antigen levels prior to treatment with Bepi and potential immunotherapies after Bepi therapy to augment Bepi's stimulation of the innate immune system need to be tested in patients with baseline hepatitis surface antigen levels are greater than 3,000. Later this year, data from B-TOGETHER our sequential combination therapy using Bepi followed by interferon will be available.

This study will help inform the design of future immune therapy combination studies. Next slide, please. Now I'd like to switch to our last chronic viral illness, herpes simplex virus. After chronic viral infections that impact patients globally, another 1 is the herpes simplex virus responsible for genital herpes. GSK 104 in is a novel therapeutic intervention in early development for genital herpes.

And it leverages the knowledge and experience gained from our work with herpes varicella zoster virus VZV. Both HSV and VZV are alpha herpes viruses that lead to lifelong latent infection in neuronal ganglia following initial infections. HSV and VZV evolved mechanisms that enable these viruses to evade detection by the body's immune system. GSK is building on our internal expertise, knowledge and experience with Shingrix as we commence early development of GSK 104. Around 500 million people across the world are infected with herpes simplex virus.

1/3 of the patients with genital herpes suffer frequent outbreaks. Beyond the physical outbreaks, genital herpes is also associated with significant psychological morbidity, stigma, low quality of life, and a threefold risk of acquiring HIV. Genital herpes is incurable. Antiviral therapy is the only treatment option available. Antiviral medicines, however, have a modest impact on outbreaks and on transmission rates.

There's been little innovation in this space over the past 20 years. And although GSK 104 is still early in its development, we are excited about the potential for this asset. With that, I'd like

to hand it over to James Greenhalgh to wrap up on our commercial commitments to growth.

James Greenhalgh Executive

Thanks, Chris. We're looking forward to the opportunities we have for our chronic viral infection assets. In terms of the future of Shingrix, the opportunity we see for Bepi and the early excitement we have for the HSV assets. On Shingrix, we're well on our way to doubling Shingrix revenue by 2026, will be in 35 markets by 2024 and are exploring the life cycle management opportunities. On Bepi, we believe our potential functional cure for chronic hepatitis B has potential peak year sales of more than GBP 2 billion.

We remain excited about the promise of Bepi as a potential cornerstone therapy. And finally, while it's too early to make firm commercial commitments, we're very excited about the potential Chris highlighted for GSK 104 in genital herpes. And with that, we'll move to the discussion, and I'll hand back to Mick to moderate the Q&A.

Mick Readey Executive

Thanks, James. Yes. So now we'll go to Q&A. [Operator Instructions] So we'll open up I can see we have a question from Emmanuel. Emmanuel, hopefully, you should be able to speak.

Emmanuel Papadakis Analyst

I have indeed unmuted myself, sir. You limit me to 1 is difficult. But at Bepirovirsen , I mean, maybe talk to us a little bit about expectation for the functional cure you hoping to see in the data with later this year? And then maybe I could tag on a second part, which is what do you think is the threshold for functional cure rates? We need to see or should wants to drive broad clinical adoption should this drug become available to patients in due course.

Thank you.

Tony Wood Executive

Are you going to coordinate? Or do you -- why don't I make a start, Chris, and then perhaps you can embed a shot on that. Good to hear from you, Emmanuel. Look, the way to think about this with regards to the overall study is we're running a number of Phase II programs, which B-CLEAR was one B-Together as a second which are really designed to inform the proposition then for more in-depth Phase III analysis. B-CLEAR to Chris' point earlier, has already established the likely response characteristics for patients on immunotherapy and as I indicated in the introductory section, if you were available to join it, our estimate there, based on modeling is that we'd expect to see around about a 20% functional cure rate, which we think is clinically significant.

B-Together itself is running another experiment, which is asking an important question as to whether or not the addition of alpha interferon on top of Bepi in sequential form is capable of preserving the depth of response that we see at end of therapy. If you look at individual data for interferon itself, you'll see that although functional cure rates there are typically in the order of 5% or less, higher rates can be achieved, but what you have is a significant degree of discontinuation associated with the side effect profile for interferon. So what we're trying to do in B-Together is simply to assess how that might fit in the context of the overall clinical

plan. The important thing though, I would emphasize at this point is it's one of a number of Phase II studies, and we really see those together with prosecuting in the B_WELL Phase III setting as being the earliest on point at which we will then underwrite a Phase III data confidence level set for Bepi's immunotherapy. Chris, if you want to add anything to that, please do.

Christopher Corsico Executive

Maybe, Tony, just to highlight 1 other point. If you look at B together, the treatment course of interferon is not the typical 48-week treatment course. It's sequential 24 week. And that's because everyone we talk to, both in terms of patients as well as the investigators and physician communities that treat these patients will tell you the systemic side effects of interferon are significant. So as we look to the future and we look for future immunotherapies, getting an understanding of what an interferon treatment course can do really helps to unlock many of the other potential ways that we would want to augment the immune response that Bepi initially triggers as a way to cure disease.

But I think it's really important to put this in the context of what we see in terms of functional cure rates currently based on standard of care.

James Greenhalgh Executive

The many online build would be we see clinically meaningful from both physicians and prior research as being from 15% to 20% and upwards. So very excited at those points.

Christopher Corsico Executive

Emmanuel, does that answer your question?

Emmanuel Papadakis Analyst

It does. If I'm allowed 1 very quick follow on. The only question would be the 15% to 20%. Are you talking about that at the end of the treatment period or 6 to 12 months post cessation of treatment because, obviously, in the studies we've seen so far, there's been a significant drop over that time period.

James Greenhalgh Executive

To me at that functional cure, right?

Tony Wood Executive

And Chris, you might comment on modeling and projections. So we can just join the dots for Emmanuel.

Christopher Corsico Executive

Sure. And so in order to -- this is to help clarify, functional cure requires at least 6 months off of all therapies. And as if you start to look at the B-CLEAR data that we just showed that was after the Bepi had been discontinued for 24 weeks. Now we have to keep in mind that there was a cohort that were on nucleosides and nucleotides. But there was also a cohort that had

not been on those at baseline that were followed and there, again, when you see based on the cuts of hepatitis B surface antigen, you had in the non-nucleoside group response rates at the end of that period of 25%.

Mick Readey Executive

Excellent. If we have any other questions, please feel free to raise your hand. So one question that we had received because obviously, there's the e-mail, my e-mail address is also at the bottom of the invite. But I mean, I guess this one would be more for Lizzie stating about Shingrix opportunities over the medium term and what can continue to drive growth for Shingrix?

Lizzie Champion Executive

Yes. Thanks for the question whoever e-mailed. So I think let me start by restating our confidence in Shingrix over the medium term, and I'll replay some of the messages that I stated in the presentation, which is this year, double-digit growth, confident to double our revenue to GBP 4 billion by '26 and we expect multibillion products towards the end of the decade. Now why do I say that? So let me touch on 3 points.

So starting with the U.S. there is huge headroom remaining in the U.S., 85 million Americans remain unvaccinated. Now clearly, we've reached 30% of the 120 million Americans. So we've reached an easy to reach the motivated people, the people who were first in to their HCP to receive the vaccine. But we are absolutely confident to reach the analogs that we have with flu with pneumococcal disease all adult vaccines, which would take us to 60%.

So we are a long, long way of saturation in the U.S. The other thing I'd say just to remember from a U.S. point of view, which I think people often forget is that even at the point at which we've saturated the full catch-up cohort there are 4 million Americans who will enter the cohort every year, which is a really significant number, and I think often underrecognized. So that's the U.S. huge headroom.

Ex U.S., I would say we're really just getting going. I think you all know that our focus to date has really been U.S. with mostly private market ex U.S. and we have huge potential to expand from that private market. So we need to build on the momentum we've demonstrated with more than 30% of revenue in '22 and continue to expand access to Shingrix through national immunization programs.

And I just want to share one very specific example, recent -- I already shared the Japan example, but a different Japan example. Japan is obviously a very, very important market for us. And as of April this year in the Tokyo area, which represents by far the biggest -- you all know, by far, the biggest city in Japan, 6 million patients over the age of 50, they were granted a subsidy, which means they get reduced cost access to Shingrix. And of course, with that, we expect tailwinds in Japan. So it's early days, but those are examples of some of the expansion we expect.

And then the last thing I would say, and I won't go into more detail because I shared this earlier, but we are looking for further expansion opportunities with Booster, with population expansion, we expect to continue to be able to deliver growth with Shingrix over the medium

term.

Mick Readey Executive

Thanks, Lizzie. So our next question comes from Tim Anderson. Tim, hopefully, your line should be unmuted.

Timothy Anderson Analyst

Great. When will the China opportunity materialize meaningfully with Shingrix. And then on the guidance for $4 billion by 2026, were greater than $4 billion. Consensus is already at $4 billion in 2024. So I'm trying to understand why -- it seems like that guidance by 2026 is quite conservative.

The product did $3 billion last year on this weight of $4 billion this year, consensus has $4.3 billion in '24 you're saying it won't get there until '26. So can you explain.

Lizzie Champion Executive

So let me start with China, and that will be, I guess, part of the answer will be ex U.S. So China, what I would say is it's really very early days. So if you think about the COVID impact, China are now exiting the impact of COVID. We are very excited about the opportunity in China. I won't state the numbers, but I think you only have to look at some of the other private vaccines available in China to see the opportunity that we have ahead of us.

And we are absolutely poised to move on that opportunity. So as of today, we're present in around 300 cities, which represent more than 80% of the addressable population we see for Shingrix. So very excited about the opportunity we have ahead in China. And then in terms of your question about cautious, I think, was your question. So let me restate.

So we have said confident to double revenue reach GBP 4 billion by 2026. There are multiple components to that driven out of U.S. sales. And as I've said, we see continued growth in the U.S., but clearly, the arch of the U.S. means that as we continue to penetrate the 120 million Americans, it becomes harder to get there.

So we are far for far off saturation, but we expect to see that shape of the curve in the U.S. And then ex U.S. or restate. So tremendously important looking forward, it will increasingly become a key part of our delivery. So I think we stated Q1 close to 40% of our revenue in Q1 this year, and that will continue to grow as we look ahead.

So our restate expect this to be a multibillion product through the decade.

Mick Readey Executive

Excellent. Our next and perhaps final question will be from Michael Leuchten. Michael, did you unmute.

Michael Leuchten Analyst

Hope my headset doesn't pack in. Very quick question on the Booster strategy for Shingrix. Just wondering what the regulatory burden or ask may or may not be given the longevity of

the vaccine data? Like how do you do a study that would sort of show the booster benefits given you've got the 10-year efficacy data of up to 90%?

Lizzie Champion Executive

Yes, it's a great question, Michael. So the way we're thinking about this, and again, I'm going to restate some of the stuff I've said, but we think it's highly likely that the booster strategy won't be consistent across all patients. And we know that we're seeing some differences in terms of immunocompromised patients. So that could be somewhere around 10% of our patient pool. But if we see an increased waning in a broader break than that to an increased risk patient group, then of course, that number becomes bigger.

We are yet to engage with regulators on this, and it's important to state that.

And actually, as of yet, we are waiting for the data to further inform. So we continue to track through long-term follow-up. We have the 10-year data as you stated, as of next year, we have 12-year data available . And that will inform how we then engage with regulators and in terms of the positioning for Booster. But the main point, I think, that's important to take away is that you shouldn't think about a patient is the same.

We believe that we will be able to find a readthrough, which doesn't require us to follow an efficacy study that will get us there to boost within an appropriate time frame. And I would say the last comment is, remember, that we have 5 years post launch. So despite the fact we have 10 years as a long-term follow-up data, we're still quite early. We have a runway ahead of us to bring these to through.

Tony Wood Executive

And, you might also just comment as well as which I fully agree with, but we also need to understand the nature of breakthrough as well within that population, which is, again, Michael, yet to be properly qualified. Lizzie, do you want to just finish up on that?

Lizzie Champion Executive

Yes. So Tony, what you're referencing is the long-term data so far, what we need to understand better is just the severity of those breakthroughs. So at the moment, we're seeing numbers of breakthroughs, but what will become important to further categorize the need for booster which populations is the severity of breakthroughs and how they show up.

Mick Readey Executive

Excellent. I guess we may have time for one further question if somebody would want to raise their hand. But I can see. Is that Emmanuel you can unmute and fire away.

Emmanuel Papadakis Analyst

And maybe just a follow-up on the peak penetration levels you expect to achieve in the U.S. given your comments around 30% penetration and 85 million remaining, how realistically do you expect to get into that? And at what point do you think you reached a tipping point whereby you've start to slow down significantly in terms of penetrating that catch-up call.

Lizzie Champion Executive

Yes. Thanks for the question, Emmanuel. So I think I referenced, if we look at other adult vaccination analogs, so let's say, flu, pneumococcal, all are significantly north of 60%. So we remain absolutely confident that we will get to the 60% penetration. So from the 30%, I think we're actually somewhat a little bit north of 30% now, but confidence will get from 30% to north of 60% penetration.

Mick Readey Executive

And I think we may have time for one more. Tim, did you have another question?

Timothy Anderson Analyst

Yes. On Bepirovirsen In all comers, it didn't make a difference when you added a nuke or not. So in [indiscernible] treated patients you had functional curates that were -- was about the same 9% to 10%. I'm wondering why that would be the case. I know that by certain subgroups within that, you had higher response rates but why in all comers would it not really make a difference to have nuke's background?

Christopher Corsico Executive

So thanks for the question, Tim. It gets to the fact that nukes don't clear surface antigen and what we have seen is that for Bepi, the best responses of those patients with surface antigens at baseline 3000 and below, which gets to our discussion about why we believe to get those patients with surface antigen levels above that at baseline, we're going to need to talk about combination therapy. But it is important to note what the NAs do is suppress DNA, but have no impact on service antigen.

Mick Readey Executive

Excellent. Or did I see 1 further question? No, I think so. Hopefully, you've now got about sort of 10 minutes to join the next breakout session. Hopefully, you have details for that on the landing page.

I'd like to thank each of our panelist and for everybody who's dialed in for this session. Thank you very much, and thanks for your interest in GSK, and you can now please disconnect. Thank you very much.

Frannie DeFranco Executive

Hello, everyone. Welcome to this breakout session focused on delivering health impact at scale. I'm Frannie DeFranco from the Investor Relations team. And today, I'm joined by Deborah Waterhouse, CEO of ViiV Healthcare and President of Global Health at GSK; and Dr. Thomas Breuer, Chief Global Health Officer.

Here is our usual safe harbor statement. The purpose of this session is to provide you with an overview of our work to deliver health impact at scale. Deborah will give you a short presentation. And as always, we'll have plenty of time for you to ask questions at which point she'll be joined by Thomas.

With that, I'll hand it over to Deborah.

Deborah Waterhouse Executive

Thanks, Frannie. As a global biopharma company, we know that our ESG strategy supports our sustainable performance and long-term growth. Specifically, we see the S an area of global leadership for GSK with our proven expertise in prevention and infectious diseases. This is why we laid out our bold ambition to positively impact the health of more than 2.5 billion people worldwide, including more than 1.3 billion people in lower-income countries that are often disproportionately affected by infectious diseases. And while last year, we announced an investment of GBP 1 billion over the next 10 years to accelerate R&D led out of the global health research hubs in Siena and Tres Cantos dedicated to infectious diseases but disproportionately impact lower-income countries.

Alongside this work, we also developed access and equity strategies across our commercial pipeline for vaccines and medicines that target priority diseases most relevant to global health.

As Emma has said, we are focused on getting ahead of disease together by using our science, technology, talent and partnerships to deliver health impact, reducing the global health burden whilst also contributing to the sustainability of GSK something that I will talk about over the next [slide]. One of the important benefits of being a global company is the ability to reach people at enormous scale. And I'll expand on just a few examples of how we do this. Earlier this year, through our immunization partnerships, we reached a milestone of 1 billion vaccine doses to Gavi contributing to the expansion of immunization programs in low-income countries. As WHO states that after clean water, vaccination is the single and most effective public health intervention in the world.

And by working with partners like Gavi, we can expand into sustainable access and strengthen health care systems. We're also passionate about the impact that we can have on neglected topical diseases or NTD. And the disproportionate burden they have on some of the world's poorest communities, we remain committed to the elimination of lymphatic filariasis globally and our vendors or donation program has supplied more than 11 billion tablets, driving the elimination of LF in more than 18 countries.

The way in which we leverage partnerships is also evident in our work in B. Today, approximately 38 million people live with HIV. The vast majority in sub-Saharan Africa, where many people live on $1 or $2 a day. We are proud of our long-standing partnerships with the Medicines Patent Pool and have agreed the most comprehensive set of voluntary licenses of any company for our antiretroviral dolutegravir. As a result of these licenses, around 21 million people, representing just over 80% of people living with HIV across 122 low and middle-income countries have access to genomic formulations and dolutegravir basements.

In parallel to delivering significant impact for underserved people in low-income countries, our work creates tangible opportunities to create value across GSK. Let me share some examples of how we do well by doing good to highlight this. The platform technologies developed as part of our global health R&D have in turn supported the development and commercialization of the other assets in our pipeline specifically the AS01 adjuvant, which

was the result of our malaria vaccine R&D, and that is now used in Shingrix and Arexvy. Through the FDA's priority review scheme, the approval of tefelicrin, our medicines so radical cure of key buybacks malaria and not a priority review voucher that enabled us to bring forward the launch of ViiV product in the U.S. by 6 months.

And our investments in pediatric reformulations of dolutegravir supported the extension of our dolutegravir patent protection by 6 months, and I can announce today that dolutegravir has been granted pediatric exclusivity by the FDA, extending the patent to 2028 in the U.S. We will follow the same approach for cabotegravir. And back to the point I made earlier about the scale of our impact, supplying large volumes of vaccines through partners like Gavi provides efficiencies in manufacturing, which lowers overall cost of goods.

Over the next few slides, I'm going to walk you through some of the programs we are working on today that we believe will deliver significant health impact. In many resource pool settings, the greatest barrier to treating and preventing HIV remains access to affordable medicines. Within 6 months of [indiscernible], cabotegravir long-acting for HIV 3 exposure prophylaxis or prep being launched in the U.S., we were proud to announce a new agreement with the medicines paying for granting voluntary licenses to this innovative long-acting prevention medicine. In March this year, sublicenses was signed with 3 generic manufacturers who will help enable access across 90 countries.

It's also important that we don't leave behind those who are living with HIV. As we know, HIV disproportionately impact some of the most vulnerable populations, including 1.7 million children, 99% of whom reside in low and lower middle income countries. In response, we've created dissolvable formulations of our key medicine dolutegravir, increasing usability and accessibility for children and their caregivers. We're delighted that around half of children now on treatment are taking a generic version of our disbursable formulation of dolutegravir. And looking to the future, we are committed to developing new and innovative age appropriate formulations of our medicines for children, including our long-acting injectable products.

Another example I want to share with you is our work in malaria. Malaria is a disease which continues to take the life of the child under the age of 5 every minute in Sub-Saharan Africa. With our partners, we've developed 2 products for the prevention and treatment of malaria, the world's first vaccine against malaria, Mosquirix and the single-dose radical cure for P. vivax malaria to [indiscernible], which is due to rolled out this year. Mosquirix is prequalified by the WHO, a prerequisite for UN agencies such as UNICEF to procure a vaccine and through the malaria vaccine implementation program in Ghana, Kenya and Malawi, mean 1.4 children -- 1.4 million children have already received at least 1 dose of this vaccine, and this rollout continues.

To secure long-term supply and reach even more children in malaria endemic areas, a tech transfer is underway with Bharat Biotech of India. The acceleration of these tech transport -- this tech transfer will significantly increase production output of the vaccines with GSK continuing to supply the ASA-1 adjuvant to Bharat. This tech transfer illustrates our model of sharing the responsibility of bringing innovative medicines and vaccines to patients. Taking this approach ensures GSK can focus on new development of innovative candidates.

And finally, I'd like to talk about tuberculosis. TB should be preventable and curable, yet it is the second leading infectious disease killer after COVID-19. In TB prevention, we have delivered proof of concept of the M72/AS01E vaccine, which demonstrated significant efficacy in a Phase IIb trial. The results were described by the WHO as unprecedented in decades of TB research backing research and an important scientific breakthrough. M72/AS01E could become the first new vaccine to protect against tuberculosis in more than 100 years and the first to show significant efficacy in adolescents and adults.

The Bill & Melinda Gates Research Institute, Gates MRI, obtained a nonexclusive license from GSK for continued development of this vaccine below and lower middle income countries and now has the primary responsibility for the ongoing development, including a Phase III efficacy study.

Importantly, this license does not impede GSK's ability to commercialize the vaccine in upper middle and high-income countries, including China, where TB remains a public health concern. Beyond our vaccine, we aim to change the treatment paradigm in TB and tackle the growing issue of antimicrobial resistance. Since current treatment options can have serious negative impacts on patients' lives, we are developing in partnership with several potential -- we are developing in partnership several potential first-in-class medicines for shorter and simpler treatments. There remains a need for multi-drug regimens which means collaboration is essential to get ahead of TB, and we are industry leaders in multiple -- multisector research consortia to advance their development.

Before I close, I'd like to emphasize how proud we are to prioritize our commitment to getting ahead of infectious diseases that disproportionately impact lower income countries. Our work in this space has been recognized by the Access to Medicines Index, which has ranked us as #1 since the Index's inception in 2008. We are very proud to be leader in this space, and we know that our employees are proud to. In fact, in 2022, our annual company-wide survey showed that our long-standing commitment to global health contributes to why colleagues are still proud to be part of the GSK organization with the vast majority of colleagues believing that GSK is ambitious for patients and GSK is committed to making its products affordable and available to people around the world.

With that, I will wrap up the presentation and pass back to Frannie for Q&A. Thank you.

Frannie DeFranco Executive

[Operator Instructions] So do we have any questions [that left] to take them? Okay. Great. It looks like we do have 1 that's come through. Thomas, thank you for coming on video.

So this question is actually for you. We see that we have the Chief Global Health Officer here with that as well, would love to hear a little bit about his role in how he's [indiscernible] global house. So let's come to you, Thomas, to give some background there.

Thomas Breuer Executive

Yes. Thank you. So as part of our ESG agenda to reduce health inequality in low and low middle-income countries, focusing on infectious diseases, we essentially have a 3-pronged approach. We have a group of roughly 200 people exclusively focusing on global health. So

we have 2 R&D units, 1 in Spain, 1 in Italy, 1 is exclusively focusing on developing new medicines, malaria medicines, TB medicines, medicines against neglected tropical diseases.

And on the other side, we have a similar unit in Italy, which exclusively focuses on developing the new vaccines against strictly speaking, on global health vaccine. So that is R&D.

Then we have another group which is access. So this unit is accountable for product GSK owns and has in the market to make them accessible to low and low middle income countries. Examples are the Gavi vaccines, numbers were mentioned by Deborah. We have a huge [indiscernible] donation program against [indiscernible]. So this is access to new malaria vaccine ports into this category as well.

And then we have a smaller unit which works on capacity and capability projects mainly in Africa, but also in other countries. We work, for example, with Safety Children or [indiscernible] another organization where we focus on TB. Maybe another point Deborah briefly alluded to this. So obviously, we want to do good in developing countries because it's part of social responsibility, and we are very strong in this. But sometimes it happens that what we do in global health has impact on our commercial side.

An example is that the adjuvant AS01 was first tested in the malaria trials and uses the same adjuvant now in Shingrix in our recently approved RSV vaccine. When you provide vaccines in high-income countries, if you have high volumes for low-income countries, your overall economics of scale goes up and the cost of goods for all vaccines essentially goes down.

Then we have the FDA vouchers for global health medicines and vaccines, [indiscernible] is a good example where we got the voucher, the voucher was used by ViiV together HIV product on the market in the U.S. 6 months ahead of time. So there are interlinks between what we do in Global Health on the ESG agenda and commercial activities.

Frannie DeFranco Executive

Thank you, Thomas. That was very helpful. Maybe the second question that's come in around MPP agreement. So how does data get collected around reach for MPP agreements? And so this is a medicine patent pool [indiscernible] listening.

Who is responsible for this? How is it happening? I think a little bit about tracking and responsibility once it goes with MPP?

Deborah Waterhouse Executive

I can answer that 1 because it's more in the HIV space. So we've had a long study relationship with the Medicines Patent Pool, both on dolutegravir and now on cabotegravir. So what happens is we issue kind of voluntary licenses, a vast majority of which are royalty-free. The MPP then awards those licenses to generic manufacturers, they are responsible for tracking then the number of people in lower middle-income and low-income countries that actually receive those medicines. And so we get -- we talk about the fact that the 28 million people globally that are on an antiretroviral, 21 million are in least developed countries on a dolutegravir-based regimen, and that data comes from the MPP.

It's fully verified by them, and then we were able to publicly share that. And we've got an

incredible partnership with the MPP. At the moment, we're all working very hard on ensuring that cabotegravir, which could really change the trajectory of the HIV epidemic in Sub-Saharan Africa. We're working very hard through the MPP to ensure that the generic manufacturers that have been selected, that the tech transfer goes fast and smooth and that we're able to release significant volumes of product from those generic manufacturers into the marketplace as quickly as we can. There's likely to be a 2- or 3-year gap.

So we will -- we've made a commitment that at a not-for-profit price we will bridge between now and when the generics come on stream. But again, MPP awarded those voluntary licenses, which are royalty-free and then they will track how many people benefit from cabotegravir for prep. So that's how it works.

Frannie DeFranco Executive

That's very helpful. I do see a number of people on the line that I know your names, and I know that you're not shy. So while I'm happy to receive e-mails would also love the interaction. So if anyone in this session does want to raise their hand, I'd be happy to come to you. I know there are some local investors that are here.

If not, I have 1 that I think would be helpful for us to sort of give an overview of how our approach to Global Health ties in with ESG in general. So Deborah, I think this will come to you. But can you talk about GKS's approach to ESG and some of the things that you talked about in the Global Health space and how it connects from a health impact and business perspective?

Deborah Waterhouse Executive

Yes. So ESG for GSK broadly, is an integral part of our strategy. If we want to attract investment, if we want to demonstrate that we are a company that has a long-term sustainable future we believe we have to do well financially, obviously, but it's also important to be responsible from a doing good perspective. So we ensure that we have 6 kind of key areas that we focus on, access to health care, global health and health security, environment, diversity, equity and inclusion, ethical standards and product governance. So we basically weave those areas into how we run our business every day.

And so the work that we do from a health impact perspective, both through ViiV and through GSK's Global Health is a real contributor to the social part of that agenda, which is in the main around access to health care but also about Global Health and Health Security. And a lot of what we've talked about today, Thomas is giving great examples of where our medicines and our vaccines are having a huge impact in many low middle income countries. And at a macro level, the way we talk about this is that we say by 2030, we will have impacted the house of 2.5 billion people around the world. 1.2 billion will be through what we do in our commercial market and then 1.3 billion will be through all of the work we do through global health and the work that ViiV does with the MPP, et cetera, that will reach 1.3 billion. That really sets us apart, I think, from many other companies because we're very, very explicit about the goal that we're aiming for.

And then we're very, very clear that it's an integrated part of our strategy overall in delivering against that ESG agenda. And I think investors really respond well to that because you want

to have a company that's financially successful, giving a good return, but it's going to be sustainable over the long term, and that is obviously where the ESG part comes in. So we're very focused on it and it's an integral part to how we run our business and our goal is to reach 2.5 billion people in terms of impacting their health over the next 10 years.

Frannie DeFranco Executive

Okay. That's good. Neil, I see that you have a question, I'm going to allow you to talk. And hopefully, you can come off mute and ask your question.

Unknown Analyst Analyst

Can you hear me?

Frannie DeFranco Executive

Yes, we can.

Unknown Analyst Analyst

Yes. I just -- obviously, it's great to see GSK making so much progress. In terms of the clinical trials, obviously, you need a number of volunteers to trial out these new drugs. Is that possible to get that number going forward? Because I think you're struggling at the moment, don't you, to recruit?

Deborah Waterhouse Executive

So I can give an answer for HIV, and then I'll pass to you, Thomas, to talk about Global Health more broadly. So when we undertake our HIV clinical trials, we have a large global footprint. We make sure that we represent all the populations across the world that are either living with HIV or have the potential to acquire HIV depending on what sort of study it is. And we find that those studies recruit fairly rapidly, particularly as we work often with partners, so I'll give you an example of the HPT in [indiscernible] studies that we did for HIV, women study, which was around 3,000 women who were at risk of acquiring HIV was totally done in Sub-Saharan Africa that recruited quickly. And we had quite profound results from that study, as you know, came out to superior versus standard of care.

So in HIV, actually all settings that we operate and find that we're able to recruit relatively rapidly despite the fact that we're very specific that the people who we enrolled in the trials must be diverse and representative of those people who are living with HIV or at risk of acquiring HIV.

Thomas, do you want to talk about some of the studies that we've got ongoing in Global Health?

Thomas Breuer Executive

So I cannot spontaneously give you an overall number, but we have a few around 6 clinical trials ongoing on the vaccine and the medicine side there in Phase I and II, so recruitment is in the hundreds. There's no problem recruiting patients. But because these vaccines and medicines will ultimately be used outside Europe and in the U.S. We have to test these

vaccines in countries where they will be used in the future. So before these trials start, we have to invest in facilities, making sure the right investors approach.

So that is slightly different from Global Health. But then when you go into Phase III trials, especially on the vaccine side, the trials are rather large. If I use the latest example of the TB trial, which will be done in collaboration with the Gates Medical Research Institute, it's a trial of 26,000 patients. So these are big trials, but recruitment is usually fairly well organized, and I don't anticipate any problems there.

Frannie DeFranco Executive

That's very helpful. And this is a nice time, I think, to plug that we did an investor education event about clinical trial diversity and the importance of that Dr. Kim Smith from the ViiV organization and then also our Head of Clinical studies who was really fantastic, Alberto Fernandez, that's on our website.

We've had another question coming around the Access to Medicines Index. GSK has ranked #1 for a number of years, how are you going to retain this position? What is the future for GSK in this index?

Deborah Waterhouse Executive

Thomas?

Thomas Breuer Executive

Yes. So I always start when I talk about the Medicine -- the Access to Medicine Index. This is not the primary goal of GSK. We are trying to do the social responsibility activities with HIV drugs as well as with medicine and vaccines on the GSK side. So that's the primary goal.

And it is very, very nice and rewarding to see that an independent organization, which is funded by investors, the Gates Foundation, et cetera, independently has judged over the last 8 cycles to put GSK as #1. But if you follow these activities closely, you might have noticed that over time, the top 3, 4 companies have become fairly close. So the difference between the first and the second and the third is rather small now, which I could also claim as a success of GSK because we have put the entire field up. I think it's very good that more and more companies invest in that space and want to shine. So we welcome the Access to Medicine Foundation and their work and are obviously happy that we have so far covered the #1 place.

Thank you.

Frannie DeFranco Executive

Okay. Fantastic. And at this point, I think that we're going to move back into the next session. So you have approximately 15 minutes to join the next virtual breakout session, which start at 3:15 British time and 10:15 Eastern Time. Details are available on the Zoom events landing page or via the e-mail you received.

All the presentation and event recordings from each of the breakouts will be available after. So obviously, we've made it so you can attend 2 sessions. Thank you so much for attending

our Global Health -- health impact session right now. I'm going to close this room now, but looking forward to seeing you all at the Q&A at the end. So thank you very much for your time, and we will see you later.

Goodbye.

Jeff McLaughlin Executive

Okay. We are just congregating here in the breakout session on seasonal respiratory viruses. Hello, everyone. Welcome to this breakout session focused on seasonal respiratory viruses. I'm Jeff McLaughlin, from the GSK Investor Relations team.

And today, I'm joined with Phil Dormitzer, who is the Global Head of Vaccines R&D and Christi Kelsey, who is the Global Head of Vaccines Commercial and Luke Miels, our Chief Commercial Officer, is also with us today for the Q&A portion. You'll see on Slide 2, our usual safe harbor statement. And as a reminder, this session is being recorded. We move to Slide 3, just to give you a purpose of the session, so you have a chance to ask questions. And first, Phil and Christi will share a bit about some of the exciting work that we're doing specifically to help prevent seasonal respiratory viruses.

So with that, I'll hand over to Phil, who will pick up on Slide 4.

Phil Dormitzer Executive

Thanks, Jeff. So GSK has pioneered novel research methods and technologies to help protect people from infectious diseases for the past so many years, and we have a strong track record of successful commercial execution. What are we referring to when we talk about seasonal respiratory viruses. By seasonal, we mean respiratory viruses that typically circulate around the same time every year. And today, we'll focus on RSV, Influenza virus and SARS coronavirus 2, the virus that causes COVID-19.

Respiratory syncytial virus or RSV, has been talked about a lot lately, one reason because it was a very bad RSV season this past year in 2022, 2023. And second, for the first time ever, we now have vaccines approved to help prevent this common virus which can nevertheless be devastating, especially for certain adults who have weakened immune systems or who have comorbidities as is the case for many older people. Each year in the U.S. RSV leads to approximately 177,000 hospitalizations and 14,000 deaths from adults 65 and older. Further, adults with underlying conditions are more likely to seek medical services have higher hospitalization rates than adults without these comorbidities.

According to the CDC, more than 90% of adults hospitalized for RSV of underlying medical conditions. Now Influenza is caused by another common respiratory virus, and this one infects nearly 1 billion people annually that can lead to severe complications, including pneumonia, heart failure and death. And of course, SARS coronavirus 2 has caused over 750 million confirmed cases of COVID-19 worldwide and has caused millions of death. One important distinction among these 3 seasonal viruses is that unlike Influenza virus and SARS coronavirus 2, RSV is very stable genetically. It comes in 2 subtypes A and B, but it does not change over time with anything like the rapidity of Influenza virus or SARS coronavirus 2.

So we do not anticipate that regular strain changes will be needed for the RSV vaccine. I'll now pass on to Christi, who will outline the opportunity.

Christi Kelsey Executive

Thank you Phil. We'll go to the next slide, and thank you, Jeff, for the intro. So RSV, obviously, as Phil mentioned, a lot of discussion about RSV. This is our newly approved RSV vaccine for older adults. And this is approved based on exceptional efficacy.

First of all, in our clinical trial, RSV Arexvy demonstrated an impressive 94.6% efficacy and people with at least one comorbidity and 82.6% overall efficacy against lower respiratory tract disease caused by RSV. Now what's important here, especially when we think about patients with underlying medical conditions, is these are patients that suffer the most, these are the patients that have the highest burden to the healthcare system. And talking with our customers because naturally, we have been approved by the FDA for over a month now. Our customers do see this as a key differentiator for Arexvy. Our profile, we feel, is very strong, and we look forward to your questions there.

We are aiming for market leadership based on the Arexvy profile, and this will be a multibillion sales potential vaccine, which further builds, as you heard from both Emma and Tony at the setup on our very strong presence in adult vaccination. So if we go to the next slide, last week at the CDC's ACIP Committee meeting, the Advisory Committee on immunization practices, we presented the much-anticipated Season 2 data indicating that Arexvy provides protection over 2 complete RSV seasons. Importantly, we also saw a consistent tolerability profile. Importantly, it's also of interest that the GSK follow-up period was for 18 months. Because of the efficacy data I mentioned before and the continued efficacy demonstrated over 2 complete seasons.

We now have a recommendation to use a Arexvy for the prevention of RSV disease in adult age 60 and above with shared clinical decision making. Now what this means is in the U.S., over 77 million older adults now have access to this vaccine and they have access ahead of the upcoming RSV season. If you think about our life cycle management program, we are just getting started. We have a very robust life cycle management plan with additional data updates and filing later this year. This will include our Flu Co-Ad data, which includes adjuvant and high dose.

This again will supplement the Co-Ad data that we already have in our label. And the Phase III data we will have later this year for our Phase III study in 50 to 59 -- in older adults 50 to 59 years of age. We also expect additional regulatory decisions in the back half of the year. So for our current recommendation for patients 60 and above, our launch efforts are very well advanced. Stock is in the distribution center, and we are ready to go.

So Phil, I'll pass over to you for our flu program.

Phil Dormitzer Executive

Thanks, Christi. So currently available flu vaccines are suboptimal partly because the viral antigens drift in the circulating strains. They even drift sometimes between the time that a manufacturing campaign for a given season starts and when the vaccines are administered.

So there's a high risk of mismatched antigens. One of the key reasons why you see such variability in the efficacy of current flu vaccines.

Now mRNA vaccines have the potential to disrupt the flu market which is estimated to be more than GBP 8 billion by 2028, mRNA can be manufactured quickly and easily, and it can be readily adapted to keep up with the changes in the virus which makes it an ideal technology corresponding to emerging and changing flu strains. Along with our collaboration partners at CureVac, we announced preliminary positive Phase I data from monovalent flu mRNA vaccine that showed a strong functional antibody increase at the lowest dose level tested and good tolerability at much higher dose levels. We're now developing based on this platform, on next-generation multivalent mRNA flu vaccine that can be used to protect against multiple influenza strains. The Phase I/II trials are underway. And we're encouraged by what we've seen thus far with the CureVac platform, we look forward to the multivalent data by the end of 2023 or the beginning of 2024.

Next slide, please. We're also pursuing a SARS coronavirus 2 mRNA vaccine using the nucleoside-modified sequence optimized CureVac platform which we believe has the potential to combine strong immune responses with an acceptable tolerability profile and the tolerability will become increasingly important for differentiation as we move beyond the pandemic and into the post-pandemic era, where consumers will want something better tolerated than the current COVID-19 vaccines. With this, we're well positioned to introduce mRNA combination vaccines to help protect against these variable seasonal respiratory viruses. And this could lead to more convenient and effective patient vaccination schedule and the potential for higher immunization rates. Next slide, please.

So in summary, key upcoming events include launching Arexvy and building further clinical evidence to support its profile. Those next steps include additional flu co-administration data. Phase III data in 50- to 59-year old adults, including those at high risk and further regulatory decisions like the decision we saw recently in Japan. On mRNA, the focus is on developing an optimal platform for multivalent and a combination of seasonal respiratory disease vaccines with ongoing work to support a profile that can achieve need efficacy with good tolerability. As a reminder, we look forward to the multivalent data by the end of 2023 and for the beginning of 2024, and we're committed to developing innovation vaccines that can help protect people from respiratory viruses, building for our long and successful history in both vaccines and respiratory health.

As our pipeline emerges, we can continue to make significant and positive contributions to help prevent infectious diseases worldwide. And now we'll move to the discussion, and I'll hand it back to Jeff to moderate the Q&A.

Jeff McLaughlin Executive

Great. Thanks, Phil. We'll now move to the Q&A. [Operator Instructions]. As I mentioned earlier, Luke Miels, our Chief Commercial Officer, has also joined our breakout session here to ask -- to address additional questions that may come up.

We will now move on to the Q&A portion, and I'll go to Graham Parry. And Graham I'm going to allow you talking privileges now, and you can just unmute yourself.

Graham Parry Analyst

So just on Arexvy. So the recommendation from ACIP was for shared clinical decision-making in a single dose only. I guess, can I just check how that was sort of compared to your original expectations? And to get a second dose or continual dose regimen, do you think you have to go back to have another ACIP meeting to recommend a repeated schedule. There were certainly some comments at the ACIP meeting from some participants sort of arguing, well, if it's single days, I'll have to -- I'd have to sort of give this when they're in the 70s to get best protection.

So do you have an uphill battle now in terms of commercializing this just given those 2 factors from the ACIP meeting?

Christi Kelsey Executive

Yes. Thanks, Graham. Thanks for your question. It's Christi here. So I think maybe a couple of clarification points.

So we were never expecting a recommendation on the frequency of vaccination at this ACIP meeting. In fact, why ACIP was keen to see the second season data is, of course, to answer the question of is your efficacy durable, and we showed very clearly that the efficacy is durable over 2 seasons and also to answer the question about safety. Do you have a consistent safety and tolerability profile. We wouldn't expect a recommendation on revaccination until we actually submit that through a supplemental BLA and we would expect them to want multiple seasons of data, probably minimum 3, 4 seasons of data before that type of recommendation is made. So just -- and Phil can provide some context on the time line for that.

As far as shared clinical decision-making, I mean, for us, we're very happy to have this recommendation. It means that you have over 77 million people that are eligible for this vaccine. As far as the shared clinical decision-making approach, we're very familiar with us from our work with Bexsero. It means we just need to work hard to continue to raise awareness, but because of a lot of the work that has already been done, in fact, 90% of HCPs are telling us that they're ready to recommend and about 64% of consumers have told us that they're actually ready to request a specific vaccine. So not a surprise as far as the market opportunity and recognition that we'll need to have additional data to provide clarity on the revaccination recommendation, which we wouldn't have just after 2 seasons of data.

So Phil, I don't know if you want to share how we're continuing to look at that question.

Phil Dormitzer Executive

Sure. We always anticipated that we would hit back to ACIP after we see data from a third RSV season. In addition now, having seen that you really don't need a boost after a single season and you don't get much of a boost either, but we're going to examine the dosing interval. So we want to see what a boost looks like after 2 seasons gap from the first immunization and probably after 3 seasons gap as well, it depends a bit on what you see after 2 seasons gap. So we will continue to gather data through at least one more season, and we anticipate going back to ACIP with additional data.

Graham Parry Analyst

Can I just double check that was all those revaccination time lines were all prospectively designed into the original Phase III trial design?

Phil Dormitzer Executive

The original design was that we would give 3 annual doses versus 1 dose and then just watch them. So we are responding to the data we've seen and saying that it's probably -- and this still needs to be discussed, but it probably doesn't make a lot of sense to give another annual dose at this point. We're probably going to get a lot more useful information if we look at speed -- what it looks like to space out those dosing intervals.

Jeff McLaughlin Executive

Great. Thanks, Graham, for the question there. We'll move along. The next hand raised is from [indiscernible]. So I will open -- allow you to talk now, if you can unmute yourself and ask your question.

Unknown Analyst Analyst

Perfect. I just wanted to ask, you gave time lines for some M&A feedback is that look a little bit longer and perhaps more realistic than other than the space. Could you outline your expectations for regulatory requirements to get this approved?

Phil Dormitzer Executive

Sure. So you probably -- you may have seen some of the data that Quebec has released a looking at a monovalent flu vaccine. The purpose of that was to really first establish the platform, a platform where you could get strong immunogenicity with low doses, but good tolerability with much higher doses. We're now in the clinic testing a variety actually of multivalent formulations. Those data should come out the end of 2023, beginning of 2024.

Obviously, we'll select the best formulation and then move on to Phase III trials. So this should be a pretty -- there'll be a number of data points that we get as we start to look at first multivalent and then move on from there to start Phase III trials for flu.

Jeff McLaughlin Executive

Thank you for that question. We'll now move on to Emmanuel Papadakis. Emmanuel, I'm going to allow you to talk. You can ask your question. Apologies.

There you go, Emmanuel.

Emmanuel Papadakis Analyst

Okay. Be curious to your...

Jeff McLaughlin Executive

I think you're back on there, Emmanuel. Apologies.

Emmanuel Papadakis Analyst

Yes. I mean it may be intentional, but you keep in the -- what I was getting is I was curious to get your perspective on the potential or significance of a combined seasonal respiratory vaccine, i.e., RSV flu, potentially COVID. Do you think it has any role play now, given the multi-season data we've seen for the RSV vaccine, if so, which role potentially? And are you working on either in the form of combining your recombinant RSV vaccine within mRNA-based flu vaccine or indeed at an early stage of an mRNA-based RSV vaccine.

Christi Kelsey Executive

Phil, why don't you take the -- what we're looking at in the clinic, and then I can talk about opportunity.

Phil Dormitzer Executive

Sure. That sounds good. So we certainly are looking at combining the COVID-19 and the seasonal Influenza vaccine post variable viruses with annual immunization. The finding that the RSV vaccine appears to be -- is likely to be a more than one season vaccine makes, I think that combination still possible about -- but perhaps less appealing. But there could be other combinations at this point would be at the research stage.

And then Christi, should I turn to back to you for that.

Christi Kelsey Executive

Yes. I mean the only thing I would say is, of course, this is quite an active area, Emmanuel, as you can imagine, just looking at the vast clinical development plans in this space. I think we need to see the composition of revaccination, and we could start to see a market that has a blend of seasonal, kind of more rapidly mutating viruses and multi-seasonal for less stable viruses. So I think more to come, but certainly, a little earn more.

Luke Miels Executive

Yes. I would just add, look, I think Emmanuel, the opportunity for a triplet is gone. What was keeping me awake at night before the second season data is an mRNA triple, flu, COVID virus. I think the likelihood that we're going to see that is very low now just because of the constructive mRNA. And that's why our effort is focused on the doublet, the flu COVID proposition rather than the triplet.

And we see the RSV market has really been dominated by protein, creatin, adjuvant.

Jeff McLaughlin Executive

Thank you, Emmanuel, for the question. We're going to move along now. The next question is from [Zayne Ibrahim]. [Zayne], I'm going to allow you to talk, if you want to unmute yourself.

Unknown Analyst Analyst

So just back to RSV and looking at the second season data, so clearly a robust protection through the second season. But at the same time, we didn't see a benefit with the booster. So

just curious to know -- for your initial thoughts and why there wasn't a benefit even at the immunogenicity data suggested an increase both in antibodies and T-cell response. And perhaps tied to that, what is the base case now that you're assuming for revaccination in the [GBP 3 billion] peak sales target that you set?

Phil Dormitzer Executive

It's certainly a known phenomenon that you get a better booster with a longer interval from the initial immunization as immune responses wane, should get a better response. I think it's an empirical question how long is that best interval for revaccination? And so again, we'll kind of come up with an empirically based answer to that question. And my expectation is it's just a matter of waiting to the optimal interval to deliver boost.

Christi Kelsey Executive

Thank you for the question there. As far as our assumption, the price range that we've assumed. It assumes a 2-year -- every other year, a vaccination schedule based on the data that we have. And of course, we'll continue to see more data over time.

Jeff McLaughlin Executive

Thanks, Christi. Thanks [Zayne] for the question. We will now move on to the next question from Will Hamlin. Will, I'm going to give you talking privileges here.

Unknown Analyst Analyst

I've just got a follow-up on the earlier question on the regulatory pathway for mRNA flu and COVID. So are you -- it's not quite clear whether or not you're relying on trying to show efficacy stand-alone and get the approved standalone. And then once both standalones are approved, then you just show tighter levels basically are the same in the combo? Or are you trying to get registered approval for the combo? And if so, what would the comparator arm be in any trial?

Phil Dormitzer Executive

Yes. I think the pathway is to seek regulatory approval of the stand-alone and then of the combination for flu, there's a well-established accelerated pathway where you can actually get a license based on serology, achieving accessible HI titer and then with a demonstration of efficacy to follow. For COVID-19, it appears that Europe is going to accept immunobridging to current vaccines. The U.S. would like some sort of efficacy data, but that could either be from a prospective trial or a human challenge trial or potentially even real-world evidence once you license that in Europe based on immunobridging and then a combination, and we would anticipate that you could then immunobridge the combination are back to the stand-alone.

Of course, discussions are ongoing about all of these things, but that is the leading pathway that we're considering right now.

Unknown Analyst Analyst

Okay. And if there were competition kind of already there ahead of you, would that make any

difference to the approval pathway?

Phil Dormitzer Executive

Certainly being able to immunobridge to an existing licensed vaccine is helpful. And I think we really have cut up quite substantially, particularly in the flu area, we are seeing that with the published data from others on initial attempts as of flu vaccine where some of the responses weren't quite -- where they might be hoped to be and where there's fair amount of reactogenicity has really reinforced our strategy, again, the platform right first and then going in with a number of different formulations to really try to get something that really has both the immunogenicity and the tolerability that we desire. So I do think we're catching up in that regard. And it's great to be first out, but there's also some real advantages to be able to bridge to existing vaccines.

Jeff McLaughlin Executive

Thanks for the question, Will. We only have a couple of minutes left here. [Operator Instructions]. I do see one more question in the queue. It is from Graham and we'll come back around to you, Graham, just pause for a moment in case anybody else has a question before we give you a second shot.

And it looks like Graham has removed his hand. So I guess he withdrawing that question. So I think if no other questions, we can wrap things up. Does any -- Luke, any final remarks or comments from you before we go into the larger Q&A?

Luke Miels Executive

No, I think just one point earlier on the ACIP recommendation. I think going into it, we certainly were hopeful on a full recommendation, but we were expecting no support for the 60 to 65 zone or low support. So it's a bit of a wash to Christi's point, it's not insurmountable to navigate physician involvement. And I would argue, some ways it helps us, which I can expand upon in the next session. And we got a broader population in that 60 to 65 cohort.

So net-net, I think we left the field happy that day.

Jeff McLaughlin Executive

I do see one new question from [Zayne]. [Zayne], I'm going to give you a chance to ask your final question here in the last minute or so before we move back.

Unknown Analyst Analyst

Yes. Sorry, just one quick follow-up on RSV pricing, and I appreciate that yet to be finalized. But just in terms of what was presented to ACIP, you presented a base case of $270 versus Pfizer at $200 and again appreciate both are yet to be finalized, but how might that look in practice in terms of having to see vaccines with a similar recommendation albeit with your comorbidity data at different price points? How should we sort of think about that? Or should we think about that as a sort of moving targets still?

Luke Miels Executive

I think both companies are going to try and get as close as they can to each other. And contracted will start next week, and I don't think any company will want to disclose until the last minute. But yes, I think the range is that we've placed in both companies are probably likely to be adjusting based on what they learned from the other data set.

Jeff McLaughlin Executive

Excellent. We are stack up on time, and we really appreciate everybody participating in this breakout session. You have just a moment to flip over to the larger Q&A session. So details to do that are available on the Zoom events landing page or via the e-mail that you have received. But just wanted to thank our panelists and all of your questions from the attendees.

Thank you for the interest in GSK. You can please disconnect now and move over to the other session. Thank you.

Josh Williams Executive

Now I'm going to share my screen at the presentation. And I'm going to go from the beginning. Thanks. So thank you, everyone, for joining us today. Welcome to this breakout session focused on invasive bacterial and fungal infections.

I'm Josh Williams from the Investor Relations team; and then joined by Kumaran Vadivelu, Head of Vaccines Development, R&D; Rob Bowers, Head of General Medicines Commercial; and David Redfern, President of Corporate Development, who will be joining us for the Q&A portion of this call. On Slide 2 is our usual safe harbor statement. The purpose of this session is to give you a chance to ask some questions. So we will stop, but we will start with around a 10-minute introduction from Kumaran and Rob and some of the exciting work we are doing specific to bacterial and fungal infections. So Kumaran, over to you.

Kumaran Vadivelu Executive

Thank you, Josh. I'm thrilled to join you this afternoon to share some of the exciting work in Vaccines R&D. As a global healthcare company committed to finding new ways to prevent and treat disease. One of our focus areas is bacterial and fungal infections. On this slide, you can see some of the common infections that continue to significantly impact patients worldwide.

For example, vaccine-preventable diseases like meningitis and pneumococcal continue to hospitalize and kill people every year. In the U.S. more than 150,000 people are hospitalized from pneumococcal pneumonia every year. And even with antibiotic treatment, 10% to 15% of people infected with meningococcal disease die. These statistics underscore the urgent need for improved vaccines to address this pressing medical need.

Over to you, Rob.

Rob Bowers Executive

Thanks, Kumaran. So there also remains a significant unmet need for patients affected by common community infections like Urinary Tract Infections and vulvovaginal candidiasis, which I'll refer to as VVC. These diseases are amongst the most common infections that

women will experience, but their impact on quality of life for patients is often overlooked, especially given the burden of resistance and recurrence in these patients, combined with the lack of innovation for decades. For example, the lack of new oral options for complicated UTI means that patients with resistant infections have to be treated at a hospital with IV antibiotics. Over the next few slides, we'll give you an overview of our key pipeline products in this space, and then we'll open up for Q&A.

Please turn to the next slide. And back to you, Kumaran.

Kumaran Vadivelu Executive

Yes. Thanks, Rob. The first program I would like to share with you is our pentavalent ABCWY meningococcal vaccine. A vaccine designed for the broadest meningococcal disease coverage. Our 5-in-1 MenABCWY vaccine builds on the legacy of Bexsero, our market-leading meningitis B vaccine and integrates Menveo covering [ACWY] vaccine.

There is an opportunity to improve immunization rates among U.S. adolescents for MenB, which is currently only at around 30% penetration. Recently, we presented preliminary pivotal data on our 5-in-1 vaccine candidate, which met all primary endpoints demonstrating statistical non-inferiority compared to Bexsero and Menveo with an acceptable safety profile. On top of that, our pentavalent is the only investigational vaccine to have shown immunological effectiveness against a panel of 110 diverse MenB strains, which account for more than 95% of those circulating in the U.S. We are on track for a U.S.

regulatory submission in 2024 and our life cycle management efforts feature additional work to pursue global licensees and expansion into infant populations. We expect combination vaccines to drive incremental growth in the overall meningitis market by improving compliance and immunization rates. As illustrated in the table on this slide, the introduction of a pentavalent Meningitis vaccine for U.S. adolescence could potentially reduce number of required doses for those age 16 to 18. Please turn to the next slide.

Before the Affinivax acquisition, we had a gap in our vaccine R&D portfolio as we were limited in our assets for pneumococcal disease, a GBP 7 billion market opportunity. Despite the routine recommendations and widespread use of pneumococcal conjugate vaccines, we know there is still a considerable disease burden among older adults and young infants. Current conjugate vaccine technology limits potential coverage to 20 out of the 100 new serotypes and provide suboptimal protection for some serotype, such as serotype 3. The most successful next-generation pneumococcal vaccines will provide both #1 higher serotype coverage and broader immune responses. Referring to the bar chart on the right side of the slide, you can see that introducing a 24-valent vaccine developed using our MAPS technology, could boost coverage to above 60% of the disease, an expansion to a 30-plus valent formulation could increase coverage to over 90% of the disease.

Next slide. This figure represents the differences between MAPS technology on the left panel and conventional conjugate technology on the right panel. MAPS technology uses high-affinity biotin reserving binding interactions to present immunogenic epitopes of both pneumococcal polysaccharides and pneumococcal protein antigens to induce B-cell and T-cell responses for robust immune protection. B-cells initiate response to the pneumococcal

polysaccharides and B -- and T-cells respond to the pneumococcal protein antigens. MAPS offers to distinct advantages over traditional pneumococcal conjugate vaccine.

First, MAPS facilitates higher valency. This means that expanding coverage beyond 20 to 30 serotypes is a much easier proposition than with chemical conjugation. Second key differentiator is that MAPS complex is more immunogenic and also introduces an additional form of immunity, specifically T-cell-mediated pneumococcal-specific, anti-protein immunity, something that's unique to MAPS. Traditional glycoconjugate vaccines like PCV employ a protein carrier CRM197, that is unrelated to pneumococcal disease, and therefore, do not stimulate pneumococcal anti-protein immunity. Next slide.

This slide presents the results of Phase 2 involving older adults demonstrating the clinical proof-of-concept for the technology as well as MAPS 24-valent candidate which forms the foundation for proceeding to Phase III. We are confident that our vaccine candidate leveraging MAPS technology holds significant promise to reshape the pneumococcal vaccine landscape due to number 1, it's high valance. Number 2, robust anti-polysaccharide immunity, as shown in Phase II data presented on this slide, including higher response for most serotypes. And I would like to draw your attention to serotype 3, where we observed threefold increase against PCV13. Third, a broader immune response facilitated by inclusion of pneumococcal protein.

Collectively, MAPS technology attributes are critical for improved disease coverage and potentially enhancing efficacy against invasive disease as well as showing greater impact on mucosal diseases like pneumonia and otitis media. We are making progress in advancing our development, but the aim to be the first to market with the 24-valent vaccine. We expect Phase III trials for adults to start in 2024 and are targeting the launch of a pediatric vaccine before the end of this decade. Additionally, we are on track to advance our MAPS 30-valent-plus formulation into the clinic in 2024. At this point, I would like to pass the presentation over to Rob.

Rob Bowers Executive

Thanks, Kumaran. So in addition to preventing infections, we must continue researching and developing new treatments for bacterial and fungal infections, including those at the community level. ESBL-producing bacteria can negate the effect of commonly used beta-lactam antibiotics. As you can see from the chart on the top left here, rates of ESBL-producing bacteria are increasing in complicated UTI in the U.S. The majority of these bacteria are multidrug resistant to any oral treatment.

Hence, the reason they are deemed a priority pathogen by both the WHO and the U.S. Centers for Disease Control. Business estates IV therapy for a condition that would previously have been treated with oral therapy in the community setting. For VVC, our market research shows 8 CPs see 30% of their patients as complicated or challenging to treat due to the impact of resistance or recurrence with no other oral options for patients after fluconazole. On the right-hand side of the slide, you'll see where we've outlined what we see as the key criteria that are essential to developing a successful portfolio and becoming commercial space.

First, we're focused primarily on infections with large populations and significant unmet needs. By focusing on the portion of these patients with the highest unmet need, for example, patients with resistance or recurrence on existing therapy, which is about 1/3 per group. We have a portfolio with a potential to reach GBP 2 billion in peak year sales. Additionally, we're focused only on novel first-in-class assets that are differentiated and have efficacy against resistant pathogens. All of our assets is addressed or have the potential to address WHO priority pathogens.

This designation is an important signifier of high and increasing unmet need and is commonly used as a key qualifying criteria for future pull incentive policies that have been developed in the U.S., Europe and the U.K. designed to incentivize and reward antibiotic innovation. And finally, we know that bringing oral outpatient treatments for common community infections as strong commercial value. Which is aligned to outcome-driven impacts like reducing hospitalizations and reducing pressure on the hospital system. So we see a significant opportunity to lead in this space and to build a unique portfolio of first-in-class, best-in-class medicines with synergistic strategies.

This large unmet need in a market with decreasing competition match with our commercial and R&D capabilities in this space makes us confident that we will be a key leader in this area. With new policy initiatives and pull incentives emerging, GSK is well positioned for these significant upsides should they come to fruition. Next slide, please. So on this slide, you can see an overview of the anti-infective assets that we've invested in with near-term potential. All of these assets are novel or first-in-class oral options for community or outpatient infections with growing resistance.

Starting on the left with Gepotidacin. This is a first-in-class triazaacenaphthylene, or a triaza antibiotic, and its all distinct mechanism of action provides activity and broad coverage against most strains of e coli, including those resistance to current antibiotics such as fluoroquinolones and ESBL producers. In November, we announced that our Phase III studies were stopped early for efficacy following a preplanned interim analysis by an independent data monitoring committee. Data was then presented at [MID], demonstrating noninferiority against the most commonly used first-line treatment, nitrofurantoin, in both trials and additional superiority in one of the trials. Gepo demonstrated a consistent treatment effect in patients with the highest unmet medical need who are those with resistance, history of recurrence or aged greater than 50 years.

Now despite black box warnings and FDA guidance to reserve their use in UTIs only for patients with no alternative options fluoroquinolones are still commonly used as a second-line antibiotic in the U.S. with close to 25% market share. Gepotidacin has the potential to provide a valuable new treatment option that can displace fluoroquinolones, preserving fluoroquinolones used for other serious infections and in line with good antibiotic stewardship practice. Gepotidacin only needs to displace 1/5 of current fluoroquinolones use to become a $1 billion medicine in the U.S. we're currently preparing the U.S.

submission. Given the opportunity we see in this space and in order to build out a world-leading infectious diseases portfolio, we announced an exclusive license agreement with Spero Therapeutics for Tebipenem. This is a late-stage antibiotic that may treat complicated

urinary tract infections. Tebipenem has a clear U.S. FDA regulatory path to potential approval with Phase III clinical trials starting in 2023, following encouraging U.S.

FDA regulatory feedback on the proposed clinical trial. And finally, in March, we added a third asset to our portfolio. Through an exclusive agreement with Scynexis to commercialize and further develop Brexafemme. This is a novel approved antifungal medicine with a broad spectrum of activity against existing and emerging resistant strains of fungi. Including Volvovaginal Candidiasis and with potential invasive candidiasis.

Brexafemme has a distinct mechanism of action, whereby it kills the fungus as opposed to some antifungals, which inhibit fungal growth. It's the only oral antifungal U.S. FDA-approved treatment for VVC and reduction in the incidence of recurrent VVC. GSK plans to relaunch the VVC indication -- sorry, GSK plans to relaunch the VVC indication are underway. And we also have a Phase III program in invasive candidiasis underway.

Candida auris is an emerging multidrug resistant fungus cited as an urgent threat by the U.S. CDC, alongside other serious drug-resistant Candida species. We're developing Brexafemme to address this emerging threat. Next slide, please. So we're looking forward to the opportunities we have for our bacterial and fungal infection assets, including meningitis, Streptococcus pneumoniae and our anti-infectives portfolio.

On meningitis, we are working closely with regulatory agencies to review the complete Phase III data before U.S. regulatory submission in 2024. On pneumococcal disease, we plan to start our 24 valent vaccine Phase III program in 2024 and move our 30-plus valent vaccine into the clinic in 2024. And finally, on our anti-infectives portfolio, we're excited about the significant opportunity to lead in this space and to build a unique portfolio of first-in-class, best-in-class medicines with synergistic strategies. So with that, we will move to the discussion.

And Josh, I'll hand it back to you for the Q&A.

Josh Williams Executive

That's great. Thank you very much, Rob, and thank you very much, Kumaran. [Operator Instructions]. So got a question from Colin White. So Colin, I've given you permission to talk, please come off mute.

Colin White Analyst

Can you hear me?

Josh Williams Executive

Yes, loud and clear.

Colin White Analyst

Just a couple of questions from me. It's Colin White from UBS here. I just wanted to know what you thought of the Vaxcyte 24-valent data that was presented earlier in your -- and how you think your vaccine will be differentiated? And then secondly, if you could tell me with the time lines on the Candida orders with Brexafemme, when might that be -- When may that be able to be used to treat that? And what do you think the size of the opportunity is there?

That's all.

Kumaran Vadivelu Executive

Yes. Thanks for the excellent question. First thing is about our comment on Vaxcyte's results. First thing to note is Vaxcyte candidate was compared against PCV20, which is the less immunogenic vaccine. And on top of that, we did not observe clear statistical superiority of Vaxcyte compared to the current standard of care.

I would like to reinforce the key advantages of MAPS technology that will help to deliver potentially best-in-class vaccine, which are, number one, ability to make high valance. You have seen that with 24-valent data, 30-plus valent will getting to clinic in 2024. There are two more things I want to draw your attention to. First is strong antibody-mediated immunity against polysaccharides. I mean you can see in our Phase II data, we observed a threefold increase in response to serotype 3 compared to PCV13.

And that clearly surpasses current standard of care and the best -- the field -- pneumococcal field so far. Second one that's unique to MAPS technology. We think it's an x factor is the inclusion of native pneumococcal proteins to induce broad immune response, both T-cell and B-cell targeted against the protein, which could go on to have both an effect on serotype 3 as well as non-vaccine types. So collectively, we feel these features would position us to potentially deliver the best-in-class vaccine in the pneumococcal field. Your second question about the pediatric trial.

Colin White Analyst

Yes, I think was around the timing. And then it was the Candida auris for Rob afterwards.

Kumaran Vadivelu Executive

Okay. So we have just completed Phase I trial for the pediatric 24-valent vaccine candidate. The ongoing Phase II trial, which started in June 2022 is temporarily paused following an audit finding related to the fill and finish presentation of the vaccine. But I want to reassure you, we are very reassured by the Phase I data we have seen in this population. It validates the technology potential in young infants, and we are working diligently to resolve this matter as soon as possible to resume Phase II study.

Josh Williams Executive

Thanks, Kumaran. Rob, over to you.

Rob Bowers Executive

Yes. Thanks for the question. So the key study that we're using for invasive fungal infections is the [MARIO] study. That's active as we speak. It's an oral step-down study that's live, and we're expecting that to read out in early 2025, and we'll then be sort of filing after that.

To your point about how big an opportunity is that? At the moment, we see the bigger initial opportunity in the U.S. in the VVC space initially. But that the importance of the invasive fungal infection is not to be underestimated. And actually, ex U.S., that will be most likely the bigger opportunity.

Josh Williams Executive

Thanks, Colin. Just give it another moment if anyone else has got a raised hand. In the interim, unless Colin has left his hand up for another question, don't know if that's the case, Colin? That's fine. No worries.

Thank you.

In which case, one of the questions that we often get to the Investor Relations team and during engagements is kind of one for you, Rob, which is -- you've got the portfolio. We have the portfolio of 3 anti-infectives, and we've now kind of attributed this around 2 billion peak year sales potential, but people don't always necessarily understand why we're that confident in that level. So perhaps you could run us through some of the key reasons to believe in some of the key factors that are driving that kind of -- that estimate.

Rob Bowers Executive

Yes, sure. And I think I sort of shared these synergistic strategies. I think all 3 of these medicines share common factors. I think the first is that they all address large populations with these 15 million episodes of UTI in the U.S. every year.

There's 3 million complicated urinary tract infections. There's 10 million VVC infections. So these are large initial populations to work with.

And then what I also shared is there's very, very clear populations with important unmet needs. Generally, across all 3, you're looking at resistant populations or recurrent populations and resistant to recurrent to the existing standards of care. And therefore, what we're bringing with these medicines is essentially a unique option where no alternates exist.

So for example, in complicated UTI, 3 million cases a year, nearly 20% have this ESBL infection, which has no alternative oral option. And so with tebipenem, you've got the ability to introduce a medicine there, which means patients can get out of hospital quicker or prevent their admission in the first place.

So I think they all share those 3 factors in common. And if you've got economic tailwinds, like you have for tebipenem, it makes a real kind of commercial sense as well as addressing a really important patient unmet need.

Josh Williams Executive

That's great. Thank you, Rob. [Operator Instructions] And whilst people maybe consider what they want to ask, maybe, Kumaran, I'll go to you just quickly, just again, kind of similar question in terms of, what are the key reasons to believe that our pentavalent meningitis' candidate is going to be differentiated and grow the market?

Kumaran Vadivelu Executive

Yes. Thanks. We view the MenB component as the distinguishing factor between vaccines. We think the ABCWY components are highly similar across various products. So we feel confident that Bexsero's proven track record of robust clinical data, real-world effectiveness will be reflected in customers' preference when it comes to MenABCWY combination

vaccine.

And another reason to believe that MenABCWY will transform the space is today, the MenB vaccination coverage for 16- to 18-year-olds stands around 30%. And with the introduction of combination vaccine, we believe we can increase the coverage closer to what MenABCWY vaccine has achieved, which is around 60%. And that's what we see as a great opportunity to potentially double the number of people receiving MenB vaccine over time.

Josh Williams Executive

That's great. Thanks, Kumaran. Again, I'm going to make a call, see if there's anyone who would like to raise a hand and come off mute and ask a question. If not, we might actually call the session and give everyone a 5-minute break before the collective Q&A back in the main kind of plenary session. So I'll just pause for a moment there and give people the opportunity.

Okay. In which case, I think -- thank you very, very much to everyone for attending and listening to the presentation and to the Q&A. And I'd also like to extend a big thank you to our speakers as well for their great presentations.

You now have about 5 minutes before the group Q&A and the final Q&A session begins, which starts at 15:45 BST. Details are available on the Zoom Events landing page that you use to navigate to this event. And also, just as a reminder, all presentation and event recordings from each breakout session will be available on gsk.com.

So again, thank you very much to all the panelists, and thank you very much to all of you listening into the call. Thank you much, and have a great rest of the day.

[Break]

Mick Readey Executive

We'll just give it a moment for the attendees to go up. I can see a few people are joining, but in this one, we will have to be prompt. So what I'll do is -- yes. Let's get going. So thank you, everyone, and welcome to this breakout session focused on chronic viral infections.

My name is Mick Readey from the Investor Relations team. And today, I'm joined by Chris Corsico, SVP of Development; Lizzie Champion, VP, Vaccines Commercial for Shingrix; James Greenhalgh, SVP, Specialty Care, Commercial; and Tony Wood, our Chief Scientific Officer.

Slide 2 looks at our usual safe harbor statement. And the purpose of this session is to give you a chance to ask questions around our -- around some of the exciting work that we're doing specific to chronic viral infections.

At this point, I will hand the presentation over to Chris.

Christopher Corsico Executive

Thank you, Mick, and welcome, everyone, to this breakout session. Infectious diseases continue to pose a significant global health burden and threat despite the fact that there have been advances in therapy. Today, we're going to highlight 3 important chronic viral infections

where GSK continues to focus its efforts to address unmet medical needs: the first, herpes zoster virus or shingles, which 1 in 3 people will develop in their lifetime; the second, hepatitis B, a viral infection in more than 300 million people; and finally, herpes simplex virus, a lifelong and curable infection responsible for genital herpes.

It's now my pleasure to turn it over to Lizzie Champion, who will provide an overview of Shingrix and our excitement about this important vaccine. Lizzie?

Lizzie Champion Executive

Great. Thank you, Chris. Delighted to be here. So Shingrix is a flagship vaccine. And if I start with what the vaccine has delivered, which you can see on the left of the slide here, so the first and only shingles vaccine to demonstrate this kind of efficacy, so 97% efficacy in pivotal clinical trials and that efficacy sustained at more than 80% over 10 years and counting.

If I talk then to the performance to date, moving to the middle of the slide. So 5 years into launch and Shingrix has grown to be a GBP 3 billion product as of last year. And much of the early success we've seen with Shingrix, of course, has been in the U.S. where we've already reached 30% of the 120 million Americans who are eligible for the vaccine. That leaves around 85 million Americans still remaining unvaccinated, which shows the headroom we still have in the U.S.

If I then talk to the ex U.S. picture, which is an important part of our growth for Shingrix looking forward, we have accelerated launches fast, we are unconstrained on supply and, because of that, are well on track to be in 35 countries by 2024. And those 35 countries represent around 90% of the global vaccines market by value.

This geographic expansion is really starting to deliver significant growth, as you can see on the chart. So as of last year, over 1/3 of our Shingrix revenue is delivered ex U.S. and more than 50% of the growth came from outside of the U.S.

So looking ahead now, we are firmly on track to deliver our commitment to double Shingrix revenue, delivering GBP 4 billion by 2026. And we expect Shingrix to be a multibillion product through the decades. I wanted to share some thinking on opportunities -- life cycle expansion opportunities we have for Shingrix. And I'm going to touch on 3. So if I start with population expansion first, and I wanted to share some news that you might have seen already this week related to population expansion.

So as of yesterday, we announced an expanded indication for Shingrix in Japan for the prevention of shingles in adults aged 18 to 49, so 18 years and over, adults with that increased risk of shingles.

Another area of population expansion we're looking at is younger patients, so specifically, healthy people aged younger than 50. And specifically, I'm going to talk about the cohort of 40 to 49-year-olds. So this cohort is big. In the U.S., it's around 40 million people, and we know that there's an unmet need here. So we know more than around 100 cases of shingles per year in that cohort in the U.S.

alone.

And with the duration of protection that Shingrix has demonstrated, we are now able to consider bringing the benefit of shingles vaccination to this younger group. Currently, we're focused on better categorizing the burden of disease and the public health impact in this younger cohort in order to initiate discussions with regulators and public health bodies.

Second, booster. So again, referencing the chart on the left, you can see the phenomenal duration of protection and sustained efficacy that Shingrix has demonstrated over 10 years. But of course, what we can also see on the chart is some very limited waning of efficacy to date. So of course, we consider the future need for a booster.

Now what I wanted to say here is that it is reasonable to have seen that the need for a booster won't be the same across all patient groups. We've got some early descriptive data from immunocompromised patients. And what we see there is that we do see some breakthroughs earlier than 10 years. Now that immunocompromised patient group, we estimate to be around 10% of Shingrix vaccinees. But if we see a need in a broader at-risk group, so patients with broader comorbidities, that number will be significantly bigger.

So what we do is we continue to track efficacy over the longer term. We continue our long-term follow-up studies, which define the 10-year data, and that will inform the potential need for a booster and specifically in which populations.

And then lastly, I wanted to touch on some emerging science. So there is a very interesting, very contested growing body of evidence, which suggests shingles vaccination is associated with the reduction in the risk of dementia. This includes a recent observational study which has gained significant attention. Now to be clear, this study is not yet peer-reviewed, but it has gained, for good reasons, significant attention. And that study shows a 19% reduction in the risk of dementia following shingles vaccination.

It's emerging science, and there are significant unanswered questions in this space and as to what underpins the potential association. But of course, any risk reduction here is incredibly meaningful and therefore a reason for us to be excited and put significant focus. I'll now hand it back to Chris, who will share more on the exciting science we've seen on chronic hepatitis B, herpes zoster and herpes simplex virus.

Christopher Corsico Executive

Thank you, Lizzie. If I can get the next slide, please. Chronic hepatitis B infection is a viral infection of the liver that can cause both chronic and acute liver injury in disease. When the immune system is unable to clear the virus from the body, the virus persists in the liver and could be detected in the blood. There are approximately 300 million people living with chronic hepatitis B.

And chronic hepatitis B results in nearly 900,000 deaths per year related to liver complications such as liver failure and hepatocellular carcinoma or liver cancer.

All patients living with chronic hepatitis B must be regularly monitored because they are at increased risk of developing cirrhosis, liver failure or liver cancer. And that means even for patients who are feeling well, they need to continually be followed by their physicians to assess the underlying nature of the disease.

The desired goal of treatment is functional cure. Functional cure means clearance of both hepatitis B surface antigen and hepatitis B viral DNA from the blood after being off all therapies for 6 months or longer. Therefore, to be a successful treatment, the treatment not only needs to suppress hepatitis B viral DNA, it needs to be able to clear hepatitis B surface antigen and in turn enable the body's immune system to clear the virus.

Current treatments include nucleoside or nucleotide analogs or NAs and immune therapy, specifically pegylated interferon or PEG interferon. Despite these therapies, very few patients attain functional cure. In fact, patients on NAs typically have functional cure rates of less than 2%. And even adding PEG interferon to the regimen while increasing functional cure rates comes with systemic side effects that make it difficult for patients to treat -- to remain on treatment for the full 48 duration. About 1/3 of patients are even unable to complete the full treatment course.

It's for these reasons that better treatments are needed given the large unmet medical need. Chronic hepatitis B remains a global public health issue, and diagnosis rates remain low. In the U.S., it's estimated that only about 35% of infections are diagnosed and only 25% in Europe. And while the rate is double in Japan, Japanese patients are required to be screened based on health care policy. This year, in an effort to raise awareness and also raise and make diagnosis rates increase, the CDC published guidelines that adults should be tested for hepatitis B.

As part of our continued mission to get ahead of disease and develop innovative medicines to treat more than 2.5 billion patients, GSK remains committed to finding a functional cure for hepatitis B to complement our prophylactic hepatitis B vaccine. We are excited to be here today to discuss bepirovirsen or bepi, a new agent that could advance the treatment of chronic hepatitis B, potentially providing functional cure.

Bepi is an antisense oligonucleotide designed to inhibit the translation of hepatitis B viral proteins from its messenger RNA. Based on our evolving clinical data, bepi distinguishes itself from other investigational therapies by its unique triple mechanism of action. It can inhibit production of viral proteins, including hepatitis B surface antigen. It can reduce viral replication as measured by reducing hepatitis B DNA. And it stimulates the body's innate immune system to suppress the virus.

It is this unique triple mechanism that we believe offers the potential for bepi to change the treatment paradigm in chronic hepatitis B by potentially offering patients functional cure.

If I can get the next slide, please. Last November, data from the Phase II B-Clear trial was published in The New England Journal of Medicine, and that data are shown on the left side of the slide. The study demonstrated that the -- at the end of study period, 9% to 10% of patients, whether on a background of nucleosides at 9% or not on nucleosides at 10%, achieved sustained loss of both surface antigen and hepatitis B DNA following a 300-milligram course of weekly bepi for 24 weeks and then being followed for an additional 24 weeks off of bepi.

For patients with antigen levels of 3,000 and below at study entry, 12% of the patients on NAs and 25% of the patients not receiving NAs met the conditions for functional cure. In patients

with the lowest surface antigen levels, those with baselines less than 1,000, bepi resulted in response rates of 16% for patients on NAs and 25% for patients not on NAs.

The B-CLEAR study helped us identify a patient population most likely to achieve functional cure: those patients with a baseline surface antigen of less than 3,000. This informed the design of our Phase III pivotal B-Well studies, which are actively enrolling patients.

The B-CLEAR data demonstrated that bepi is needed in combination with other therapies if we want to treat patients who have hepatitis B surface antigen baseline levels of greater than 3,000. Specifically, sequential combination therapy to reduce baseline surface antigen levels before bepi treatment or potential sequential immune therapy after bepi to augment bepi's stimulation of the innate immune system need to be tested when baseline surface antigens are greater than 3,000.

Later this year, data from B-Together, our sequential combination therapy using bepi followed by interferon, will be available. This study will inform the design of our future immune therapy combination studies. We remain excited about the promise of bepi to be a cornerstone therapy both as monotherapy and as sequential combination partner of choice to advance the care of patients with chronic hepatitis B.

Next slide, please. Now I'd like to talk about HSV and genital herpes. Another chronic viral infection that impacts patients globally is the herpes simplex virus, HSV, which is responsible for genital herpes. GSK '104 is a novel therapeutic intervention in early development for genital herpes. And it leverages the knowledge and expertise gained from our work with herpes varicella zoster virus or VZV.

Both HSV and VZV are alpha herpes viruses that lead to lifelong latent infection in neuronal ganglia following initial infection. HSV and VZV evolved mechanisms that enable these viruses to evade detection by the body's immune system.

GSK is building on our internal expertise, knowledge and experience with Shingrix as we commence early development of GSK '104. Around 500 million people around the world are infected with herpes simplex virus. 1/3 of those patients with genital herpes suffer frequent outbreaks. Beyond the physical outbreaks, genital herpes is also associated with significant psychologic morbidity, stigma, low quality of life and a threefold increase in the risk of acquiring HIV. Genital herpes is incurable.

Antiviral therapy is the only treatment option available, and antiviral medicines only have a modest impact on outbreaks and transmission rates. There's been little innovation in this space for over 20 years. Although GSK '104 is still early in its development, we are excited about the potential for this asset.

With that, I'd like to hand it over to James Greenhalgh to wrap up on our commercial commitments to growth.

James Greenhalgh Executive

Thanks, Chris. We're looking forward to the opportunities we have for our chronic viral infection assets in terms of the future of Shingrix, the opportunity we see with bepi and the

early excitement we have for HSV.

On Shingrix, we're well on the way to doubling Shingrix revenue by 2026, will be in certified markets by 2024 and are exploring life cycle management opportunities.

On bepi, we believe our potential functional cure for hepatitis B has potential peak year sales of more than GBP 2 billion. We remain excited about the promise of bepi as a potential cornstone therapy.

And finally, while it's too early to make commercial commitments, we're very excited about the potential Chris highlighted for GSK '104 in genital herpes.

And with that, we'll move to the discussion, and I'll hand back to Mick to moderate the Q&A.

Mick Readey Executive

Thank you, James. We'll now go on to Q&A. [Operator Instructions] So the first question comes from James Gordon.

James Gordon Analyst

A question about Shingrix and the booster that was referred to during the intro. So my question is, when could you have data that would actually generate a recommendation that people should get revaccinated with Shingrix or boosted beyond the immunocompromised people? And is it going to be enough just to show that the efficacy from the original vaccination has faded out a lot? Or would you actually need to show a benefit from revaccinating them?

And do you think that you could get a recommendation for that before you start U.S. sales -- so burning through enough patients that U.S. sales would start to go down because you've done such a good job of vaccinating so many people in the U.S.? What are the time lines that you get the booster versus when Shingrix starts to go down in the original population?

Lizzie Champion Executive

That was a long question, James, but I'll try and do it piece by piece. Thank you for the question. So booster, so I'm going to restate some things and then hopefully also answer some of your question parts. So yes, as you said, it's important that you think about the need for booster across different patient cohorts differently. That's what we believe will be the most likely case.

Now you've seen the 10-year overall data, phenomenal efficacy sustained. The key thing that I'm going to say is we need to continue to deliver that long-term follow-up data with more expected in the next year ahead, which takes us through to 12-year long-term follow-up data. That data is key to inform the potential need for booster and how broad, which I think is what's sitting behind your question, how broad a patient cohort requires that booster and when. The one thing I wanted to say to build on the point around immunocompromised patients is we believe around 10% of our patient who currently is immunocompromised, but we also know that there are other factors that impact the ability of the immune system to deal with the shingles virus.

Now what we don't know is how broad that will go and therefore how broad the need for a booster is, that a vast, vast majority of our patients have some form of comorbidity. So actually, it could be immunocompromised patients, it could be much, much broader, but the data, the long-term follow-up data is key to inform that.

I'm not going to be able to share any more on time lines just because we need the data to inform, but what I would say is we have a commitment to discuss with regulators the long-term follow-up data. And that will be our opportunity to learn more about how we -- the study that we need to get there. Our belief is that certainly for those initial patients, we will be able to build on immune data without the need for efficacy data, if that was the other part of your question.

Mick Readey Executive

Sorry, go ahead James.

James Gordon Analyst

So it sounds like you do think you would need to do a new study or it would be on the basis of just showing that efficacy has sufficiently fallen for some populations?

Lizzie Champion Executive

That's right, but we don't believe that we would need to do an efficacy follow-up. But I want to restate that we are yet to engage regulators on this just because we don't have the data yet, the long-term data yet to inform the need for a booster. That's the long-term follow-up data that's coming.

Mick Readey Executive

Excellent. Thank you very much. So our next question comes from Steve Scala.

Steve Scala Analyst

Regarding this link between Shingrix and dementia, one question with 3 parts. What is the hypothesis explaining the link? What is GSK doing with this information? And has no similar signal been seen with RSV?

Lizzie Champion Executive

Okay. So let me start, and then I'm going to pass to either Chris or Tony from -- for any development builds. So a couple of things to start with, so of course, this is due to the current available options for dementia, of course, this is incredibly meaningful, and of course, therefore, it's an area of focus for GSK.

It is an emerging body of evidence. So I'm not going to talk about the association because I know there are many, many questions, but I will hand in a second to Tony and Chris to comment on what we know and what we don't know about the potential association.

And then in terms of what GSK are doing in this space, clearly, we are working with experts. It is well recognized that there are many questions remaining about this potential association,

and those need to be unpacked. The fastest way at least for us to answer some of those questions is retrospective analysis, but I can't share any more than that in terms of time lines. But you can expect to hear more from us.

Let me hand to either Chris or Tony just to build on this really interesting science.

Tony Wood Executive

Why don't I just take it at a really high level? Because I'm sure, Mick, you want to move to another question given we've all got to get to the next session. Look, a couple of things. Firstly, in all honesty, Steve, the published [indiscernible] or the yet to be published [indiscernible], as you're referring to, I think, started with [indiscernible] course over a period of now more than that. RSV, we have data for 2 or 3 years.

So we're not in a position yet to be able to know before any prospective study can be designed. And as regards to your question about the underlying mechanism, that is still subject to significant conjecture and will be widely -- [key elements] that must be clarified before investing in a prospective study.

Mick Readey Executive

Steve, does that answer your question?

Steve Scala Analyst

Yes.

Mick Readey Executive

Excellent. Any further questions, please, could you raise your hand? Okay. We did get some e-mail questions because obviously, my e-mail address is on the link. And somebody was asking about -- probably something for Chris about, what are the characteristics of a functional cure?

And how is it defined from a regulatory and from a practical perspective when we're thinking about bepi in hep B?

Christopher Corsico Executive

So thank you, Mick. And the whole space has evolved, but as of today, functional cure means that both the surface antigen level and the HBV DNA level are below levels of quantification and that patients have to be off all therapies for 6 months or longer for them to be classified as functional cure.

And the reason this is important is that with suppression of HB surface antigen and with suppression of HBV DNA, we know we further reduce the risk of long-term sequelae, particularly liver cancer. And that's why functional cure becomes a very important endpoint.

Tony Wood Executive

And the point on the 6 months or longer, it's not there's uncertainty there. It's related to the nature of the last treatment and the half-life associated with it.

Mick Readey Executive

Thank you very much. Tony, I'm having slight issues with your sound actually. I just -- but our last question will come from Evan Wang.

Boran Wang Analyst

This is Evan Wang on for Seamus at Guggenheim. Just as you're talking about bepi and potential combinations there, I know you described bepi as something like a partner of choice or a combination of choice. So I guess how are you looking both internally and externally on, I guess, appropriate, I guess, combination regimens and mechanisms to combine?

Mick Readey Executive

I think, Chris, do you -- Chris, sorry, please.

Tony Wood Executive

Why don't I let Chris take that given that you defined it in principle on one of your slides?

Christopher Corsico Executive

Yes. So there are a couple of ways we're thinking about combination therapy. And the first is, are there agents available that can take patients with high baseline HB surface antigen levels and reduce them, then treat with bepi and then follow? And then the other is, what can we do on the back end of bepi because we know bepi stimulates the innate immune system to build on that immunologic component to further either maintain or draw more patients into functional cure?

So it's a combination sequentially on either end with bepi being a key component of further driving down both surface antigen levels, driving down DNA levels but also stimulating the innate immune system.

Mick Readey Executive

Excellent. I think unless anybody has one quick final question, yes, I think that's about all, hopefully, which is in good time because the final Q&A session will start in the 2-minute time, 3-minute time. Details for the Zoom Events should be on your event landing page or in the e-mail you received. So thank you to each of our panelists and everybody for joining, and thank you for your interest in GSK. Thanks very much.

Frannie DeFranco Executive

Hello, everyone. Welcome to this breakout session focused on delivering health impact at scale. I'm Frannie DeFranco from the Investor Relations team. And today, I'm joined by Deborah Waterhouse, CEO of ViiV Healthcare and President of Global Health at GSK; and Dr. Thomas Breuer, Chief Global Health Officer.

Here is our usual safe harbor statement.

The purpose of this session is to provide you with an overview of our work to deliver health

impact at scale. Deborah will give a short presentation. And as always, we'll have plenty of time for you to ask questions, at which point she will be joined by Thomas.

With that, I'll hand it over to Deborah.

Deborah Waterhouse Executive

Thanks, Frannie. As a global biopharma company, we know that our ESG strategy supports our sustainable performance and long-term growth. Specifically, we see the S as an area of global leadership at GSK with our proven expertise in prevention and infectious diseases. This is why we laid out our bold ambition to positively impact the health of more than 2.5 billion people worldwide, including more than 1.3 billion people in lower-income countries that are also disproportionately affected by infectious diseases. And while last year, we announced an investment of over GBP 1 billion over the next 10 years to accelerate R&D, led out of Global Health Research Hub in Siena and Tres Cantos, dedicated to infectious diseases that disproportionately impact lower-income countries.

Alongside this work, we also developed access and equity strategies across our commercial pipeline for vaccines and medicines that target priority diseases most relevant to global health.

As Emma has said, we are focused on getting ahead of disease together by using our science, talent and technology and partnerships to deliver health impact, reducing the global health burden whilst also contributing to the sustainability of GSK, something that I'll talk about over the next few slides.

One of the most important benefits of being a global company is the ability to reach people at enormous scale, and I will expand on just a few examples of how we do this. Earlier this year, through our immunization partnership, we reached a milestone of 1 billion vaccine doses to Gavi, contributing to the expansion of immunization program in low-income countries. The WHO states that out of clean water, vaccination is the single most effective public health intervention in the world. By working with partners like Gavi, we can expand sustainable access and strengthen health care systems.

We're also passionate about the impact we can have on neglected tropical diseases or NTD and the disproportionate burden they have on some of the world's poorest communities. We remain committed to the elimination of lymphatic filariasis globally, and our albendazole donation program has supplied more than 11 billion tablets, driving the elimination of LF in more than 18 countries.

The way in which we leverage partnerships is also evident in our work in HIV. Today, approximately 38 million people live with HIV, the vast majority in sub-Saharan Africa where many people live on $1 or $2 a day. We're proud of our long-standing partnership with the Medicines Patent Pool and have agreed to the most comprehensive set of voluntary licenses of any company for our antiretroviral dolutegravir. As a result of these licenses, around 21 million people, representing just over 80% of people living with HIV across 122 low and middle-income countries, have access to generic formulations of a dolutegravir-based medicine.

In parallel to delivering significant impact for underserved people in lower-income countries, our work creates tangible opportunities to create value across GSK. Let me share some examples of how we do well by doing good to highlight this.

The platform technologies developed as part of our global health R&D have in turn supported the development and commercialization of other assets in our pipeline. Specifically, the AS01 adjuvant, which was the result of our malaria vaccine R&D, is now used in Shingrix and Arexvy through the FDA's priority review scheme, the approval of tafenoquine, our medicines for radical cure of P. vivax malaria and lots of priority review voucher that enables us to bring forward the commercial launch of a ViiV product in the U.S. by 6 months.

And our investment in pediatric reformulations of dolutegravir supported the extension of our dolutegravir patent protection by 6 months. And I can announce today that dolutegravir has been granted pediatric exclusivity by the FDA, extending the patent to April 2028 in the U.S. We will follow the same approach for cabotegravir.

And back to the point I made earlier about the scale of our impact, supplying large volumes of vaccines through partners like Gavi provides efficiencies in manufacturing, which lowers overall cost of goods. Over the next few slides, I'm going to walk you through some of the programs we are working on today that we believe will deliver significant health impact.

In many resource-poor settings, the greatest barrier to treating and preventing HIV remains access to affordable medicines. Within 6 months of amplitude, cabotegravir long-acting for HIV pre-exposure prophylaxis or PrEP, being launched in the U.S.A., we were proud to announce a new agreement with the Medicines Patent Pool granting voluntary licenses for this innovative long-acting prevention medicine. In March this year, sublicenses were signed with 3 generic manufacturers who will help enable access in 90 countries.

It's also important that we don't leave behind those who are living with HIV. As you know, HIV disproportionately impacts some of the most vulnerable populations, including 1.7 million children, 99.9% of whom reside in low and lower middle-income countries. In response, we've created a dissolvable formulation for our key medicine dolutegravir, increasing usability and accessibility for children and their caregivers. We are delighted that around half of children now in treatment are taking a generic version of our dispersible formulation of dolutegravir. And looking to the future, we are committed to developing new and innovative age-appropriate formulations of our medicines for children, including our long-acting injectable products.

Another example I want to share is our work on malaria. Malaria is a disease which continues to take the life of a child under the age of 5 every minute in sub-Saharan Africa. With our partners, we've developed 2 products for the prevention and treatment of malaria, the world's first vaccine against malaria, Mosquirix, and a single-dose radical cure for P. vivax malaria, tafenoquine, which is due to be rolled out this year. Mosquirix is prequalified by WHO and prerequisite for UN agencies such as UNICEF to procure vaccine.

And through the malaria vaccine implementation program in Ghana, Kenya and Malawi, nearly [1.4 million] children have already received at least one dose of this vaccine, and this rollout continues.

To secure long-term supply and reach even more children in malaria-endemic areas, a tech transfer is underway with Bharat Biotech in India. The acceleration of this tech transfer will significantly increase production output of the vaccine, with GSK continuing to supply the AS01 adjuvant to Bharat. The tech transfer illustrates our model of sharing the responsibility of bringing innovative medicines and vaccines to patients. Taking this approach ensures GSK can focus on new development of innovative candidates.

And finally, I'd like to talk about tuberculosis. TB should be preventable and curable, yet it is the second leading infectious disease killer after COVID-19. In TB prevention, we have delivered proof of concept of the M72/AS01E vaccine, which demonstrated significant efficacy in a Phase IIb trial. The results were described by the WHO as unprecedented in decades of TB vaccine research and an important scientific breakthrough. M72/AS01 could become the first new vaccine to protect against tuberculosis in more than 100 years and the first to show significant efficacy in adolescents and adults.

The Bill and Melinda Gates Medical Research Institute, Gates MRI, obtained a nonexclusive license from GSK for continued development of this vaccine for low and lower middle-income countries and now has the primary responsibility for the ongoing development, including the Phase III efficacy study.

Importantly, this license does not impede GSK's ability to commercialize the vaccine in upper middle-income and high-income countries, including China, where TB remains a public health concern.

Beyond our vaccines, we aim to change the treatment paradigm in TB and tackle the growing issue of antimicrobial resistance. Since current treatment options can have serious negative impacts on patients' lives, we are developing in partnership with several potential first-in-class medicines for shorter and simpler treatments. There remains a need for multidrug regimens, which means collaboration is essential to get ahead of TB. And we're industry leaders in multiple multi-sector research consortia to advance the development.

Before I close, I'd like to emphasize how proud we are to prioritize our commitment to getting ahead of infectious diseases that disproportionately impact low-income countries. Our work in this space has been recognized by the Access to Medicine Index, which has ranked us as the #1 since the index' inception in 2008.

We are very proud to be leaders in this space, and we know that our employees are proud, too. In fact, in 2022, our annual company-wide survey shows that our long-standing commitment to global health contributes to why colleagues feel proud to be part of the GSK organization, with the vast majority of colleagues believing that GSK is ambitious for patients and GSK is committed to making its products affordable and available to people around the world.

With that, I will wrap up the presentation and pass back to Frannie for Q&A.

Frannie DeFranco Executive

Thank you, Deborah. We will now go to Q&A. [Operator Instructions] I thank you in advance. So now I'm going to stop sharing my screen.

And I see that we do have a question on the line from Jo Walton.

Jo Walton Analyst

Deborah, could you tell us a little bit about the timing of the TB vaccine and how -- a bit more about how you share that between the Bill and -- how that -- how you coordinate that and the time lines for getting it to both the lower-income and the higher-income markets?

Deborah Waterhouse Executive

Great. Thank you so much for the question, Jo. I'm going to actually hand to Thomas who's leading all the development work on that vaccine. So Thomas, over to you.

Thomas Breuer Executive

Yes. So after we delivered the proof of concept, which was published in The New England Journal of Medicine in 2019, we gave the Gates Medical Research Institute, so not the Gates foundation, but its arm which develops medicine and vaccines, a nonexclusive license. And over the last few years, we have essentially transferred all the knowledge, trained them on tech transfer. And they are in the process of preparing for a large Phase III trial.

Meanwhile, they're running a trial on HIV-positive patients in Africa. So the trial, even though the exact date is not set, but the Phase III trial, which is around 26,000 subjects, so a huge trial, multi-country, is set to start beginning of 2024. So as I said, the Gates MRI has a nonexclusive license for essentially all Gavi-eligible countries, so all the countries where TB is a major global health problem. GSK remains the right for high-income countries and countries like China, for example, which also has TB. But the Phase III trial, when it starts in 2024, will run a few years and will read out, and then we have to see the efficacy.

Maybe the other thing I would like to add is the TB vaccine is an adjuvant vaccine, so it has antigen component and an adjuvant component. The adjuvant is obviously coming from GSK and will in the future come from GSK. And there are contractual agreements in place to provide adjuvant for the Phase III trial. But also should the vaccine be licensed that there will be continuous supply afterwards. So thanks for the question.

Frannie DeFranco Executive

Thanks, Jo. Does that help you? Do you have any follow-ups to that?

Jo Walton Analyst

Just to understand how you combine that with studies, so is it -- will it be a global study with the 26,000 across Africa starting in 2024? Or will you be doing your part of it as well starting at the same time, so it will be, I don't know, 40,000 or however many it may need to be. Does the Gavi -- does the lower income come first? Or do you do the 2 together?

Thomas Breuer Executive

So Gates MRI will do 1 study, the study is powered to come up with the ultimate answer of the efficacy of that vaccine. So this clinical trial with nutrition to decide whether GSK has interest to launch it in other countries. So from that point of view, it will primarily and first go to the

countries covered by the loan exclusive license of Gates MRI. And if the efficacy and if the need is there to launch it in the high-income countries that will be decided later, but we will all...

Jo Walton Analyst

I understand now.

Thomas Breuer Executive

Yes, we will all bank on the same clinical trial, which is large enough to come with a definite answer.

Frannie DeFranco Executive

Okay. Thank you very much, Jo. I've had a question sort of e-mailed over to me around how the Medicine Patent Pool work. So do you have any sort of profit that comes via MPP, a licensing fee, for example. And how does data get collected around the reach of these agreements and who's responsible for that happening?

Deborah Waterhouse Executive

I can answer that it's related to HIV. So we issue voluntary licenses through the MPP. The vast majority of the licenses that we issue are royalty-free. So there's no profit for the straight GSK as a result of them. We actually came up with sort of an innovative idea about 4 years ago with the MPP because there were some lower middle income countries that didn't qualify for the MPP royalty-free license product but still needed some support to get access broadly across their countries, and it was countries like Kazakhstan, Belarus and a few others.

So we actually did a different type of license with a small royalty on it, and that's really helped the uptake across those kind of middle to upper middle income countries where access has been a struggle previously. But in the main for most of the licenses, there is no royalty whatsoever. And there's no royalty anywhere in Sub-Saharan Africa, so just to answer that question clearly.

So the second question is about reach. So we talk about the fact that globally, 22 million people are actually taking a [DTG] based regimen, but 1 million of them are in developed countries, middle income, higher income countries, and 21 million are actually in these developed countries, low and middle income countries. So that data is provided by the MPP, it's collected and verified by them and passed to us. So it's quite significant and robust data, and that's why we -- and they feel very comfortable sharing that information. So that's basically how both the licenses, most of which are sort of voluntary licenses without a royalty, a few do have some small royalties work and then also how we collect the data to know how many people are living with HIV are benefiting from our product.

Frannie DeFranco Executive

Great. Jo, I see that you have a follow-up question, I'm going to come back to you and allow you to speak.

Jo Walton Analyst

Thank you. Let's hope I can do this without too much coughing. You say that scale is very important. And I know that you do a lot of work to help lower-income countries get access to your products and you do some tech transfer. Is there anything that you're doing in the opposite direction in the sense of having transferred some technology actually helping to build the technology there and perhaps using some of the output using them as a manufacturer for a product that you can then use elsewhere because one of the things that you need to do to help lower and mid-income countries, is to build that infrastructure and you can do that by giving them tech transfer or you can also doing it by buying stuff from them.

So can I just ask if there's any sort of other helps that you're doing to help getting those local factories up and self-sustaining other than just with your tech transferring.

Deborah Waterhouse Executive

So, Thomas, I'm going to come to you with -- because obviously, your team does a lot of capacity building. I'll just wait and make more comment about manufacturing just because it's a very relevant topic to the voluntary licenses that we just awarded. So we look very carefully at who we gave the voluntary licenses for cabotegravir 2 and one of the reasons why we chose one of the manufacturers because they were intending to set up if they got the license manufacturing site that would produce cabotegravir for prep in Africa.

So if there is an opportunity for us to support African production within Africa for Africa, that's something that we look to do. But there's a lot of other work that we do, Thomas, if you just want to talk about it around order health care capacity building. We do this within these, but actually the real scale is in the work that we do in the global help team. So I'll let Thomas highlight that.

Thomas Breuer Executive

Yes. So I understood your question as a 2-pronged question. In terms of buying material, buying raw material. Obviously, that is a worldwide operation. I don't have the details, but we are very agnostic if certain things can be bought from African countries, to use for manufacturing of medicines and vaccines that will definitely be done.

The other question you had is, and this came up post the pandemic, the African country look again, having not manufacturing site in Africa is a major disadvantage in a pandemic and as far as I know, 2 companies, the messenger and our companies have come forward because the setup of the manufacturing site with messenger and our vaccine is far less expensive and can be modular.

So these 2 companies have come already forward. We have, over the last 9 months, had several conversations with African manufacturers, whether some of our products, including vaccines can be produced there either from a fill/finish or a total point of view, nothing has materialized that I can publicly comment on it, but we are certainly aware of that aspect. And if we can contribute, we will contribute in the mid- to long term.

Frannie DeFranco Executive

Great. Thank you. And thank you, Jo, for the question. If anyone asked us questions, please just raise your hand. I see a number of very familiar names on the lines that would love to come to you.

But in the meantime, I have another question here. GSK is ranked number one, the access to medicines index for a number of years. What are your plans to retain this position? What is the future of GSK on this index?

Thomas Breuer Executive

So first of all, when I get asked this question, I always make the point that we are not doing good or we are not in the global health space to win the access to medicine index. We are doing many, many things, which we have just laid out on the ViiV side as well as on the GSK side, and we are obviously very proud that, that has resulted in the number one spot for 8 consecutive time since 2008.

On the GSK side, essentially, there's a global health team of 200 people, which are focused on reducing health and quality, focusing on infectious diseases in low- and low middle-income countries. We have 2 R&D units exclusively focused on either developing medicines or vaccines in -- for the global health countries, and we will obviously continue with that. We have huge access programs. Deborah mentioned albendazole or the Gavi vaccines which we supply. And as other medicines and vaccines become available in the GSK pipeline on the commercial as well as global health side, we will make them available.

So with these activities, I'm absolutely sure that the independent access to Medicine Foundation, which is funded by the Gates Foundation, but also in investor companies that we will rank high. The other point I wanted to make over the last 8 cycles since 2008. We were always at the top number one position. But until a few years ago, there was a big gap between GSK and on the other companies when you now look at the first 3 to 5 companies, they're all fairly close, which means the entire feud has been lifted and many more companies paying our attention to access to medicine, I think, which is overall, very, very good. And at least that give some credit to GSK was always on the forefront of these activities.

Frannie DeFranco Executive

Thank you, Thomas. I had another one that's come in around Global Health and the connection to the ESG strategy overall. So maybe this is one for Deborah, but maybe just contextualize for some of our investors how we approach ESG, how it's connected to the business and the TAM Global Health?

Deborah Waterhouse Executive

Yes. Thank for the question. So we've made a commitment that over the next 10 years, we will impact -- our ambition is to impact the health of 2.5 billion people. 1.2 billion will be through our commercial business and 1.3 billion will be through the work that we do in the global health space. And that is a goal that have underpinned a great deal of the way that we think about ESG.

There are 6 core areas that we really focus on. And these areas run all the way through the

organization. So ESG is not something we do is kind of on the side of the main business, this is threaded through everything we do because we truly believe this is a very important part, not just of delivering great financial results but actually ensuring that we have a sustainable business and have a really strong approach to environment, social and governance.

So the areas that we focus on are access to health care, global health and health security environment, diversity extend inclusion, ethical standards and product governance and the work that we do in global health space is around access to health care and then global health and health security. And that is both in the work that Thomas does in terms of ensuring that our R&D is delivering enough medicines for countries who are low income and low middle income, but it also is really a part of how we think about our commercial business as well.

And if you think about ViiV, we are a great example of all of our products being made available commercially across the world. But actually, we also through the MPP ensure that, that access is there for those countries who are less able to effort those medicines. The same applies to our vaccine and many of the relevant medicines that's on the market today and that are also coming through our pipeline. So it is an integral part of how we show up as a company. We're very passionate about this area, and we think it's very important to do well financially and deliver great results, but also to do good in terms of having a real focus on our ESG agenda.

Frannie DeFranco Executive

That's really helpful. And maybe I'd just suggest we come to Thomas to talk about that cross-fertilization between the global health and the commercial business. I think it would be great to have some comments from you, Thomas, on that.

Thomas Breuer Executive

Yes, so Deborah just explained in great detail that the primary reason we do all of this is to show social responsibility and making our products available across the world, including low and low middle-income countries. However, there are intended and unintended cross-fertilization between what we do in global healths and what we do on the commercial side. And just let me give you a few examples. So you're all aware of our highly successful Shingrix vaccine and of the very, very recent licensure of the RSV vaccine, both of these vaccine contain an adjuvant called ASO1. And the initial trials to show the advantage of combining an antigen with an adjuvant was essentially the malaria vaccine, Mosquirix where this was first proof from a proof-of-concept point of view.

And this technology is now widely used across many of our commercial products.

Another example are economics of scale. So when we produce vaccines, which are used in high-income countries and for UNICEF, if you have a much higher manufacturing site utilization, your overall cost of goods were down, which obviously serves global health, but it also serves us on the commercial side. Another example are the FDA priority voucher.

So when you license with the FDA, certain medicines or vaccines you get this voucher, the good one for the development of tafenoquine which is one dose radical cure for malaria, P. vivax voucher was used to license one of our HIV product 6 months in advance in the U.S.,

which obviously had positive commercial implications. It may be something which is not relevant right now which might become relevant sooner rather than later is that certain vaccines and medicines we are developing for low-income countries due to global warming, these diseases might become all of a sudden relevant to other parts of the world. So I would not exclude that certain drugs and vaccines, we currently develop exclusively for global health has higher relevance at some point in the future.

Frannie DeFranco Executive

That's great. So I think that we now have a couple of minutes to join the final Q&A session, which starts any moment now. So details are available on the Zoom events landing page or via the e-mail that you received. Thank you so much to our panelists and to everyone for joining and your interest in GSK. I'm going to stop sharing and close the session now.

And hopefully, we'll see you in the close. Thank you all. Bye. Okay.

Nick Stone Executive

Okay, in the spirit of getting started. Welcome back, everyone. I hope that you enjoyed the breakout sessions and also the virtual setup. I mean it gave you the opportunity to interact with Tony, Luke, David and Deborah and clearly members of the team. Now the intention is to start a broad Q&A session, which we'll aim to finish probably by about 4:15, so about 30 minutes from now.

If needed, we can always run a little bit longer.

[Operator Instructions] And with that, I will start the Q&A.

Nick Stone Executive

And by the looks of it, Stephen Scala is the first to raise his hand. So Steve, I will allow you to talk. So over to you, sir.

Steve Scala Analyst

Thank you so much. As a leader in both HIV and vaccines, I'm surprised that GSK doesn't have an HIV vaccine in development, at least I don't think you do. I know it's a tough target, but there have been other tough targets that have been figured out. I assume you will say GSK is monitoring developments in the field, but GSK also argues it's better than the competition. So monitoring developments would be looking backward.

So how should we think about the HIV vaccine possibility and the risk it presents to GSK?

Peter Welford Analyst

Deborah, do you want me to come to you in the first instance and then we can also lean on Tony as well.

Deborah Waterhouse Executive

Yes, sure. Happy to answer that question. So the last 40 years, unfortunately, is littered with HIV vaccine that unfortunately was not able to bring the efficacy and safety that would be

required for it to have the appropriate levels of how it impact. The reason being, as you -- I'm sure you know, Steve, is just because of the way the virus functions, the fact that it mutates so fast, the fact that the body does not mount an immune response once the virus enters the body in the way that it does to other infectious diseases.

So we do assess the landscape, you're absolutely right. We also keep a very close eye on all the scientific literature and any signal that there is a way forward to develop -- to discover and develop an HIV vaccine. But at the moment, that scanning continues, but there's nothing on the horizon that would lead to believe that you would be successful in delivering that vaccine with the right level of safety and efficacy. And you'll have seen recently that J&J saw their latest attempt fail.

I think Moderna are heading into many years of exploration. They've had some challenges with their program, too. So for us, we are focusing our energy on longer and longer acting prep so that we are at least able to protect people from acquiring HIV through therapeutic interventions. But at the moment, the science does not appear to give us avenue forward on creating an HIV vaccine. Tony, is there anything that you would want to add to that?

I know you and Smith, our Head of R&D, discuss this on a relatively frequent basis.

Tony Wood Executive

No, I think you've got it exactly right, Deborah, we've got lots of great opportunities to [indiscernible] a couple of challenges that really happen [indiscernible] right balance.

Nick Stone Executive

Can we take the next question from Jo Walton at Credit Suisse.

Jo Walton Analyst

Apologies. I'm asking a question I asked earlier because I don't think I got as full an answer as I might have done. Were you surprised to find only a limited benefit of a second dose in the second season for RSV. The answer was, it was a surprising finding, but is there any scientific rationale which might suggest that, that would limit this so that this wasn't going to be an opportunity to come back every 2 or 3 years.

Can you confirm that your forecasting and your price, et cetera, is effectively set on an every 2-year review. The price will be set. And then if it comes up with, say, a third year of benefit, then would you be able to raise the price again. So just to understand the possibility that this could be a one-off only vaccine.

Nick Stone Executive

It's the first question to you, Tony, and then we'll come to Luke for the question around pricing.

Tony Wood Executive

Yes. Look, I would say in terms of, were we surprised? No, I think it's perfectly reasonable to expect that vaccine efficacy will wane and you see a spectrum of that from annual to longer term. Obviously, it's difficult to predict until we see the results. In terms of the why that might

be, there are a number of theories that we're exploring.

That would be conjecture at the moment, Jo. So I'll give that to ourselves to -- for the time being. But I would say we're not surprised we see it very much as within the range of possibilities that one might expect to announce it relative to vaccine.

Luke Miels Executive

And Jo, just as background, and then Tony's team moved heaven and earth to get the second season data visibility on that one before we went back to ACIP with the price collar. So what was presented is very much informed by the fact that we expect this to be at least a 2-season vaccine. Now selling price, of course, is always a balance. Now our assumption is that in future ACIP meetings that we see continued support for a multiyear vaccine there and our forecast is based on that.

Also, of course, there are some positive dimensions. We had the inclusion of the 60 to 65 that we had not modeled internally. We thought that, that may not get through. And also the fact that you've got every second year of vaccine is attractive based on our market research and there's a high propensity to focus on the part of physicians and pharmacists.

Tony Wood Executive

Probably the only other thing to add, of course, we're the only -- we designed the study to enable us to compare second season vaccine efficacy to second season boost and we'll continue to run that out into third season as well.

Nick Stone Executive

Thanks, Tony. Thanks, Luke. So our next question is going to come from [Forshay] at Redburn.

Unknown Analyst Analyst

On R&D cycle times, where do you think time has specifically been saved? And if any, is it applicable to the rest of development efforts outside of vaccines?

Tony Wood Executive

Yes. Thank you for the question. Time has very much been saved across the entire spectrum of clinical trial activities that would be associated with not only data collection but ultimately filing. If you take the vaccines combination out, which, of course, is at the overall end, we still see improvements. That's not to say, though, and I don't want to give the impression that we think our part is done.

But in either development or in research. There's still more work for us to do to continue to drive improvements based on both data and platform technology opportunities on both the development and organization and the research organization.

Nick Stone Executive

Thanks, Tony. Can we take the next question from Graham Parry.

Graham Parry Analyst

A follow-up actually from the RSV vaccine as well. Just I guess the, Phil was sort of suggesting that maybe to establish a repeat vaccination schedule versus the one dose that's been recommended by ACIP, need data perhaps coming back to revaccinating over 2 or every 3 years. Can you just remind us how is the trial design in front of me. Can you just remind us, is the trial prospectively designed to measure that? Or is it just an annual vaccination at year 1, 2, 3 versus just no follow-up?

And then to follow up on Jo's question, if you didn't get used with revaccination after the first year, is there any sort of biological reason why you would expect to get a boost after a 2-year or a 3-year gap?

Tony Wood Executive

Yes, Graham, I'm not going to comment on the design of our studies. We don't typically share, [Technical Difficulty].

Graham Parry Analyst

I'm not sure if it's just me. I couldn't quite hear that, Tony.

Nick Stone Executive

Yes, Tony, we can't hear you. It's very muffled.

Tony Wood Executive

Give me a second.

Nick Stone Executive

It's much better.

Tony Wood Executive

Better. All right. Look, let me just repeat it quickly then, and then I'm going to invite Phil to make a comment. So I don't think we've disclosed the design of our ongoing study. So I can't comment on that beyond the high-level comment that I made to Jo.

With regards to what might occur looking out to Phase III -- sorry, to a third year of protection, obviously, that's something which is in the range of possibilities that I mentioned also in my answer to Jo, but Phil, I might just ask you to perhaps add a little bit of color to that.

Phil Dormitzer Executive

Sure. So it certainly is observed routinely in animals and in some ways in humans as well that allowing longer intervals between a prime and a boost allowing the immune response to fade that leads to better boosting. And I don't think there's any reason to suspect that anything is going on here that is fundamentally different than what has been seen with other vaccines.

We haven't seen how RSV vaccine is behaving humans before, we're learning now. And I would say that what we've seen suggest that a longer interval between prime and boost will

probably be optimal and that will need to be determined empirically.

Nick Stone Executive

So can we take our next question from Levin at Redburn as well.

Unknown Analyst Analyst

One quick one from us. How should we think about the process of bepirovirsen?

Nick Stone Executive

Was that the price, sorry?

Unknown Analyst Analyst

Yes, the price. Yes, sorry, the price of bepirovirsen.

Nick Stone Executive

Luke, do you want to take that one, please?

Luke Miels Executive

Yes. I mean I think it's ultimately going to be driven by the proportion of patients that achieve a clinically meaningful functional cure at the end of that. So it's difficult to speculate at this point. It is an oligonucleotide. So cost of goods will be at a component and whether you need a doublet, triplet or mono strategy to achieve a response after initial exposure to nucleotide.

So time will tell. We obviously have a range internally, but we're not ready to speculate. I just wanted to double back to Jo's question because I forgot to answer that. Can you increase the price in the U.S., of course, with the IRA is somewhat restricted. But if you look at the natural sequence of launching RSV into Europe and other markets, there's a natural tail period of going through reimbursed, et cetera and we should have the third year's data at that point before we enter pricing negotiations with major markets outside of the U.S.

Nick Stone Executive

Thanks for the clarification. Emmanuel, can we continue to the next question, please?

Emmanuel Papadakis Analyst

I know HIV didn't pitch today, but since it is an infectious disease, perhaps you forgive me for asking for a quick update from Deborah on where we're at with the subcutaneous iteration of Cabenuva, I'm referring to the, I guess, stepping stone version before we get to the Halozyme formulations a bit later in the decade, I know you talked about potentially a bridging study facilitating approval as soon as later in 2024, 2025. So perhaps just an update on where we are with that. That would be very helpful.

Deborah Waterhouse Executive

Thanks, Emmanuel. So just to recap where we are. So we're working very hard, first and foremost, on finding different formulations of cabotegravir both to ensure that we've got a

low for long acting, i.e., 3 months and 3 months plus over the coming year. And cabotegravir formulation that can be small enough in terms of its size of dose that it enables kind of a self-administered product. We're making good progress with our cabotegravir formulation work, and we are encouraged by some of the results we're seeing, although those won't be available for us to share just for a little while.

So that's that part.

In terms of the parts that I'll go with cabotegravir so the partners that we've got rilpivirine, [indiscernible] and the maturation inhibitor and then the capsid, again, they're all progressing on track. And therefore, we should be in a position to share more with you at the investor update that we are planning for the end of September, early October period, but actually the real kind of news that will undoubtedly be waited for by ourselves would be what we're going to choose to take into Phase III.

So that we will be sharing, as we said, in 2024, we're absolutely on track to do that. And the thing I'll just remind everybody is that the HIV treatment market is pretty fixed. It grows at 1% to 2% a year. And as we progress all of these options forward, we won't take all of them to market because obviously, we'll make choices as to what we think will be best to meet to the needs of patients and best at generating financial returns for the GSK.

So we're on track, we're making progress, particularly with cabotegravir formulation, which enables self-administered, but also an HCP administered subcut and also the ultra long lasting intramuscular as well. So on track, more news to come.

Nick Stone Executive

Thanks, Deborah, and thanks, Emmanuel. Can we take the next question from James Gordon at JPMorgan.

James Gordon Analyst

James of JPMorgan. Maybe a slightly bigger picture question, which would be -- it was flagged to the intro that more than half of the sales. I think you said 2/3 of the portfolio is now infectious disease and HIV. Is that where it stays? Or could you become basically an infectious disease and HIV company based on the things you're talking about?

And how much synergy is there between infectious disease and HIV and oncology?

Nick Stone Executive

Thanks, James. Tony, do you want to talk about how you think about the portfolio? And then Luke, maybe we can come to you in terms of from a commercial standpoint and delivery of sales. So Tony?

Tony Wood Executive

Yes. So look, James, we very much see the opportunity that you've described in the infectious disease area. And now the vaccines organization is a single part of R&D and Luke and I have the opportunity to assign capital across the entirety of the R&D portfolio. So you'll continue to see us maximizing the potential that we see in that portfolio. And of course, I

won't repeat, in the session this afternoon highlighting some of the fantastic opportunities that we see ahead of ourselves there.

I think it's also an important though to recognize that we have opportunity within the respiratory and immunology areas, backing up on where we are with our IL-5 franchise and with Benlysta, I'm sure they're going to be the subject of future management events. And then lastly, just quickly, Nick, perhaps we see oncology as an emerging area and one in which we're paying careful attention to allocation of capital to ensure that the oncology programs have a PTRS proposition that is competitive with the rest of the portfolio that I've described. I might let Luke now answer with regards to the synergy question. And if it was a scientific one, I'll come back to that later and Nick perhaps.

Luke Miels Executive

Yes. Look, I think the commercial synergies are less than the biological synergies but there are pockets when they can become very meaningful. So Tony has alluded to the synergies that we get with the respiratory portfolio in the Shingrix population and RSV. We have synergies across, so gepotidacin, Brexafemme, and tebipenem and we're very mindful of that when we're conducting these types of acquisitions. So I wouldn't say it's transformational synergy commercially, but it's very helpful when it occurs.

Nick Stone Executive

[Operator Instructions] And our next question comes from Andrew Baum from Citi.

Andrew Baum Analyst

Yes. Slightly tangential question. You obviously have a collaboration with CureVac on the infectious disease side. Given the emergence of really quite promising data on the oncology side for the antigen personalized cancer vaccines. I know that it's a painful topic, historically, given MAGE-A3 and cancer vaccines for GSK, but given the emerging data, very different modalities, is this something potentially as interest or the interest solely stems to the infectious disease space.

I mean, obviously, think you have the BioNTech and then the Moderna pancreatic in melanoma, respectively.

Nick Stone Executive

Tony, do you want to take that one?

Tony Wood Executive

And Andrew, I might answer that sort of in the following terms. The way we think about the cancer vaccine area. And look, we've been following the data you referred to closely as well. I think there's encouragement, but still quite a lot of confusion and complexity in those data. And I very much see the opportunity in cancer vaccines as being as much about understanding where and at what stage of treatment the canter have the right characteristics for a vaccine to be effectively if a vaccine most significant impact is going to be really enhancing what we might call an antigen quality proper.

And so as we're looking at this, we're paying attention to that component, obviously, in combination with immunotherapy as well. I see the technology available to then make those kinds of vaccines, be it individualized or tumor antigen approach is just one component of it.

And obviously, we're taking a look across the broad range of technology landscape that might allow us to make a decision as with regards to cancer vaccination at an appropriate point in time. And as you know, Andrew, we stepped away from cell therapy in cancer because we saw a greater set of opportunities ahead of us with early on the [indiscernible] and other assets in the portfolio like [indiscernible].

Nick Stone Executive

We'll take our next question from Kerry Holford of Berenberg.

Kerry Holford Analyst

Firstly thank you for this really thorough review of the anti-infectious portfolio. I guess my question is more big picture thinking about your allocation of R&D spend in this area. Interested to understand if there are specific disease areas or mechanisms across infectious disease where you feel GSK going forward is going to spend more or less on R&D, both in terms of internal and external investment and then specifically on the latter and the specific areas with this within the infectious is these portfolio that's in benefits for more business development, external input?

Nick Stone Executive

Tony, do you want to take that one?

Tony Wood Executive

In terms of the -- let me start with how we look at the sort of platform technology contributions or investments across vaccines. I very much look at this as we are extremely well served with regards to the high-priority problems that are in front of us. And that comes in the form of protein subunit vaccines and adjuvants. And of course, what you see there is an increasing complexity associated with structure-based approaches to the design of those. There are massive opportunities for us in synergies with the pharma part of the organization for which those technologies are very heavily embedded.

In addition, of course, our recent acquisition of Affinivax places us in a strong position with regards to polysaccharides vaccines. And obviously, you're very familiar with the reasons, and the differentiation that we expect in the new area. And then just to pick up a little bit on Andrew's comments in mRNA. We're very pleased with where we stand right now in terms of our collaboration with CureVac and we're looking forward to seeing the multivalent new data that will be available towards the end of this year to see whether or not a promising profile that we see for reactogenicity, and immunogenicity with that platform, it continues to play out.

Now having said that, I think it's really important also to recognize that we're yet to see a Phase III success or multivalent. And therefore, we're also continuing to examine alternative approaches across mRNA for the future. We have our real internal capabilities that I

mentioned that we're building, which are based on of all technologies, and we'll continue to explore the space of either nanoparticle design plays an important role there as well as where the see optimization and let's poll structural changes to enable improved selectivity.

So that then begins to get us into -- I'll pause after this point, I promise, make sure it doesn't turn into a 20-minute on vaccine technologies. That then allows us to think about the transition from the existing high priority portfolio into areas like therapeutic virus where one might have the initial, I think, expansion based on what we see from Shingrix is the best priority approach there. Is the underlying science as to why Shingrix work so well. It has a number of potential explanations to stand those data before we left to what the future technology landscape might look like. Hopefully, that's not too detailed, Kerry, that gives you a sense of how we're thinking about it.

Luke Miels Executive

Yes. And Tony, I'd just add, there's -- I'll just add on the BD point. There's a natural balance that Tony and I have when we look at the portfolio and looking at the deals. And there's a ratio that we have internally. Of course, we're not going to give any color on that ones today.

But as we've said in the past, you can look at the deals we've done and put them into 2 buckets. There are the momelotinib type transactions where we're looking for a disruptive technology with infectious diseases.

There are a number of deals which we find attractive because it's a relatively low entry price for the revenue that you get, if you look at the amount of capital that's being deployed to achieve the more than 2 billion that we expect from the UTI portfolio combined with Brexafemme. These deals, again, are not transformational in nature, but if you can pick them up without too much distraction, they had revenue and they are profitable. And they also are addressing a broader underneath, which is supplanting broad-spectrum antibiotics or antifungals with more narrowly defined, more effective antibiotics or anti-fungals.

Nick Stone Executive

Comprehensive answer, hopefully, for Kerry, just mindful of time, we've got currently 3 individuals with hands raised. So I'll work my way through them. So Jo, back to you, please, at Credit Suisse.

Jo Walton Analyst

Gosh, I think you'll be asking a question on Dominic's behalf. I'm sorry, I didn't realize that.

Nick Stone Executive

That's fine. Jo. I can go to Dominic, if you want. That's not a problem. Dominic, over to you.

Dominic Lunn Analyst

So the question was just on the proposed European health care reforms. So one of the proposals is to give a voucher awarding an extra year of European [Pass at Life] for drug of your choice if you develop an antibiotic for one of the WHO priority pathogens and it appears that you could also sell the voucher. So how likely do you think it would be that this could be [

Jepo?] And are there any other assets in development that could also receive this voucher?

Nick Stone Executive

I guess, Tony, it's kind of a regulatory question, but maybe there's a market access aspect, which Luke might want to comment on as well.

Tony Wood Executive

At this stage, all I would say is obviously, we have -- as we're thinking about broadening the portfolio and to Luke's point, that is in the context of tuck-in deals that makes sense, if you like, a portfolio standpoint, we're obviously considering the WHO priority pathogen list and the consequences that come with that. But right now is more of a focus on where we see significant unmet medical need. Luke, you might have additional comments to add.

Luke Miels Executive

Yes. The only thing I would say is in my experience vouchers work, it's a very effective, efficient, market-driven mechanism to drive innovation in pockets where there may be reluctance to do it. We don't factor it into our current valuation but it would certainly have an influence, and I think the success of the U.S. program has been outstanding and the capacity to monetize those are very useful.

Nick Stone Executive

Last question from Graham Parry then, please, it's from Bank of America.

Graham Parry Analyst

So actually, just a sort of follow-up on the original question about revaccination. Just can you confirm you don't need a new Phase III trial for extended revaccination, that's probably just the simplest way to put it. And then the commercial stroke R&D question on Shingrix. I think you said in the past talking about revaccination boosters for Shingrix, but you've also talked about that likely only being for immunocompromised patients. So if you can just clarify, is that really what we're thinking about here?

Is that just sort of single-digit percentage of the population that you'll be looking at there?

Unknown Executive Executive

[indiscernible]

Nick Stone Executive

Yes, yes, please, please.

Tony Wood Executive

Graham, you can imagine, there were a range of questions, you're asking about RSV in third season. So at this stage, I would say we are looking at how to best prioritize answers to those questions within the context of the portfolio.

Nick Stone Executive

Luke, do you want to comment on the second part of the question?

Luke Miels Executive

Yes, sure. So I think, Graham, right now, is just speculation. We don't know when there is a material drop in efficacy, but there will be a point at which logically, you could rechallenge those patients. Now whether that's the full population or a cohort we don't know, we're modeling both. I think the key thing to reflect on as we've made interest around some of the interesting studies emerging with dementia, we're trying to find ways to extend this portfolio beyond the initial primary population and booster is an important component of that.

And we should know, I mean next year, we started to get some more color with the 13th year of the initial sequence and then we should get the trajectory there in terms of how the efficacy and the outlook for is looking.

Nick Stone Executive

Just to sort of round this out, I mean, look, this has been a couple of hours, hopefully, well spent for all of our participants. I mean hopefully, you've learned a little bit more about the excitement that we've got for the vaccines business and the infectious disease portfolio more broadly. Clearly, it's one of the broadest, if not the broadest in the industry, representing 2/3 of our pipeline we've given you obviously a deep dive into the areas where we are most excited in the context of delivering growth for the future.

But it falls on me to say thank you to all of our panelists today. It's much appreciated. But more importantly, thank you to all of you that attended today's session. Naturally, if you have any feedback or follow-up questions, then don't hesitate to contact us at irteam@gsk.com. And with that, I shall thank you all, and we'll close the call.