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EDITED TRANSCRIPT

MRK - Merck & Co Inc Investor Day

EVENT DATE/TIME: JUNE 20, 2019 / 12:30PM GMT

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PRESENTATION

Operator

Ladies and gentlemen, at this time, we ask that you please take your seats, and ensure your phones are silenced.

(presentation)

Please welcome Merck's Chairman and Chief Executive Officer, Ken Frazier.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Good morning, everyone, and thank you for joining us today. Now I'd like to turn to our forward-looking statement, and here it is in all its glory. It can be found on merck.com. And with that, let me turn right away to our agenda for today.

As you can see, we have a number of interesting and what I hope will be informative presentations for you today. I'm very excited about having our leadership team here to discuss our confidence and our growth potential over the next decade. Bringing a product to the market, for example, KEYTRUDA, taking it from early-stage discovery through development, through commercialization is to say the least a team sport. And it takes a deep bench of talent with the knowledge, the expertise, the commitment, the experience to be successful in developing a drug and commercializing it. And I think we have a team here today that is not only capable of doing that once or twice, but importantly for a company like Merck to do it on a repeated basis. These layers exhibit the type of integrity and expertise and values on which, frankly, this company was built over the last 130 years. So I'm very excited to have my leadership team here today. Our mission and our rich legacy of inventing to save and improve lives is the foundation of our company, is the foundation of everything that we do. And I think, importantly, it's the springboard for our future. We aspire to be the premier science-based biopharmaceutical company. We say that to ourselves not to be arrogant, but to say what our aim is. And our mission, we believe, is even more important today given the backdrop of what's happening in the health care space.

As you know, there are tremendous issues facing our industry. For example, the rising cost of innovation, a huge amount of political uncertainty about the affordability of drugs, the pricing of drugs, a number of other challenges, but they are also some great opportunities that we face, including huge unmet needs that the world needs to solve for. The fact that the global population is growing, we're going to be adding another 1 billion people in the next 10 years or so. But in many of the developing markets in which we operate, the population is also aging and there are a number of diseases of aging that have not been solved for. There are new modalities and technologies that we believe will create new scientific opportunities, and we have an immense opportunity, we believe, to help solve some of the world's biggest health care challenges. Many diseases don't have any good treatment today. And if we're really going to think seriously about bending the cost curve around the world, I believe that drugs and vaccines -- innovative drugs and vaccines can be part of that answer. I also believe that demand for truly innovative products will remain high despite the pressures around affordability. I think we are well positioned to continue doing what we've done for the past 130 years, but I'd like to turn now to what's been changing at Merck. So since our last Investor Day, which was 5 years ago when we met in Boston, we have continued to revitalize the company's focus on R&D, and I believe it's paying off in ways that I think you have seen and in ways that you will see. Roger and others will talk about that today. We solidified our leadership across the 4 key growth pillars that we have announced that we were going to focus on: oncology, vaccines, hospital and specialty and Animal Health. And Frank and Rick will tell you more about those items.

Merck has always been therapeutically agnostic. We've never decided upfront where we're going to focus. We actually think in excess of focus is antithetical with being a company that is led by the science. If you think about it, 5 years ago nobody thought Merck was an oncology company. And when we last met in Boston, we talked in the early days about what the potential of pembrolizumab might be, but no one saw us as a cancer company. Today, we are a leader in immuno-oncology because we're willing to evolve on where the science takes us. And Roy Baynes and Mike Nally will be talking about that and specifically our pipeline later.

We've also, though, given all the challenges in the outside world, recognize the need to strengthen our operating model to drive our execution of our science-led strategy over the long term. And for that, you're going to hear from Rob Davis who's going to talk about the things that we're trying to do in order to stand Merck up against what maybe a much more challenging future as we go forward. Importantly, as I said in the first couple of slides, which are really important for a company like Merck to actually execute long term on its strategy of innovation is in energized and talented leadership team and a deep bench of talent. And I will say to you that, that's the kind of thing that I assume that from the outside it's hard for people to appreciate. But I will say personally as CEO of Merck it is the thing that I have been most focused on over the past 9 years, is building that deep bench of talent, because at the end of the day when you see an execution strength, like we've shown in KEYTRUDA, it's the result of a talented group of people who're working together with a common commitment. And I think you're going to meet many of those people here today. So our work over the past 5 years, since we've last met, I believe, is paying off for Merck. And I think we have very strong momentum that we believe will continue over the next few years. And as we look ahead, I believe Merck is well positioned to deliver on what I said earlier, which is repeatable success. So what are our strategic priorities to drive continued leadership? First of all, we believe Merck can deliver as it says durable and efficient scientific innovation driving value for many stakeholders around the world. We will continue to invest thoughtfully in R&D. We'll continue to execute across the business and unlock the full commercial potential of our products in pipeline because we can leverage our global scale to do that. We'll continue to drive simplification inside our company because we're large, geographically dispersed company across many areas of business. But

importantly, we're also very much focused on culture change. So what do I mean by that? Just because we're a large company, it doesn't mean that we have to be plotting at everything we do. We have to find ways of unleashing our talent and allowing people to move in the areas that we need them to move quickly and efficiently. We also believe we're positioned to deliver, and Rob will talk about this long-term profitable growth both at top line as well as in terms of our margin expansion going forward, and we'll do that through disciplined capital allocation going forward.

So before I turn to Rob, I'd like to just acknowledge that I know that people have certain questions in their head. Everywhere I go, the key question I hear from people is, what do you have beyond KEYTRUDA? First of all, let me acknowledge that, that's an important question and one that I would have if I were in your shoes. KEYTRUDA is an unprecedented product. It is extremely large and it's going to only get bigger. For us, that's actually an opportunity as well as a challenge. But I think what we're going to be able to show you today is that we do have tremendous growth opportunities beyond KEYTRUDA. KEYTRUDA will have tremendous opportunities in and of itself, but we believe we have strength across our entire innovative portfolio. Importantly, we have great opportunities to invest in organic growth. There's a lot of runway for the products that we already have, and we see multiple opportunities there. We also believe we have the strength in our balance sheet to pursue the best external science and value creating ways. We think we have developed in our discovery labs the ability to develop breakthrough treatments, not just in the next 5 years, not just in the next 10 years, but for the wave of innovation that's going to come afterwards. And all of that is premised on having a leadership team that has both the capabilities and the commitment to execute on our strategy. So thank you for your kind attention. Thank you for being here. And with that, I'd like to turn the stage over to Rob Davis.

Robert M. Davis - *Merck & Co., Inc. - Executive VP of Global Services & CFO*

Thanks, Ken. And good morning, everybody. Thank you for joining us. I'm excited for the opportunity to share with you why we have such confidence in our short and long-term growth potential and why we believe we have such strength in our business. As Ken talked to you about in just the presentation he just went through, innovation is the core of our strategy. And importantly, our consistent commitment to that strategy along with our investment in R&D is paying off. You see that in what we did in the first quarter. That momentum continues today. And frankly, that momentum will continue into the future.

And importantly, we're confident that if we deliver on that strategy, which we will do, we will deliver strong shareholder returns and it's really driven by 3 key value levers. It's driving sustained long-term revenue growth, it's allowing for meaningful operating margin and expansion, and doing all of that while maintaining a strong balance sheet and a disciplined capital allocation strategy focused on both investing in business, but also returning meaningful value to shareholders. And if we do that and we will do that, we will drive the type of value you're all looking for.

As Ken mentioned, we're facing an evolving landscape and we recognize that. But we firmly believe the best way to address that landscape is to out innovate. If we bring real value by addressing true unmet medical need, we will be able to drive strong growth and strong value. Importantly, as you look out over the foreseeable future, our growth opportunities are known and they are in hand. In most cases, they're in products we already have in the market where we have the opportunity for multiple indication expansion as well as geographic growth. And as you look across the 4 growth pillars, we have derisked assets in each of them. Within the leading oncology portfolio, we have KEYTRUDA, we have Lynparza, Lenvima. And most recently, we have the late-stage asset we just acquired with the acquisition of Peloton. Within our durable vaccines business, we have GARDASIL. In hospital and specialty, we have BRIDION, which continues to deliver very strong growth in the hospital setting. And importantly and most recently, we have the opportunity with ZERBAXA with the recently received indications for hospital-acquired pneumonia and ventilator-acquired pneumonia, we see that as a real growth potential moving forward. And then finally, we have an industry-leading Animal Health business, which will continue to perform and grow at rates well in excess of the Animal Health market.

So as you look across to this portfolio of opportunities, that's why we're confident that we will be able to drive strong growth in each and every year, including 2023, which is the year with the greatest impact from the loss of JANUVIA, due to the loss of exclusivity. And importantly, we continue to believe there are growth potential and the revenue potential we have in that 2023 time frame is meaningfully underappreciated. So as we look forward, we are confident that based on the innovative products we have, the strong demand that innovation drives, we will be able to deliver strong growth, even though we expect overall long-range plan to see pricing declines in both the U.S. and globally. And we think that is the core and the true value of our strategy. Innovation drives value, value drives demand and that delivers for the shareholders. While we're very confident in our growth we are cognizant of the landscape we face. And as Ken mentioned, in order to be able to fully invest in our evolving and growing pipeline while delivering top and bottom-line growth, we have to evolve our operating model. We recognize this. We're changing the way we

work, to accelerate growth, to improve our operating model economics while creating the headroom necessary to invest in innovation. And we're going to do this through a comprehensive program aimed at making Merck a leaner, more efficient, innovation-driven company. This program will reach across all elements of our value chain and will not only aim to focus on making sure we drive our resources to our highest growth, highest value opportunities, but also to better enable innovation, allow us to ensure we can get our products to our patients in a much more direct way, and importantly drive simplification and productivity across all of our operations. We're going to achieve this by driving process improvement and leveraging new digital capabilities and automation to enable the transformation.

And all of this, we're confident will set us up for the growth we've been talking about. When we achieved this, you're not only going to see that we're able to redirect our investments to ensure we're investing in our growth and in our innovation, but you're also going to see that we're going to be able to do this with operating expenses growing at a rate meaningfully below sales. And when you combine this with the fact that as we see our business naturally shift from today, a broad-based primary care business to more of a hospital oncology and specialty-focused business, which brings with it natural mixed benefits, we will deliver meaningful operating margin expansion and that will translate to accelerated earnings per share growth.

As you can see from the chart, our SG&A will decline ratably as a percentage of sales throughout time. And that's important to note because we already are starting from an industry-leading position. What we do plan to continue to invest in R&D and grow R&D investment every year year-on-year, you will see that growth start to moderate beginning in the 2021 time frame, as the bolus of oncology and KEYTRUDA opportunities start to move through the pipeline allowing us to moderate R&D expense to rates below the growth of sales and thus drive meaningful improvement in R&D as a percentage of sales over time. As a result of that, while you will see some operating leverage over the next couple of years, we see our operating margin start to expand more on an accelerated basis beginning in that 2021 time frame. But importantly, this isn't only about driving operating margin and expansion. And what you can see from the chart, combining the disciplined and frankly excellent execution, our scientific team has been able to deliver in our development programs over the last few years, particularly with KEYTRUDA, the meaningful growth and profitable growth our innovative pipeline is bringing us, combined with the cost and capital discipline you've seen us execute over the last few years, we have seen our return on invested capital actually grow over the last few years and we expect to see that continue to grow out into the long-term to rate meaningfully above our cost of capital.

Now turning to the last value driver, our balanced and disciplined capital allocation strategy, which is focused, as I said, on investing primarily in the business first and also ensuring we can bring meaningful about value back to you, the shareholders. As you can see, from the chart, what I've tried to do here is to take R&D expense and recast it as an investment to give you a sense of the scale of how much we're actually investing behind our most important growth driver R&D.

But importantly, we're not stopping there. We recognize we have to also be able to deliver products to the market. And as a result, we've embarked on an approximately $16 billion capital program, aimed primarily at increasing capacity across our oncology franchise, our vaccines business and our Animal Health business, and in addition to that, we're continuing to make investments to build out our discovery capabilities. And finally, we're going to make the necessary investments into IT to ensure we can enable that digital transformation I've talked about. With that, we still remain committed to the dividend. And you can see, we will make meaningful dividend payments over time with the target of driving a payout ratio of between 47% and 50% over time. With all of that, we still have meaningful capital to deploy and our next priority is towards deploying that capital to value-creating business development consistent with our strategy. But to the extent we're not able to find those opportunities, we are committed to continuing to return excess capital to the shareholders through share repurchases. Over the next 5 years, we expect very strong free cash flow. And when you combine that with the strength of our balance sheet, as you can tell from the chart, we have amplifier power to frankly do any form of business development or other investment to drive growth that we would choose to do that we think creates value and that's very important. We have the capability to pretty much do what we want. And as we think about business development, our strategy is unchanged. As we've been doing over the last several years, we continue to focus on how can we find opportunities to augment our pipeline and our portfolio by looking to external invasion and finding the best science wherever we can find it to bring it in-house to augment the strong organic pipeline we're developing. And our preference is to continue to do that primarily through bolt-on acquisitions as well as strategic collaborations. As Ken has previously talked about, in 2018, we did approximately 60 transactions that spanned licensing, acquisitions, technology deals as well as clinical collaborations. And most recently, you've seen us do several acquisitions, including Peloton, Tilos, Immune Design as well as Antelliq in the Animal Health space. And importantly, we continue to leverage the 2 most important strategic transactions we've done, which are the partnerships we've done with Eisai

and AstraZeneca to get access to Lynparza and Lenvima, which you'll hear about later today, continue to be great opportunities for broad-based growth and importantly drive important growth in that period around the JANUVIA/JANUMET expiration.

So to summarize. We're operating from a position of strength. We're very focused on growth. And I'm confident we have the right team, the right people, the right products and the right pipeline and portfolio to deliver on that growth in the decade to come. And importantly, what you're going to hear through the remainder of the day from my colleagues is the details of why we're so confident, and we'll be able to execute that strategy and why we're confident. You're going to see us deliver sustained revenue growth, strong and meaningful operating margin expansion, and smart and disciplined capital allocation that will drive real value for our shareholders. So with that, I'm going to turn the stage over to Frank Clyburn, who'll come and take you through our human health commercial operations and give you more details about why we see the sales growth coming in the future. Thank you.

Franklin K. Clyburn - *Merck & Co., Inc. - Chief Commercial Officer & Executive VP*

Thanks a lot. Thank you. Good morning, and it is very exciting to be here. And my presentation will really hopefully give you a chance to feel and see why we're so excited about the opportunities that we have in front of us. In the commercial area, we really have 3 priorities. I'm going to share with you how we plan to build on the leading position across our growth pillars. We have the opportunity to capitalize on global growth opportunities. When you look at our portfolio and you look at the unmet need that exists around the world, we have a portfolio that allows us on a global basis to engage with physicians, patients, payers and policymakers we think that differentiates us from other companies. And we also have a number of launches that are underway, and I'm going to share with you a flavor of how some of those launches are going, but also we have the opportunity for numerous launches in the future, both near and long term. You heard about our growth pillars. And why these growth pillars are very important is, if you look at what's happening in oncology, we know oncology is the largest therapeutic market today, and every projection has over the next 10 years for this marketplace and therapy area to grow significantly. Based on the significant amount of research and development, the number of patients that are developing cancer around the world and the innovation that is taking place, and we have a leadership position there. Vaccines. When I travel around the world and talk to Ministers of Health and policymakers, they look at vaccines as a solution to their health care problems. And we have a number of opportunities to help address those needs as well as to grow our sustainable Vaccine business.

Our hospital portfolio. A lot of companies have moved away from the hospital segment. We have a very strong portfolio of novel products that we believe differentiates us and will help us to continue to grow going forward. And we have these products in hand, so there is strong visibility into our growth profile, as you heard from Ken and Rob, over the next 5 years.

Oncology and KEYTRUDA. It has in a very short time become a foundational cancer treatment. I want you to think about 5 years ago when we met, we talked about studying KEYTRUDA in monotherapy and exploring all of the options that we could in a monotherapy perspective and then looking at studying KEYTRUDA in numerous combinations. At that time, we talked about 30 different cancer types we were exploring the utility for KEYTRUDA. You're going to hear today, 5 years later, we have activity across 25 different cancer types. We have established KEYTRUDA based on the significant overall survival benefits that you're seeing us deliver in head and neck cancer, lung cancer, melanoma cancer, bladder cancer and others. And this is changing the way in which patients are being treated today. And Roy and Roger and the clinical team have done an outstanding job of positioning us for the future.

Lynparza, an important business development deal we did with AstraZeneca, and we're not only seeing Lynparza's use within women's cancers, we're now seeing the opportunity to be used in men cancers. I'm going to share with you some of the recent data that was just presented at ASCO. And we see significant growth ahead of us with Lynparza. And also Lenvima, a broad-based tyrosine kinase inhibitor that we have significant opportunity in the near term with current indications, but also in the future as we look out in combinations with KEYTRUDA.

To this date, we have already 27 indications when you look at KEYTRUDA, Lynparza and Lenvima that span across 15 different cancer types. And then we have an additional indication, the first agnostic indication for KEYTRUDA in an MSI high population. And we have conservatively estimated that we have treated over 200,000 patients and helped them around the world with the early stages of that. There is a lot of runway ahead. KEYTRUDA clearly, we are very pleased with the results to date. In 2018, we announced that we sold $7.2 billion, grew over $3 billion that year, one of the best launches in the industry and we're very proud of that. We announced in the first quarter, we had strong results, close to $2.3 billion, 60% growth, ex-exchange. And clearly, we could see the momentum that we're having with this product. But I'm here today to tell you that I really believe we're

still in the early stages of the opportunity we have with KEYTRUDA. And here is why? In lung cancer, we are very well positioned. Based on our significant data based off of KEYNOTE-024, our combination data with KEYNOTE-189 and 407. And most recently, we just received approval this week later line of therapy for small cell lung cancer in the U.S., and small cell represents about 10% to 15% of all lung cancer patients. So we have a very strong position in lung cancer. But we still have opportunities even in the U.S. to grow in the PD-L1 negative segment, and that's something that we are focused on as a team in the U.S. But when you look at outside the U.S. what's happening in lung cancer, we've seen very rapid uptake, but we're still working through reimbursement in Europe, in many markets, as well as we just received the approval in China in April. And then in Japan, we had 6 approvals at the end of last year. So you can see continued momentum in our ex U.S. opportunity in lung. I was also recently at the American Society of Clinical Oncology meeting recently and had a chance to see how people absorbed or updated data based off of KEYNOTE-426, which is our renal cell carcinoma data. And you know we're just starting that launch in the U.S. In that data, many of our KOLs felt was practice changing data when you saw the overall survival benefit across all 3 risk groups in that trial. And we're seeing and hearing very early encouraging feedback in RCC. Also adjuvant melanoma, a very important indication because this is an indication our first adjuvant indication. And we're seeing good feedback from the community physicians in the U.S. And also we're launching our adjuvant melanoma indication in Europe. And in Europe, we're seeing very strong uptake in Germany. And in Europe, we also have a Q 6-week regimen, which we think is very important as you think about patients being treated in the earlier stages of disease. We also have a very strong new indication in head and neck cancer. And I had a chance to sit in the oral session at ASCO and when physicians had a chance to see the updated data from KEYNOTE-048 and think about head and neck cancer patients that have been waiting for 10 years for something new and different, KEYTRUDA plus chemotherapy across first-line patients in all segments showed a significant benefit in overall survival. You now have the option also for head and neck cancer patients to use KEYTRUDA in a biomarker express population in monotherapy. And this now, we believe has a significant opportunity to bring benefit versus the standard of care, which is an extreme regimen of chemotherapeutic agents. So we're very excited about head and neck. And then there's going to be many more indications to come. You heard me just announce some of the recent approvals. Many more to come over the next several years in neoadjuvant, adjuvant therapy, new combinations, new tumor types. So we clearly see KEYTRUDA not only today, near term and long-term, as a significant opportunity for future growth.

If I turn my attention to Lynparza, we also see a phenomenal opportunity here with Lynparza in our partnership with AstraZeneca. Lynparza in a competitive marketplace in the U.S. has a 60% TRx share, it's the market leader. It also has the broadest clinical development program out of all the PARP inhibitors. And what's really exciting is that we just introduced and are launching new data in a maintenance indication with patients that have germline BRCA mutations in ovarian cancer in the SOLO-1 data, practice changing data, where you saw a progression free survival benefit and hazard ratio of 0.30, and we're hearing tremendous feedback from our customers about the importance of Lynparza for that patient population. What was also exciting at ASCA, we shared data in germline BRCA-mutated pancreatic cancer patients, a subset of pancreatic cancer patients. But many of us know, this is significantly a cancer type with a lot of unmet need. And we've seen now in that subset a benefit from Lynparza on progression-free survival, and this begins to start to see, as you can see here, the opportunity we can build beyond the women's cancers of ovarian and breast cancer to pancreatic opportunities potentially in prostate cancer and more. And we're very excited about the opportunity we have to combine Lynparza with KEYTRUDA in many cancer types. So we see this as a very significant growth potential not only for Lynparza, but clearly also with KEYTRUDA.

Lenvima, also establishing itself as a tyrosine kinase inhibitor of choice. It's approved in many markets around the world. We're seeing very strong uptake in hepatocellular cancer, which is a high prevalent cancer in China. And we have a strong collaboration with our partners at Eisai. And you're going to hear more that we now have 13 combination studies underway with endometrial cancer and non-small cell lung cancer and renal cell carcinoma, very broad-based combination program with KEYTRUDA and Lenvima, and we're excited about sharing that data in the future.

So if you look at our oncology growth pillar. We believe over the next 5 years, I want you to think about the opportunity for more than 50 additional indications. KEYTRUDA, Lynparza and Lenvima are truly establishing themselves as cancer foundations, and we think the number of indications that we have today as well as the potential over the next five years gives us tremendous growth opportunities, and we have the potential to nearly triple the number of oncology indications by 2023. If I shift and look at vaccines. Vaccines, we see as a growing global business with both near and long-term opportunities. You can see around the world we've had a chance to double our vaccine business from 2010, to where we are today. And we are investing in vaccine manufacturing capacity to increase doses produced based on our global demand, and we expect to see additional supply coming on board in the '23 to '24 time frame. And we also believe you'll hear today we have a very strong pipeline within our vaccine franchise with regards to RSV, CMV, dengue and others.

GARDASIL is, I think, one of the most exciting stories that we have. This is a product based on data that was coming out of Australia, real-world data that has now repositioned GARDASIL. And there is a global appeal to try to eliminate cervical cancer. We have seen a reacceleration of growth of GARDASIL. And in fact, in the first quarter, we announced growth of 31% versus prior year. And the growth is being driven by new geographies, gender neutral immunization programs and new age cohorts especially based on our approval in the U.S.

And we believe GARDASIL, not only near term, but long-term is a significant opportunity ahead because when you look at it less than 3% of the world's population has actually received an HPV vaccine, so we see significant opportunity for us with GARDASIL going forward.

As we look at the hospital portfolio. We announced in the first quarter that BRIDION was starting to annualize at over $1 billion a year, and we're seeing very strong growth. And we think we are poised for future growth with BRIDION based on the number of surgeries where a reversal agent will be used in a number of surgeries that are increasing around the world.

ZERBAXA, ZERBAXA has just received, in June, a very important indication for patients that have hospital-acquired bacterial pneumonia or ventilator-associated bacterial pneumonia. The mortality and morbidity rates in that patient population in the hospital is still high and there is still unmet need, and we're very excited to bring ZERBAXA to those customers that need this indication. And you can see a leading portfolio of antibiotics and antifungals. And also our doravirine family launch allows us to build on our HIV future and also positions us, we think, for a very bright opportunity that you're going to hear today around MK-8591, which we are very excited about. So we also believe HIV not only in the near term, but long-term will be very important for us going forward in our hospital and specialty areas.

If I look at how is this playing out around the world, we announced very significant growth in Q1. ex U.S., we grew 12% in the first quarter. We actually grew 12% in the U.S. as well. But I also want to turn your attention to the 67% in China. That was the first quarter growth. We went back and looked at the last 18 months to see how are we performing in China. And we're the fastest growing multinational pharmaceutical company right now in China, 43% over the last 18 months, with the average at around 11%. And what is driving that growth is the health care reform that's taking place in China, but also it's our pivot to innovation in our portfolio of KEYTRUDA, Lynparza, Lenvima and JANUVIA. And we believe that growth is not only near term, but has the opportunity for long-term sustainable growth.

So in summary, the management team is very confident in our growth opportunities and ability to execute. The innovative portfolio I showed with you will drive significant demand. We have significant global opportunities both in the U.S. and outside the U.S., a world-class commercial team that really knows how to execute in this changing environment. And we believe that we have the commercial foundation for sustained global growth. I'd like to thank you very much for joining us and now ask you to turn your attention to our next growth pillar, Animal Health. Thank you.

(presentation)

Richard R. DeLuca - *Merck & Co., Inc. - Executive VP & President of Merck Animal Health*

Good morning. It's a pleasure to be here with you. Today, I will show you that Merck's Animal Health business is a global leader, extremely innovative, has consistently outperformed the industry and gains a competitive advantage through several touch points within Merck. You're familiar with the metrics. Great long-term metrics in the industry, is projected to grow mid-single digits. Some of those drivers, ever increasing populations, rising middle class, both creating increased demand for protein and increased pet population, more pets getting medicalized and also pets living longer because of that great care. So who is Merck Animal Health? We execute, and we've consistently grown faster than the industry. Merck Animal Health is a global leader in pharmaceuticals, vaccines, digital technology and customer solutions. We're present in over 150 markets. We have an extensive network of manufacturing and research and development sites, and I will talk a little bit more in depth about research. But as far as manufacturing goes, we have a global platform. We're able to take advantage of both global and regional opportunities, especially strains that are only allowed in certain markets. However, I have the distinct advantage of being able to access Merck's considerable expertise around the world in manufacturing to get best practices, process improvements that are developed within the entire Merck organization, help troubleshoot problems quickly and take advantage as rapidly as possible of local opportunities.

Merck Animal Health is the leader in vaccine revenue. We produce over 100 billion doses of vaccine annually. We have a deep and broad portfolio across species, therapeutic areas and geographies. In addition, our vaccine biologics strength provides consistent growth opportunities due to

the long life cycles. In addition, our top 10 products only account for 38% of our revenue. Our extensive network in research and development is broken out between pharmaceuticals, biologicals as well as our newly acquired innovation centers from Antelliq, giving us the opportunity to tackle big and small problems wherever they are in the world. So locations in itself don't mean anything. So I want to show you how productive we've been. We're at the top of the industry over 66 product approvals over the last 5 years. And how do we do this? 3 innovation pathways, and we're very fortunate. The first, an extremely productive in-house discovery and development group located around the world. So we can do projects year around, and we've been quite productive. But the second pathway is Merck Research Laboratories, where I gained my competitive advantage. We have access to the best scientists in the world as a result of what Merck's doing and access to some of the best assets that they have and will continue to get. And I'll talk more in depth about that in a minute. But we also have been very active in external partnerships as well as business development.

I want to talk a little bit more about some of the touch points and the key areas that we're working on. Vaccines. We collaborate on a regular basis. Both ways, we have communication. It makes both of us stronger, and we've been very fortunate and very productive in that regard. In the vaccine and bio space, we are fortunate to be able to access their talent, their oversight and their assets in oncology, and I've several products and projects being worked on in the oncology space, which they've provided me oversight with and are doing quite well in various stages, both near term and long term.

As well as a big unmet area, I was able to gain assets out of Merck for dermatology in pets. We don't play in that space today, but I can assure you we will tomorrow because of access to Merck Research assets. Some of the other key areas, a strong point for Merck, anti-infectives. We work closely, numerous projects going on. And another one that we're quite proud of, diabetes. Merck's a leader in diabetes. Merck Animal Health is also a leader in diabetes. We have the largest pet products, dog and cat diabetes on the market, as well as we're able to take advantage of their pipeline of compounds to be able to introduce the next generation of products for pets in the diabetic space, and that's great.

All this has led to us having a number of first and best-in-class assets. A few examples of those. Merck Animal Health has the only double-recombinant vaccines in the world for poultry, for any species (inaudible) poultry. We also have the only transdermal pain application for cattle. In addition, something we're quite proud of, the only long-acting flea and tick product on the market. You're depriving your pet if you don't use that product.

We also are very productive in business development. As Rob told you, we've been quite active. We go after global and regional opportunities. Some of them are Vallée, which was our acquisition in Brazil. We're #1 in the market in Brazil now in Animal Health. China, we just completed an acquisition late last year in China, which will now enable Merck Animal Health to develop and produce its own products in China. We're very excited about that. While that's a long-term opportunity, it's a large market which is going to be a great growth opportunity for us as we move forward.

We care about the long-term as much as we do the short term. Obviously, our Vilsan acquisition was in Turkey, a rapidly growing cattle market. We're #1 in that market now. And then Rob talked about Antelliq, and I'll show you that in a bit very soon. So what does all this really mean? Well, we've grown now to provide even more and more value to our customers over time, which affords us to take advantage of more and more market opportunities. And so if you look at the slide, the first circle represents the great products that we developed. That would be enough for some companies, but not for Merck Animal Health. We partner that now with leading customer solutions as well as innovative delivery options, and let me give you a few examples of those.

We have the first and the biggest needleless injector for swine, better compliance, better animal welfare, more safe for the employees. We have the largest in the first freeze-dried technology for vaccines for poultry, better compliance, way more convenient for the farmers, targeted dosing, reduced cost. As well as animal welfare platforms, animal handling programs, vet reminder systems for pet clinics, put those altogether to a formidable competitive, but we didn't stop there. We went after technology. We started our own Animal Ventures group, which I'll talk about in a second, but then we added Antelliq. We are the leader in digital technology today.

And so when you couple all of this together, it becomes a competitive advantage for Merck Animal Health, and let me just give you a quick example. Dairy companies, those large companies that are really reliant on getting dairy production, they come to us now, even though they don't own the farms and they say please help us. We want certified animal welfare practices. We want to make sure animals are being treated properly. We want to make sure they're healthy, and we need you to increase their productivity, efficiency and help them stay in business because a lot of them are family businesses and help lower the cost of the dairy companies.

And so coupled together, we offer identification from Allflex, our Antelliq business. We offer monitoring for dairy cows. And so now, we can tell when the animal is cycling. We use our reproductive products to helping the process. We actually monitor the animals through the calving and milking cycle. We monitor them afterwards, and then it starts all over again. And if the animals get sick along the process, we use our products to treat as well. Just one example, I could be up here all day talking about it.

On the pet side, think about a holistic solution coupled with our leading pet recovery system and our newly acquired Antelliq Sure Petcare business, imagine a holistic health option for pets in the diabetes space. Being able to put a recovery chip in, the chip senses temperatures, being able to check apps on your phone. Putting the Antelliq animal pet tracker on the pets collar to track activity during the day, to see whether it's actually moving around or if it might be sick. Using our considerable offerings of pet bowls and dishes in order to make sure your other pets aren't eating the medicated feed that the diabetic pet needs. And then in addition being able to put world-class algorithms in place to do even more around that pet, but also feed information to the consumer when we need to, correspond with the vet when we need to, all across that app. Very exciting for us as we move forward.

I talked about Antelliq a little bit. Let me just give you a little example of our Animal Health Ventures group. 2 projects that I can speak of, one happens to be in the cattle space. You see that stethoscope up there. I acquired that from a doctor. And what that does is, it's used for respiratory screening, lung scores of cattle, moving from pastures into a confined feeding area. However, you have to take the stethoscope and stick your arm through metal gates and touch in the right spot in a 1,100-pound animal, not something I'm willing to do, I can assure you that.

However, we made that even better by coming up with a device and better algorithms with 6 heads, as you can see in the lower picture, on a long pole with a button, so we can get 4 out of 6 readings 99% every time and help improve the treatment and the efficiency of the farm, so that we can tell if the animal is sick, it's predisposed to being sick or it's fine and they are sorted accordingly, and it cuts down on prophylactic antibiotic use. Very big in value by our customers.

As well as a sea lice counter. If you're in the salmon-producing world, sea lice costs you billions of dollars. And you would have to take fish out and use the microscope manually to count sea lice. It's mandated by governments around the world, Scotland, the U.K., Canada, Norway. We've automated that process in the dark underwater using technology that can detect the sea lice, but also the sex of the fish, the conditions, whether it's feeding properly. And now both of these will be revenue sources in the coming year in terms of being able to charge a monthly fee for utilizing our equipment, just another path to innovation from Merck Animal Health.

Extremely innovative, execution excellence and competitive advantage touch points to access the best scientific talent within the best scientific organization and to be able to do it anytime and anywhere we want. What could be better? I thank you for your time today. And I know I showed you that we are truly a global leader in Merck Animal Health and why we will grow faster than the industry. Thank you.

Now it's my pleasure to introduce the Head of Merck Research Laboratories, Dr. Roger Perlmutter.

Roger M. Perlmutter - *Merck Research Laboratories - President*

Thank you, Rick. Good morning. So you can at the moment stop taking notes. You can put down your pens and your pads, I have no slides. I have no substantive data. I have no pitch. Instead, it's my privilege this morning to introduce Merck Research Laboratories, to introduce the work that's done in our laboratories and the way in which that interfaces with Merck & Company as one seamless, holistic entity.

So to do that, I'll ask you to cast your minds back to 1933. In 1933 -- I wasn't there. In 1933, George W. Merck, who had the misfortune of taking over his father's business at exactly the wrong time just as the stock market crashed and the depression emerged, George W. Merck had a small private company, Merck & Company. And he had to decide what to do with his resources. And George W. Merck at the height of the Great Depression said, "I'm going to take what little money I have, and I'm going to build a research institute in Rahway, New Jersey."

I think about that almost every day. He took what little money he had and he said, "I'm going to build a research institute in Rahway, New Jersey." And he said at the time, "I have in mind that science is going to be more important for medicine in the future, and I want to be part of that." It was

an extraordinary vision. It was an extraordinary investment, and it has paid such enormous dividends. Those enormous dividends are fundamental to what we are as a company. When you think about us remember this, our legacy matters.

In some ways, the most important thing that George W. Merck did was handpicked those individuals who would actually work in that research institute. Chief among them was Max Tishler. Max Tishler, surely one of the great synthetic organic chemists of the 20th century, provided the foundation upon which everything else is based. It was because of Tishler that Merck had the fermentation capability necessary to assist Professor Florey when he came from Oxford University to the United States to involve American industry in the production of penicillin, which proved to be critically important in World War II.

It was because of Tishler that Merck had the ability to decipher the structural information from extracts obtained at the University of Wisconsin that identified cortisone and the cortisone/cortisol transition and led to the introduction of effective steroidal therapy for inflammatory disease. It was because of Tishler that Merck had the scientific capability to introduce the first nonsteroidal antiinflammatory drugs. It was because of Tishler that Merck forged a relationship with Selman Waksman in New Jersey that enabled the production of streptomycin. It was because of Tishler that Merck built the process chemistry expertise that enables us to do what we do now.

You'll have the opportunity to hear about many programs, programs that evolved since the time that Merck introduced the first successful diuretics to treat hypertension, the first successful HMG-CoA reductase inhibitors to lower cholesterol. Since the time that Merck introduced the first carbapenem, antibiotic imipenem still saving lives around the world and which we are improving through the addition of, for example, relebactam. You'll have a chance to hear about all of these things. But the important part that I wish to emphasize is that underneath these programs, underneath these products, underneath what Rick DeLuca told you about Animal Health, underneath what Frank told you about our commercial trajectory, underneath what Ken and Rob talked about in terms of the future of the company, there is this enormously stable platform.

And what you will hear this morning is first of all our ability to execute clinically and commercially to bring these products to life. And secondly, you will hear about the felicitous engagement of breakthrough research with a process development capability that is the leader in the industry. This is Merck. We are the premier research-intensive biopharmaceutical company in the world that has always been our place. And it began with the vision from George W. Merck. When they commissioned the research institute in Rahway, George W. Merck said -- standing before a small audience, he said, "We have faith that in these new laboratories, with the tools that we have provided, science will advance, knowledge will increase, and human life will earn still greater freedom from suffering and disease, still greater freedom from suffering and disease."

It's my pleasure to introduce my colleagues, Roy Baynes and Mike Nally, to tell you exactly how we make that happen.

Roy D. Baynes - *Merck & Co., Inc. - Chief Medical Officer*

Good morning, everyone. My name is Roy Baynes. I'm Chief Medical Officer at Merck.

Michael T. Nally - *Merck & Co., Inc. - CMO & Executive VP*

Good morning, everyone. I'm Mike Nally, Chief Marketing Officer at Merck.

Roy D. Baynes - *Merck & Co., Inc. - Chief Medical Officer*

So over the next 35 to 40 minutes, we are going to walk through a couple of late-stage development programs. We have a very broad late-stage portfolio, and we had to make choices. So we're going to focus on oncology, vaccines, HIV and our new program addressing the purinergic nervous system. I will deal with the medicine and science. Mike will deal with the commercialization aspects. And I hope that you take away from this presentation the notion that these are broad and deep programs. Indeed, each one of these is a pipeline in and of itself. The other important realization is that they are highly derisked. We already have good proof-of-concept. We have good Phase II and III data for a lot of these. And consequently, this pipeline will deliver meaningful information and approvals for the foreseeable future. So I will start off and lead into the oncology discussion.

When we set out on the journey with pembrolizumab, we realized we had really important medicine. And we sought to define broadly across tumor types the monotherapy capability. The strategy paid off, and indeed I will show you some evidence that we have very broad-based monotherapy activity. We use precision medicine to select patients, most likely to benefit and by difference those most likely that need something additional and to use that information to inform on resistance and thereby select logical combinations. And that leads to the third pillar, which is combination therapy where we have explored a broad array of combinations to address various cancers.

The key takeaway is KEYTRUDA is indeed a foundational medicine in the treatment of cancer. KEYTRUDA is really the first broad-spectrum anticancer therapy. This series of (inaudible) speaks to the breadth of that activity. Of our initial 30 cancers screened, 25 of them have shown activity for pembrolizumab or KEYTRUDA. And the circles indicate indications that have already achieved approval. The trials were oftentimes single arm trials leading to rapid entry to the market. And at the same time, we prosecuted Phase III studies looking at heart cancer outcomes of overall survival and in the adjuvant setting event-free survival.

This graphic is quite a remarkable graphic. What it shows you is heart cancer outcomes across the randomized controlled clinical trials thus performed, as an oncology drug developer, I would have been pleased to have any one of these graphics positive. But indeed every single trial that we've conducted has shown either statistically significant improvement in a heart cancer outcome or directionally favorable, medically important favorability of outcome. This speaks to the incredible power and breadth and depth of pembrolizumab as an effective anticancer agent. But we're still early in this journey. We currently have over 1,000 clinical trials ongoing. We have over 75 registration-enabling studies ongoing. We have over 600 combination studies underway and over 100 trials addressing the early treatment of cancer, that is to say neoadjuvant, adjuvant, all local disease.

I want to spend a brief moment on that early opportunity because I think it's an underappreciated area for pembrolizumab and for Merck. We already approved for the adjuvant treatment in melanoma. We have now at this moment in time 18 additional studies ongoing across 9 major cancer types, and we are indeed we believe in a leading position in a majority of these. This is a broad program, and we are addressing major cancers, including lung cancer, head and neck cancer, breast cancer, malignant melanoma, kidney cancer, urothelial cancer, cervical cancer, hepatobiliary malignancy, skin cancer, gastric and esophageal cancer. So a broad array of early trials, and it's important to recognize these are incremental because the majority of metastatic patients actually present with metastatic disease.

I'm going to focus on 2 major tumor types, which we think represent very substantial opportunities for patients and for the company. Firstly, breast cancer. In our Phase II study of chemo combination with KEYTRUDA in triple-negative breast cancer, using pathologic complete response as the surrogate endpoint, and it is a good and well established surrogate for meaningful outcomes in cancer, we have shown remarkable pathologic complete response rates. This confirms what was observed in the I-SPY 2 study and gives us a lot of confidence around our neoadjuvant and adjuvant programs in breast cancer. We have some 10 programs addressing a broad array of opportunities in breast cancer.

Another tumor I want to spend a moment on is prostate cancer, again a highly prevalent disease with significant unmet medical need. Initially, the IO drugs did not show much single agent activity in prostate. I will say, however, that pembrolizumab was one of the only ones to show some monotherapy activity. We worked diligently exploring combinations, and we had the great privilege at ASCO GU this year of showing Phase II data looking at a number of combinations, and indeed remarkable activity was seen when a PARP inhibitor was combined with pembrolizumab, when chemotherapy was combined with pembrolizumab or indeed when novel androgen receptor blockade in the form of enzalutamide was combined with pembrolizumab.

Now why is this important? Well, in this graphic, I described the natural course of prostate cancer. On the Y-axis is prostate-specific antigen, and it tends to correlate quite nicely with disease burden. This describes an average patient scores. Patient presents with disease, PSA is raised, treated with definitive initial therapy with either radiational surgery or both, rendered in a state of control for a period of time, but then often will escape, and PSA starts to go up again. At this stage, the disease is hormone-sensitive, typically response to either medical or surgical castration that provides control for a period of time, but eventually the disease escapes again and follows then an inexorable course towards demise.

Various treatments are exhibited along the way, and typically we date these with respect to when chemotherapy was given. So there's either the pre-chemo, chemo or post-chemo phase of treatment of castrate-resistant prostate cancer. Based upon the data I've shown you, we have developed now a significant registrational effort in all 3 phases of castrate-resistant prostate cancer using initially enzalutamide, and this is a collaboration

with Pfizer and Astellas, combinations with docetaxel as chemotherapy or a combination with a PARP inhibitor in the form of Lynparza. We've also extended a Phase III trial into the hormone-sensitive stage of the disease. We think this represents a very major opportunity for development of the drugs.

That allows me to segue into a brief word on Lynparza. You've heard from Frank how important we believe this is going to be as a growth component for oncology. You've already heard that we're already established as a treatment of choice in a number of female malignancies, including ovarian and breast cancer. And you've heard that we recently showed the POLO data at ASCO. We've also shown initial data in prostate cancer. Now listed on this graphic are all of the trials, and I'm not going to go through them in great detail, that essentially explore the totality of the monotherapy opportunity as well as the combination approach to KEYTRUDA together with Lynparza. We currently have the potential for an additional 19 indications using this combination or monotherapy. So key takeaway, this truly is another pipeline and a product.

Similar story for lenvatinib in collaboration with Eisai. You've heard already from Frank that this is an important monotherapy in thyroid cancer, renal cancer and hepatocellular cancer. We've already shown Phase II data of remarkable activity in combination with pembrolizumab across an array of solid tumor shown on the graphic. And what we've tabulated now is 13 Phase III trials, which are being deployed across 7 major tumor types where we believe we have really good proof-of-concept for the value of the combination. So again, another key takeaway, a pipeline and a product.

Quick word on our early phase program. We have now over 20 new molecules in Phase I or in early Phase II experiments trying to augment the body's natural immune response against cancer. I'm not going to step through these individually, but suffice it to say the panel on the left reflects agents which we seek to use to prime or improve trafficking of the cell which kills cancer, that is to say the cytotoxic T cell into the tumor.

We're also showing on the top right-hand panel the molecules we're working on to try and reduce the immunosuppressive environment within the cancer. And then, obviously, we're combining with a lot of agents aimed at killing cancer because we believe in this active antigenic or immunogenic cell death that immunogenicity is enhanced. So again, I've shown you a very broad oncology program. We have a lot of confidence in this program, and we think it will be a major driver.

And I'd now like to hand over to Mike to discuss the commercialization aspects. Mike?

Michael T. Nally - *Merck & Co., Inc. - CMO & Executive VP*

Thanks, Roy. So over the next few slides, what I intend to do is actually build on what you've heard from both Frank and Roy and talk a little bit about the opportunity we see ahead. The reality is we have a unique and unprecedented opportunity in oncology. And while over the last 5 years we have made enormous progress based on a strategy of scientific excellence, world-class clinical execution and stellar commercial performance, the reality is that there's so much more to be done as you saw in Roy's slides. We see the opportunity ahead of us as greater than the opportunity that we've realized to-date1.

And if you look on this slide, you can see the market opportunity. By all estimates, the cancer market is sizable and expected to almost double by 2028. When we look at our portfolio and the assets within our portfolio, we firmly believe we will outperform this growth in the cancer market. That will largely be predicated on the continued foundational treatment, KEYTRUDA, using it in more tumor types, in more combinations and in earlier lines of therapy, additional combinations and tumor types for both Lynparza and Lenvima and the rich pipeline that you saw from Roy with over 20 different mechanisms that will ultimately provide benefit to patients. When we think about this, this is an enormous opportunity, and we firmly believe over the next decade that Merck will be the long-term leader in oncology.

In the neoadjuvant and adjuvant space, we see a huge opportunity to move into earlier lines of therapy. There is a significant burden of disease in earlier lines of therapy. And as this chart shows, in the dark green shading, the reality is the majority of patients in many tumor types present with earlier stage disease. By bringing treatment earlier in the continuum, we have a great opportunity to save more lives. This program is going to be executed in a comparable manner to our program in the metastatic disease. And I think what you've seen in that case is our clinical execution capability has enabled us to outperform the competition.

As Roy noted, we see the opportunity in earlier lines of treatment as an additive opportunity. We'll be able to maintain our metastatic business, but also benefit from patients in that earlier line of care. And when we think about the breadth of our portfolio and we think about the breadth of data that we'll be generating, we'll have a comparable wall of data in the earlier lines of therapy as to what we've been able to generate in metastatic disease. Ultimately, in a number of these tumor types, we expect to be first to market in the earlier settings.

As Roy noted, 2 additional opportunities that are really, really intriguing are in breast and prostate cancer. As this slide shows, breast and prostate cancer represent 2 of the 4 largest diseases by prevalence. Both markets are enormous, the breast cancer market almost $40 billion, the prostate cancer market about $50 billion. In breast, we'll initially focus in the triple-negative space, but we'll move beyond that over time.

In prostate, our trials will represent over 40% overall prostate cancer market. And I think what this development strategy illustrates is how combination-based approaches have the potential to help patients with cold tumors where monotherapy was not as effective as in other tumor types. So overall, we are extraordinarily excited about the opportunity before us in oncology. We believe we have a leading oncology program across a number of different tumors in a number of stages of disease. And we look forward to the continued expansion of our oncology business over the years to come.

With that, I'm going to turn it back to Roy now who will cover our vaccines pipeline.

Roy D. Baynes - *Merck & Co., Inc. - Chief Medical Officer*

Changing gears now, I want to talk a little bit about our vaccine portfolio. You've heard from Frank the realization that indeed the majority of papillomavirus-related malignancy can be prevented with vaccination. This is going to rely on the evidence to support age-expanded and gender-neutral vaccination. Our pneumococcal vaccine program is a very active one and a broad one. Existing vaccines control and have controlled a number of the serotypes of pneumococcal disease, thereby reducing the overall burden. However, in various specific groups now, we have serotypes, which are not covered by prior vaccination. And this program focuses on deploying appropriate serotypic vaccination to the appropriate populations that need them.

Next, I want to say a quick about respiratory syncytial virus program. RSV continues to be a major cause of morbidity and in sometimes mortality, particularly at the extremes of life, that is to say newborns, young children and adults. We have a two-pronged approach here. The one relies on a passive immune approach using long-acting monoclonal antibodies to neutralize the virus. The other is a vaccine approach based upon an RNA vaccine that we are collaborating with our colleagues at Moderna in the development of.

Next, I want to say a quick word about our cytomegalovirus program. CMV is today's rubella. It is the most common nongenetic cause of neurologic defect in young children, particularly deafness. It has been identified by major government agencies and regulatory authorities as an area of significant unmet medical need, and we are most pleased to be bringing forward what we believe is an industry-leading CMV vaccine. And our early phase experiments suggest the ability to generate meaningful immune coverage.

Dengue virus continues to be a scourge in many parts of the world, some areas contributing to hemorrhagic fever and mortality. We, together with our partners, the Instituto Butantan in Brazil, have inlicensed vaccine, which essentially has all of the appropriate antigenic coverage to protect against all the subtypes of dengue. And that's important because partial protection we believe may be associated with adverse outcomes. Our Phase I data suggest indeed that we achieve broad coverage. And we have a Phase III program being prosecuted by Instituto Butantan in Brazil at this time.

You're all no doubt aware of the Ebola outbreaks in Africa that have been fairly catastrophic for the regions where they have occurred. It's a dreadful one ongoing at the moment in the Democratic Republic of Congo. Merck is both pleased and proud to have brought forward a vaccine, which, when used in ring vaccination fashion, can help interrupt the deadly cycle. This is currently under review by major regulatory authorities and we believe will have a major impact on public health.

I now will hand it back to Mike to talk about commercialization aspects of our vaccine portfolio. Mike?

Michael T. Nally - *Merck & Co., Inc. - CMO & Executive VP*

Thanks, Roy. The overall vaccine market is an attractive market that will -- demonstrate significant growth over the next decade to approximately $60 billion. Merck's long history and heritage in vaccines has made it a leader for the last number of decades, and we expect to continue to occupy a leadership stance going forward. One of the real benefits of the vaccine business is the durable nature of products. Some of our vaccines such as M-M-R as well as Pneumovax 23 are over 30 years old and continue to provide enormous public health benefits around the world. Given our capabilities, both from a scientific as well as from a manufacturing standpoint, we have an enormous opportunity to continue to do good for the world in the areas of vaccines.

If we think about the near-term growth drivers and over the longer term how we're going to continue to accelerate in this space, it's really predicated on 4 things, the first of which is improving coverage rates. Coverage rates for vaccines everywhere around the world are too low. As we're witnessing right now, there are a number of outbreaks of measles and mumps. And so the pediatric coverage rates are inadequate to provide the heard protection that we once achieved. If you think about the adult and adolescent markets, those pathways are even further underdeveloped. And so there's a huge opportunity for us with all of our vaccines to improve coverage rates.

The second part is on expanding cohorts. And we have a number of life cycle management activities in place to expand cohorts for our vaccines. A great example there is the recent approval of GARDASIL 9 in the U.S. for the 27- to 45-year-olds cohort. This opens up a huge market opportunity to protect individuals who have not been vaccinated.

The third dimension is the geographic expansion of our business. As recently as 2010, 75% of the doses we distributed in vaccines were in the United States. Today, the majority of our doses are outside the U.S. And one of the great opportunities we've seen in the past couple of years has been the approval of GARDASIL in China, opening up a cohort of approximately 100 million to 150 million women in the indicated age range with the ability to pay for the vaccine. We will also grow though through our innovative pipeline that Roy touched on, and I'll go into more depth on that over the next couple slides.

We have a portfolio-based approach to tackle pneumococcal disease. Merck has a long history in the pneumococcal market with Pneumovax 23, which was approved 36 years ago. We've seen a recent resurgence in Pneumovax 23 as public health authorities around the world place greater value on adult immunization. V114 will be our first foray into the conjugated market. We recently received Breakthrough Designation for V114 in both pediatrics as well as adults. And V114 has demonstrated in Phase II studies in both populations a comparable immune response to PCV13 across the 13 shared serotypes with the addition of 2 valuable additional serotypes.

Over the long term, our polysaccharide library as well as our capability in conjugation allows us to mix and match and tailor and create unique vaccines for the different market segments. V116 is a unique vaccine tailored specifically to the adult market. V116 is based on the underlying epidemiology in adults recognizing that it differs from the pediatric segment. By creating this construct, we're able to tackle the vast majority of residual pneumococcal disease in the adult segment. We also have efforts underway in the pediatric segment to do the same thing, to create a unique offering for the pediatric market. This approach ultimately provides us with a great foundation for the future in pneumococcal disease.

Why are we so interested in this space? This is by far the largest vaccine market globally. We estimate that pneumococcal market will be between $7 billion and $10 billion over the next decade. And as Roy noted, there is a significant unmet need given the serotypes that are not covered in today's vaccines, but also for the need for higher immunogenicity of certain serotypes within -- in today's vaccines. The 2 distinct segments that we see are the pediatric segment, which is currently 2/3 of the market. There are about 140 global national immunization programs.

But despite this, there are still approximately 500,000 deaths annually in the pediatric segment. V114, in our next-generation candidate, will be specifically targeted to address this residual disease as you can see here on the chart. In the adult segment, there are limited national immunization programs with less than 40 globally. This result in a significant burden of disease for adults from pneumococcus. V114 provides a conjugate option initially in this space, but our real approach in the adult market is the use and leverage the entirety of our portfolio to meet the distinct needs of markets around the world.

By taking this portfolio approach and with our next-generation vaccines in both the pediatric and adult markets, our candidates will cover the vast majority of residual disease and provide significant public health benefit. Ultimately, we believe that this breadth of our portfolio will enable us to win in the pneumococcal market.

I'll next touch on the remainder of the vaccine programs in the pipeline. These programs are all first-in-class or best-in-class programs that really address sizable market opportunities. We believe across these 3 programs, there's about a $10 billion opportunity if we are able to succeed and capture the majority of the market. In RSV, it is the most important respiratory pathogen with no preventative vaccine. We have 2 programs as Roy noted MK-1654, which is a long-acting monoclonal that will target the pediatric segment and we have V172, which has broader utility when also provide protection to adults. When you look at the burden of disease of RSV you can understand why public health authorities around the world are looking for a solution. Ultimately, if successful, we believe this market size will be in excess of $5 billion a year annually.

CMV, again, there are no preventative measures to address CMV. Our candidate V160 is expected to be a first-in-class vaccine. During Phase I trials with V160, we were able to induce an immune response that closely mimic natural infection. Again given the burden of disease and the total of congenital abnormalities, including hearing loss on society, we see this is an anonymous market opportunity in excess of $3 billion a year globally.

And lastly, dengue. We believe we have a best-in-class dengue candidate. Dengue in dengue endemic regions account for about 4 billion people globally with a significant burden of disease in those countries. Our product profile, being a single dose and having a balanced immune response across all 4 dengue serotypes, provides a great opportunity to provide protection in not only the private and public markets in the dengue endemic regions, but also as a traveler's vaccine going forward. The peak market size that we estimate for dengue is in excess of $3 billion a year as well. So we are really excited about the areas of unmet need that we can tackle with our vaccine portfolio. We have a broad portfolio and a unique expertise to tackle some of the most important diseases going forward. And we'll look forward to building on not only our in-line portfolio, but these new vaccines to drive growth going forward.

With that, I'm going to turn it over to Roy on HIV.

Roy D. Baynes - *Merck & Co., Inc. - Chief Medical Officer*

As you heard from Roger earlier on legacy matters and Merck has had a storied legacy in the fight against HIV. I'm not going to go through the time line, but suffice it to say, Merck has introduced many first-in-class molecules to address these grievous illness. Last year, we were fortunate to achieve approval for our industry-leading non-nucleoside reverse transcriptase inhibited doravirine both as a single agent as part a complete regimen and as a fixed dose combination as a single tablet regimen. We're continuing to innovate. You heard mention of MK-8591 and this, we believe, is a critically important molecule for the treatment and prevention of HIV. The molecule has remarkable properties: it's extremely potent, it has a very favorable resistance profile, it has very favorable kinetics leading to the ability to think of flexible dosing and it plays well with others. So it looks like it will be an important component of combination therapy.

This is a new class of molecule. This is nucleoside reverse transcriptase and translocation inhibitor. And we think that these properties allow for forgiveness or significant forgiveness around missed doses, which is obviously very important. We do believe that in the pre-exposure prophylaxis, the flexible scheduling lends itself to really remarkable possibilities. We believe it could be used as a daily dose, weekly dose, monthly dose or indeed much longer as an implantable.

We have already Phase II data establishing remarkable efficacy in combination with doravirine, this data to be presented in upcoming meetings. And we have a suite of other classes of molecules with potentially more favorable kinetics, which will allow less frequent dosing. So we do believe either as part of a daily regimen or weekly regimen or potentially an implantable regimen, this will play a major role in the treatment of HIV. Our long-term aspiration is obviously cure, but until that is achieved, we do believe 8591 will have a major role to play.

And now, over to Mike to talk about the commercialization.

Michael T. Nally - *Merck & Co., Inc. - CMO & Executive VP*

So despite all the progress we've made in HIV, it remains a major global public health threat. And importantly, in the middle column here, of those newly diagnosed with HIV, 2/3 of those individuals are between 20 and 40 years old, meaning they will face decades on treatment and will require unwavering adherence in order to survive.

The HIV market is a large market and we expect it to continue to grow. We estimate, over the next 5 years, the market will be asked approximately $30 billion. And I think it's important to now pause on a couple of key market dynamics. The first of which is that there is little margin for error, given the deadly nature of this virus and the risk of resistance. Secondly, because of lifelong therapy being required patients need options tailored to their specific needs, especially as they age and develop other core morbidities. As a result, the HIV class in many ways is differentiated from a number of other classes, where there is enormous patient and scientific leader advocacy to ensure access to the breadth of treatments. We believe this creates a significant long-term opportunity for both our recent launches of doravirine, but also with MK-8591, given its unique attributes.

MK-8591 is truly a special molecule. Its characteristics have broad utility across the major unmet needs in the HIV market. A key aspect of 8591 is the potential for forgiveness or extended coverage for missed doses. As Roy noted, given the high antiviral potency, long half-life and deep tissue penetration, it creates a stronger barrier to resistance than other compounds. Secondly, given long-acting regimens and the potential for both long-acting oral and implantable regimens, it helps address the very real pill fatigue that patients on HIV therapy face. We expect in the treatment space that MK-8591 will become a foundational anchor for combination to dose -- to drug combinations. And as a result, it offers the potential benefit of avoiding the toxicity associated with many of the current backbone therapies.

And lastly, and critically, in the prophylaxis space, MK-8591's long half-life, deep tissue penetration and the oral and implantable options provide a real solution for the 1.1 million people who had high risk in the U.S. as well as those globally. This compound has a real potential to fundamentally change the transmission dynamics of HIV. Given our broad portfolio of HIV innovations, we think we'll capture a meaningful portion of the HIV market.

With that, I'll turn now over to Roy for gefapixant.

Roy D. Baynes - *Merck & Co., Inc. - Chief Medical Officer*

The final program we plan to cover this morning is our gefapixant program. This was a molecule in-licensed from -- pardon me, acquired from Afferent. And this molecule is essentially a blocker of the P2X3 receptor. The P2X3 receptor has been now shown to be an important regulator of a pathway that is thought to be important in a number of sensory, neurological abnormalities. These are listed down the left hand side of your graphic. We already have excellent Phase II data establishing efficacy in the setting of chronic cough. And that has now been taken forward into Phase III and is in an advanced stage of prosecution.

We also engaged in signal detection in other important diseases. For example, we are exploring the possibility in the very prevalent and difficult to treat condition of sleep apnea and we also have an active program, which is pursuing the ability to interdict or prevent painful endometrial syndromes, particularly in the setting of endometriosis. We're early in this journey, but we do believe that this pathway and this molecule, again, has the potential to be a pipeline in a product.

And over to Mike for some commercial aspects.

Michael T. Nally - *Merck & Co., Inc. - CMO & Executive VP*

Gefapixant is a classic case of molecule that embodies our scientific strategy. Ultimately, we are following the science here and we're driving it based on the underlying need in this market. We see broad applicability of gefapixant across a number of different indications as Roy noted. And the extent of the unmet need in each of these indications provides great opportunity. I'll hone in for a moment on our chronic cough indication as it's our closest in indication. Chronic cough affects 10% of the population globally, in which approximately 20% of those individuals suffer from

refractory or unexplained chronic cough. There are no good treatment options for a chronic cough, and many individuals that suffer with it resort to narcotics to relieve symptoms.

When you think about the opportunity here, there's clearly a political and policy implications of this, but there's also a huge commercial opportunity based on the size of the market. We recognize that a market like chronic cough will need to be built over time as awareness, given the lack of treatment options is relatively low both from physicians as well as from patients. However, this is a real strength of the Merck commercial organization. We've had the opportunity to build markets like this many times before, markets such as osteoporosis and HPV come to mind. And we believe, in the chronic cough space, there'll be ample opportunity to build a sizable opportunity going forward.

So with that, I'll summarize. We have excellent work going on across a breadth of pipeline opportunities and we think many of these opportunities will provide real and long-lasting growth long into the future. In oncology, we have a unique opportunity. KEYTRUDA will continue to emerge as a foundational therapy across more tumor types in more combinations and in earlier lines of disease, but also our other assets: our partnered assets as well as our emerging pipeline will help extend survival across a number of different cancer types.

Our vaccines business is large, durable, and while we expect to continue to grow faster than the market based on our strong in-line portfolio, but also our very, very promising pipeline. If I think about the rest of the pipeline that we highlighted this morning, MK-8591 has the true potential to be a game changer for patients with HIV. And gefapixant represents the underpinnings of our scientific strategy. Follow the science, understand the mechanisms and apply it in a rigorous way. With that, we are very optimistic about our long-term growth potential. We've got a rich pipeline. We focused on new opportunities here today, but there's a lot more going on in our labs. And I think over time, the science, the clinical execution and strong commercial execution will lead to a long-lasting growth profile for our organization.

So with that, thank you.

Roy D. Baynes - *Merck & Co., Inc. - Chief Medical Officer*

Thank you very much. We've been talking actually now for quite a long period of time. And I think you've deserved now a well-earned break, so we're going to take a brief break.

(Break)

(presentation)

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

Hello, I'm Dean Li and I'm Head of Discovery and Transformational Medicine. It really is an exciting time to be at Merck as we advance the next generation of science and medicine. What I want to do today is just give some brief remarks that gives you a sense of the approach we're taking to discovery. And then, I'm going to invite 2 of my colleagues up here and we'll have a panel discussion with a little bit more in-depth about the pipeline.

So you've heard about the vast number of clinical trials. I think it's fair to say that our global clinical development team is really second to none. You see that as the pipeline is being prosecuted to registration and to clinical and commercial impact that you've heard before the break. But those of us in discovery sciences view those clinical trials with a different lens. We view it as an unprecedented opportunity because those clinical trials embody a massive coordinated study of human immunology and we are using that study to advance oncology. But we are also deliberately leveraging those insights in every other therapeutic area whether it'd be metabolic disease or vaccines. We will go wherever that biology will take us because essentially immunology is a common thread through so many diseases and we are positioned in an excellent way to pull on that thread. So Roger talked about the legacy of Merck. And the legacy is really the ability to transform science, medicine and Merck itself over and over, again. But there are common ingredients to that legacy. One of that is our deep scientific expertise. Our deep scientific expertise in medicinal chemistry that he referenced. You see that deep scientific expertise not just in the past, not just now, but in the future. As you watch the pipeline, there was

a slide that Roy showed about 20 mechanisms advancing from discovery to development. You see the importance of our medicinal chemistry in that pipeline. You see small molecules, but you also see a beginning and expansion of modalities. You see peptides, proteins all types of antibody technologies. We're very interested in oncolytic viruses. We also talked about our collaboration with Moderna, where we're very interested in nucleic acid delivery. That expansion of modalities is important. It does increase that toolbox, but it's not the critical choice. The critical choice is what's the most compelling biology that you can interrogate that will have the maximum impact on human health.

So we, in some sense, are modality agnostic to research because what we're going to decide is what's the crucial biology and whatever modality we need to adopt or adapt to, we will do.

Now we've talked about the diverse modalities coursing through the pipeline. There's also a platform that allows us to interrogate multiple programs through diverse therapeutic areas. And in our discussion -- in our panel discussion, we'll talk about how important it is to connect the biologies in the different therapeutic areas with one another. So for example, you've seen our interest in NA activation in immuno-oncology. That's a critical biology that we think is important for patients with cancers. But the reagents, assays and insights from those studies are actually the same critical insights that one must use. To ask the question how do we make vaccines better? In neuroscience, they are interest in lipid biology and redox and stress, those are the biologies that are key to make progress in neuro-degeneration. But they are also fundamental biology. They are fundamental biology for programs in cardiometabolic diseases.

In the panel discussion, we should also rely on the fact that we'll be talking about this issue of modality agnostic and therapeutic agnostic. Essentially, the concept of therapeutic agnostic is that we recognize that compelling biology is not constrained by any boundaries that we set in the therapeutic area. So what do we need to do? We need to continue to ensure the deep scientific expertise in every therapeutic area, but we also must promote and we are promoting the productive cross fertilization between therapeutic areas on the most important compelling biology. And in doing that, what we've done is we've actually taken -- over the last 18 months, we've positioned new leadership throughout MRL discovery. In fact, of the 4 leaders of the therapeutic areas, 3 are new to Merck. And what those leaders have done is, they've increasingly positioned their discovery biology teams in south San Francisco, Cambridge, Boston area, London. Hubs where there is a deep richness of science, biology and talent. And they've placed those discovery biology teams at the same time as ensuring that powerful interconnectivity with our major MRL sites in Rahway, Kenilworth, West Point and Upper Gwynedd. So we have a repositioned, a reinvented, a reinvigorated discovery network.

QUESTIONS AND ANSWERS

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

And at this time, I'd like to introduce 2 of my colleagues to the stage: Fiona Marshall, who is Head of Neurosciences and Daria Hazuda. So I just want to start by asking the 2 of you, first, Daria, can you introduce yourself?

Daria Hazuda - *Merck & Co., Inc. - VP of Infectious Diseases Discovery & CSO of MRL Cambridge Exploratory Science Center*

Absolutely. My name is Daria Hazuda. I'm responsible for infectious and vaccine discovery research at Merck and I'm also responsible for the Cambridge Discovery Hub.

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

Fantastic. Fiona -- well I should actually say that's probably the most self-effacing introduction that I've -- that I think is -- and I'm going to hit you up on that a little bit later so that the audience knows really who you are. But I'll go to Fiona next.

Fiona Marshall - *Merck & Co., Inc. - Head of Neurosciences*

Thanks, Dean. So my name is Fiona Marshall, I'm Head of Neuroscience Discovery. I also head up the new U.K. Discovery Center in London.

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

So Fiona, I just want to make sure that everyone understands that you worked in Big Pharma, then I think you went to Millennium?

Fiona Marshall - *Merck & Co., Inc. - Head of Neurosciences*

Yes.

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

And then you went and founded -- cofounded a company. And so I'm just really intrigued because during our recruitment process, I always had this question, why do you come back to Big Pharma? Why do you come back to place like Merck?

Fiona Marshall - *Merck & Co., Inc. - Head of Neurosciences*

Yes, no, it's a good question. I mean in a lot of companies and a small company, you can be nimble and it's a dynamic environment. But you can only take things so far, and if you want to address the big problems in health care, you do need the power of Merck. What we're trying to do in the discovery centers is capture the benefits of that small nimble biotech environment, but then with access to the global capabilities that Merck brings.

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

Fantastic. That's fantastic. I was interested in Fiona as you -- your remit is neuroscience and that neuroscience is in West Point, it is in Boston and it is in London. So what is it about London that discovery hub that might be a little bit different than what is happening in West Point and in Boston?

Fiona Marshall - *Merck & Co., Inc. - Head of Neurosciences*

Yes. So the London center particularly is focused on diseases of aging. We are working on aspects of that in the other neuroscience sites as well. But the idea of these discovery centers is that they sort of acts as our sensory neuros, reaching out into the local ecosystem. And cities that they are located in, as you know, are centers of biomedical excellence. So they're very rich in the biotech community, that benefits us from business development opportunities, but also importantly, for recruiting new talent into the company. And I've been here a year, but I can tell you a lot of scientist wants to come to Merck because they know that they can develop their scientific knowledge and expertise. But they actually want to translate that into medicines for the benefit of patients.

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

And the science that you're focused on at London, is there any...

Fiona Marshall - *Merck & Co., Inc. - Head of Neurosciences*

Yes. So -- as I say, it's mechanisms of resilience and homeostatis, and a lot of these processes decline as we get older and lead to then many diseases of aging, so not just in the brain but cardiovascular disease and aging even contributes to cancer. One area, just as an example is, we're interested in mitochondria. Mitochondria are the powerhouses of cells and we know that their function declines with aging. So we've recruited a small team of experts in mitochondrial biology. They're looking out ways in which we can boost mitochondrial function and we think in cells that have a high energy requirement like neurons or muscle cells, for example, that could be very beneficial.

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

And then Daria, we've actually talked about HIV and vaccines, and you have a powerful discovery group in West Point that does that. And then, you're also leading the Cambridge hub. Can you tell us what's that Cambridge hub doing that might be distinguished from what is happening at West Point?

Daria Hazuda - *Merck & Co., Inc. - VP of Infectious Diseases Discovery & CSO of MRL Cambridge Exploratory Science Center*

Absolutely. So one of the points that I think is really worth emphasizing is that the discovery hubs are not meant to be stand-alone. They are really meant to access the incredible resources, the expertise that we have in the broader Merck network. They have the feel of a biotech, but the way they can access that -- the enormity of the expertise that exist throughout the Merck network is really actually, I think, quite unique.

So the example that I'll be giving you is what we're doing -- one of the things that we're doing in Cambridge. So Cambridge is focused on really early emerging biology and building new capabilities that synergize with the rest of the Merck network. So it's -- they're developing things that are actually quite unique and cutting-edge.

And one of the areas that we're focusing on in biology is the role of a microbiome. So we think the microbiome, it has a really important role to play in many diseases areas. But the area that we're particularly interested in is that the role that the microbiome plays in human immunity.

And so we've built a lot of the capabilities at Cambridge that are really needed to interrogate that space, but what we're doing is we're working very closely in collaboration with the infectious disease on vaccine group in Pennsylvania to use vaccine responses as a way to interrogate and provide the foundation for our understanding of this really complicated area of biology. So we're particularly interested in how the microbiome influences immunity very early in life as the immune system is evolving and also what happens late in life -- later in life as immune tone declines. And our overall goal, our ultimate goal is really to understand this biology and, hopefully, use this information to increase vaccine responses in those very vulnerable populations.

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

Well, that's great. We did emphasize the importance of studying the human immune system. And I was just curious we have these vast numbers of clinical trials in human immunology essentially in our I/O space and in the vaccines. And can you give me more color into where you think those insight in human immunology will affect the ID and vaccine space?

Daria Hazuda - *Merck & Co., Inc. - VP of Infectious Diseases Discovery & CSO of MRL Cambridge Exploratory Science Center*

Absolutely. So I can't resist by starting out saying that actually much of what we've learned previously about human immunology actually has come from the study of infectious diseases. And the most...

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

Wait, wait, wait. So the oncologist need to remember that Merck -- but keep going.

Daria Hazuda - *Merck & Co., Inc. - VP of Infectious Diseases Discovery & CSO of MRL Cambridge Exploratory Science Center*

All right. And the most profound example, of course, is the checkpoint blockade, which you heard lots about earlier this morning. But now that we have increased the expertise and our insights from -- in the immunology space from studying oncology, we actually are now actually doing the reverse. So we're actually using that expertise, the toolbox that we've built in oncology to really understand how we can use potentially some of

those tools, some of those pathways to adjuvants vaccines both in the oncology space as well as in the infectious disease space. And I'll give you one example that we're actually quite interested in, in terms of the ID vaccines and that is, the question of whether or not adjuvants can be used to reduce dosing schedules for subunit vaccines. And I think a really important example in that particular space is HPV. As you heard this morning, HPV causes 1 out of every 20 cancers globally. HPV vaccines are incredibly effective preventing that. But they require multiple shorts to elicit durable immune responses. And so if you could actually do the same, if you can adjuvant an HPV vaccine and elicit the same kind of durable immunity with a single shot, it would really help us facilitate access to HPV vaccines worldwide.

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

So Fiona, much of your neuroscience discovery is in West Point, but you have a crew up in Boston. And that crew in Boston is co-localized with the groups in Boston focusing on immuno-oncology. So where do you see the ties?

Fiona Marshall - *Merck & Co., Inc. - Head of Neurosciences*

Yes. So we have a team in Boston as you say co-localized with those experts in the immune system, so it's our neuro immunology group. And we're looking at different ways of both activating and inactivating different arms of the immune system either in targeted approaches or more generically through the body and in the brain. And we know that the immune system plays an incredibly important role in Alzheimer's disease and other diseases of neurodegeneration. So at some point, the immune cells actually act in a protective way preventing damage caused by toxic protein, but if you get an over accumulation of immune cells in the brain that can lead to neuro-inflammation, and that contributes to be ongoing process of the disease. And of course, there's also the role of immune system in inflammatory pain and even in immuno-psychiatry, so a really important area for us.

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

And Heparin relationship to neurodegeneration and in immunology?

Fiona Marshall - *Merck & Co., Inc. - Head of Neurosciences*

Yes. So I mean a particularly interesting area that's coming out of the genetics now in Alzheimer's disease is showing that many of the risk genes that we're identifying like TREM2 have a role in regulating the function of brain microglia, so one of the key immune cells in the brain. And microglia are actually a bit like macrophages. And of course, we've done a lot of work in macrophages in your area, diarrhea and in the oncology area as well, so we can apply those learnings through to microglia.

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

Yes, when I did those buckets of biology, I should have pointed out that in the I/O space, we're very interested in amyloid stroma. You saw it in the slides that Roy showed about the targets. There is at least 2 or 3 or 4 of those sort of targets are interested in things like Lenvima and in Peloton and then Tilos plays in that space, so that synergy I think is just fantastic.

And so, one of the things that I wanted to ask you Daria is that we sort of focused on this broadening of modalities. And at least when I think about a special or a therapeutic area where that whole range is there, it's your area. Can you expand on that?

Daria Hazuda - *Merck & Co., Inc. - VP of Infectious Diseases Discovery & CSO of MRL Cambridge Exploratory Science Center*

Yes. So today our pipeline in infectious disease consists of almost every modality: small molecules, antibodies, vaccines. And what's really remarkable is that we can prosecute programs at a scale and a pace that it's really hard to imagine compared to just even a few years ago. So having multiple

modalities as toolbox of modalities, not only allows us to address -- or access or address biology that we couldn't access before, but it also allows us to really think very carefully about the population that we're actually trying to approach with our intervention.

So in infectious diseases, for example, of course, we have a long legacy in the traditional vaccine space and we continue to develop traditional vaccines and I'm really excited by the portfolio that we have, as you've heard about earlier this morning. But we're also really excited about thinking differently about how to prevent infections in specific population. So you heard about some of our programs, you heard about the RSV monoclonal antibody to prevent RSV infection in infants. And of course, the potential for -- to use long-acting formulations of a small molecule, 8591, to prevent HIV infection.

One of the things that I also want to emphasize is that having prosecuted these programs now, we've actually developed an increased expertise in formulation sciences as well as chemistry in the nonoral space. And now we can use that expertise that we've gained in prosecuting these more advanced programs to think about other infectious disease areas as well as apply those learnings to other areas of biology as well.

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

I mean that's fantastic. Fiona, the question I'm going to ask you is, you're Head of Neurosciences, but when I look at you and I look -- and I PubMed you, it was like from 2013, 2018, you've got that 7 to 8 nature papers and they're focused on structural biology and chemistry, and they're actually very much -- they're in neuro-receptors, but they're also in GLP, they're in complement. And so the question I ask you is not so much the breadth of the modality, but where do you see the next generation of chemistry, the importance of structural biology, where do you see that going?

Fiona Marshall - *Merck & Co., Inc. - Head of Neurosciences*

Yes. So I mean the whole field of structural biology is moving on incredibly fast at the moment. And one of my cofounders at Heptares, which tends to have got the Noble Prize last year for that technology. And we actually had Richard Henderson came to Kenilworth, one of our sites, and opened our own internal cryoelectron microscopy facility. And very rapidly, we're now getting really high-resolution structures of complex proteins. And that's allowing us to identify really novel binding sites on those proteins, new ways of drugging proteins and their interaction with other proteins that we never would have realized was possible before.

So a key message, loading all of these new modalities we are in noway moving away from chemistry, we're actually advancing our chemistry capabilities enormously and applying them to a lot of different technologies. So as well as doing that knowledge-based structure-based design, we also are greatly extending our ability to access 3 dimensional chemical space. So whereas, 5 years ago, we had about 1 million compounds in our chemical deck. Now we've actually got, if you add up all of our DNA encoded libraries, the messenger RNA display libraries, I think, over 1 trillion compounds. So there's huge technology advances to really deal with those from the automation and the big data handling as well. The bottom line is that proteins that we thought were undruggable are now very much druggable.

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

And later on, when we have the breakout sessions, we're going to be joined by Emma Parmee, who is Head of Discovery Chemistry and Mike Kress, who is in-charge of Process R&D, who actually has to manufacture these new molecules. And so I just want to -- before I end the panel discussion, I just want to ask you just, what's exciting to you in the portfolio and the science that's coming through? Fiona?

Fiona Marshall - *Merck & Co., Inc. - Head of Neurosciences*

Okay. Well, one area I want to highlight is our pain portfolio. And here, again, the genetics is really pointing us in new directions and we're very interested in targeting sensory nerves. And you heard a bit about our program with gefapixant earlier. So we are looking at a range of different targets in sensory nerves. Some of these are actually very difficult from a chemistry point of view. So again, our unique advantage here is our chemistry capability to get the right selectivity and profile. What we're aiming to do in the pain space is to have a portfolio of pain molecules that

can target both acute and chronic pain, inflammatory pain as well as neuropathic pain. And our aim really is to gradually replace the use of opioids and actually, ultimately, wipe out opioids. There will be no need for them with all of these new drugs.

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

Yes, I mean I think everyone knows how massive the opioid epidemic and it's probably touched many people, but one area that is very personal to me is dementia. My mother suffers from it. And we see companies leave that field. And so before we end, I think I'd like to hear what you think about what is the hope in relationship to Alzheimer's and dementia because that is a great unmet need.

Fiona Marshall - *Merck & Co., Inc. - Head of Neurosciences*

Yes, so I mean I think, everyone in the room knows that there's been a lot of failures recently in Alzheimer's disease, in particular and that includes our own base inhibitor. But our clinical team ran an amazing trial. We've learned so much about how to develop drugs in the Alzheimer's space, but also in that time, the biology and our understanding of the diseases moved on enormously and our capabilities in genetics. So whereas when we started those trials, we genetics limited us to the inherited forms of the disease. Now we can do more broader population genetics, which is giving us different clues. And actually what's interesting is that Parkinson's disease, ALS, Alzheimer's are all pointing into common pathways of biology that are going wrong as you get older and it's all the accumulation of toxic proteins in neurons. And so our strategy is to try and eliminate those toxic proteins, either by targeting them directly with antibodies and we got some excellent PET tracers. For example, our Tau PET tracer that allows us to stratify patients, but also measure the effects of drugs. And then, we're also looking at small molecule approaches to activate the natural clearance mechanisms that the brain will use to clear toxic proteins.

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

Yes. So Daria, I'm going to ask you a slightly different question because it refers to your profile. And I remember the first time we talked, it was almost like a reverse interview because I was interviewing you when you were supposed to interviewing me. And I remember it because I think it's important for the audience to understand that when we show the integrase studies that was highlighted before, I do the timing of that. You were leading that team, trying to find an integrase inhibitor. Wasn't sure if you could find an inhibitor and that was at the same time that I was racing to get my second R01 and you were racing to change all of HIV.

So I need to ask you with the conversations about age and MK-8591, how do you view that molecule and the setting of types of stuff you've already done?

Daria Hazuda - *Merck & Co., Inc. - VP of Infectious Diseases Discovery & CSO of MRL Cambridge Exploratory Science Center*

Thanks. Yes, Dean, I mean when we discovered and launched ISENTRESS, I actually thought that would be a once in a lifetime accomplishment in the field of HIV because of what integrase inhibitors did to actually transform that space. But I can't tell you how super excited I'm about 8591. It really is at least, for me, in HIV, almost a once-in-a-lifetime molecule. If you would have told me even a few years ago that you could find a molecule in any infectious disease, let alone HIV, that you could dose once a day, once a week, once a month that had the pharmacology and potency that would allow it to be formulated in a long-acting formulation that can deliver and release drug -- effective drug levels for a year, I would have never ever believed it.

So I think that's just puts into context how special MK-8591 really is. So it's just important for me to really state that it's great, that Merck continues its commitment to bringing forward molecules like MK-8591 that really have the opportunity to impact the lives of people living with HIV to really think broadly about innovative approaches to prevention that can potentially transform the face of the epidemic, the HIV epidemic, globally, which remains, as you heard, a major global public health issue. And then in the discovery labs, we continue to invest in understanding the science of HIV with the ultimate long-term goal of potentially eradication or curing it someday.

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

Well, I want to thank you for taking the time to be with me today, and I want to thank all of you for your attention. And at this time, I would like to turn your attention to a short video on our scientists. Thank you so much.

(presentation)

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

I hope in the video as well as in the presentation that you just saw you have a sense of our deep commitment to science. And also, I hope you got a sense of the talent that we have to bring to bear in interrogating those questions. Let me tell you why I think that last issue about the breadth and depth of the talent is so important.

As I look out into the future, some of the strategies that have been used in the past in this industry, I think, are not going to be very revealing. I think the concept that companies can survive by excessively raising prices, I think there's a decreasing pool of smaller companies to roll up, so to speak. I think at the end of the day, those companies that have the deep expertise in human biology to consistently innovate are going to be the companies that survive and succeed in the future.

I'd like to now invite my colleagues back to the stage for our Q&A session. And I guess Teri will give us some instructions about how we're going to conduct our Q&A session.

Teri Loxam - *Merck & Co., Inc. - Senior VP of IR & Global Communications*

I can do that.

So great to see all of the familiar faces in the audience today. Thanks for joining us this morning. We're going to have a Q&A session. We've got everyone who's on stage this morning giving a presentation available for questions. If you'd like to ask a question, we're going to do in-room questions only. You can raise your hands and a member of the IR team will come and find you and give you a microphone. When you ask your question, Ken will give it to one of the leaders to answer. So with that, why don't we take our first question, and we'll see -- oops, up front here. Great.

Stephen Michael Scala - *Cowen and Company, LLC, Research Division - MD & Senior Research Analyst*

Steve Scala from Cowen and Company. I have 2 questions, please. Most investors show Merck growing through 2023 but probably not strong growth, which is what was said this morning. What do you think we are most missing about Merck's growth outlook? Is it KEYTRUDA? Is it vaccines in HIV, potential of the pipeline? Or is it something else? So that's the first question. And the second question is the P2X3 competitors claim to have agents that are up to 1,000x more selective than gefapixant, allowing them to get around the dysgeusia safety issue. Just wondering, what does Merck think of that assertion? Does Merck believe selectivity is not relevant? Does Merck believe the competitors' assertions are not true? Or does Merck think it is true, it's just that your lead is so great it doesn't matter?

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Okay. So why don't I ask Roy to start with the gefapixant question, and then we'll come back to your broader question, Steve?

Roy D. Baynes - *Merck & Co., Inc. - Chief Medical Officer*

Right. So the gefapixant molecule is obviously in Phase III in our hands. We really haven't seen the meaningful outputs from those claims that are being made. And certainly, when I look at the data, there does appear to be taste perseveration with those other molecules. I think it's also important to note that in our own program, discontinuations for taste perseveration have actually been very uncommon. So clearly, in the chronic cough setting, chronic cough has more than -- merits staying on therapy despite some change in taste.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Do you want to take the first...

Unidentified Company Representative

Sure, sure. As we look at the growth profile on why we are so confident in the strong growth I talked about and you heard from the rest of my colleagues throughout the morning, and to your question on the areas, frankly it's all of them. If you look at it within KEYTRUDA, you saw today the strength of the pipeline. As you think about Lynparza and Lenvima, across really that whole suite of products within oncology and the number of indications we continue to see as potential, we continue to believe those areas are underappreciated. GARDASIL is another area where we continue to see underappreciation and opportunity. And as we look at Animal Health, that is an area where you saw we have very strong growth. We have demonstrated the ability to consistently grow above the market, and we continue to believe we will do that going forward. So frankly, it's in each of the growth pillars where we think there's underappreciation and why we are so confident in the growth potential we have into 2023 and importantly beyond.

Teri Loxam - *Merck & Co., Inc. - Senior VP of IR & Global Communications*

Okay. We'll get another question here. Let's go up to the middle. Seamus.

Seamus Christopher Fernandez - *Guggenheim Securities, LLC, Research Division - Senior Analyst of Global Pharmaceuticals*

Great. Seamus Fernandez from Guggenheim. So quick questions. Can you guys talk a little bit about just the payer dynamics? As you think about the market for a product like gefapixant, how are you going to prep the market for that? And it seems to me like the opportunity may be more, to really get real growth, is from sleep apnea. So just wondering when we might see data from that area. But just trying to get a little bit of a sense of the commercial dynamics there. And then separately, can you talk a little bit more about -- again, we [sort of] see the declining as a percentage of sales in terms of the growth over time in SG&A and the overall expense line items. I think you had said that we should still anticipate those to either flatten or grow. So we shouldn't anticipate that it's going to be a decline, but what you're implying is that this is going to be a sales growth-driven dynamic and the leverage comes basically from more flattening of the absolute spend. Am I might just understanding that correctly?

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

So Mike, why don't you take the question on payer dynamics?

Michael T. Nally - *Merck & Co., Inc. - CMO & Executive VP*

Yes.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

And Rob, why don't you take the question about [future] (inaudible)?

Robert M. Davis - *Merck & Co., Inc. - Executive VP of Global Services & CFO*

Yes.

Michael T. Nally - *Merck & Co., Inc. - CMO & Executive VP*

Yes. So I think, Seamus, if you think about

Gefapixant, I think first and foremost, we have to see how the data plays out both in Phase III in the chronic cough condition but also among the other conditions, right? So ultimately, a lot of our thinking around the pricing will ultimately be determined by the data. But the reality is, when you actually just look at the unmet need and that there are really no existing treatment options, there's going to be strong push to have this based on the value it will provide to these patients. And so we think we can make a compelling case at the time. And obviously, it would be dependent upon that data.

Robert M. Davis - *Merck & Co., Inc. - Executive VP of Global Services & CFO*

Yes. And to your question about the margin expansion and what's driving it, I think it's important to step back and reiterate that growth is what is driving our story. And importantly, as you look at that growth, as I mentioned in the talk, there is a mix element to that growth as we switch to be more of a specialty and oncology-based company. And that will allow us to redirect investments away from primary care towards the growth areas and the new indications that we have coming.

So as we look forward, this is not about absolute expense reduction. It's about controlling expense growth to levels meaningfully below the growth of sales and redirecting expenses from those areas where we see the opportunity to harvest opportunities and then push it towards what we need to invest in growth because we're very committed to investing in that growth. And that's why you're going to see SG&A ratably fall as a percentage of sales even though it might be flat to slightly growing in absolute terms as you look forward. And clearly, with research and development, while we're seeing the bolus move through, we do see that start to moderate. While we think it will continue to grow, that growth moderates around the 2021 time frame based on what we see currently moving through the development program. And then that's where you get the acceleration in the margin expansion, combining all of that with, as we talked about, we're going to really look, rethinking the operating model and drive productivity and efficiency because we recognize, given the evolving landscape, we have to be positioned to ensure that when we're delivering that growth, which we're confident we'll do, we still are not in any way sabotaging our ability to invest fully in innovation. And that's really what the evolving model or program is aimed at, freeing of resources to put into research and development, to fuel the future pipeline while, at the same time, we're driving margin expansion, strong revenue growth and accelerated earnings per share growth over the near and medium term.

Teri Loxam - *Merck & Co., Inc. - Senior VP of IR & Global Communications*

Right. Let's get another question. Looks like Dave Risinger over there. Let's see.

David Reed Risinger - *Morgan Stanley, Research Division - MD in Equity Research and United States Pharmaceuticals Analyst*

Yes. Dave Risinger from Morgan Stanley. I guess first question is, with respect to GARDASIL, obviously the growth was exceptional in the first quarter at 31%. But the company has capacity constraints that you're working to address. Could you help us understand how significant those constraints are and how much those capacity constraints will hold back GARDASIL's growth over the next couple of years and whether we can expect substantial revenue growth out of GARDASIL in the face of those capacity constraints like we -- maybe not quite as high as we saw in the first quarter but substantial growth? And then second, with respect to gross margins, I was hoping you could address the masking of gross margin expansion in the next couple of years that will be driven by the milestone payments on Lenvima and Lynparza and how we should think about that because there will be swings in certain quarters that we can't necessarily predict. And then if I may, one more just on Animal Health. It's grown very, very strongly, but it's -- the business in the companion animal market has lagged Zoetis with respect to a stunning innovation for companion animals,

specifically the autoimmune products that Zoetis has launched and also the triple combo that's pending. Just wondering if you have products like that on the horizon.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

So Frank, why don't you start with the GARDASIL question?

Franklin K. Clyburn - *Merck & Co., Inc. - Chief Commercial Officer & Executive VP*

Sure, Dave. So we do anticipate in the near term -- we will continue to see volume growth and sales growth in the near term with GARDASIL. Our manufacturing colleagues are doing everything they can to maximize the opportunity to increase supply with our existing assets. We're looking at contract manufacturing organizations until the '23 to '24 time frame when we bring on our new capacity. So think of it in the near term you will still see growth, and then think '23 to '24 is when you'll see additional supply being able to come on to meet in particular what we're seeing as very strong ex U.S. demand.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

And Rob, you have the next one.

Robert M. Davis - *Merck & Co., Inc. - Executive VP of Global Services & CFO*

Yes. And in regards to the gross margin question, so as you look at gross margin, maybe to give you overall thoughts on gross margin then get into specifically how the milestone payments are impacting it, over the long-term horizon -- through our planning horizon we've shown you right now, we are seeing pretty meaningful benefit coming through mix with products like KEYTRUDA, like GARDASIL and all these products with margins much higher than the corporate margin. That favorable mix benefit, though, is being impacted by the fact we are assuming price declines in the U.S. and globally. So those are kind of washing each other out. And then we do have the impact of royalties and then finally, to the point you've raised, the milestone payments. As I think most of you know, the way we structured the partnerships with both AstraZeneca and (inaudible), frankly also back with Bayer for the cardiovascular assets we have in partnership with them, they're structured such that as milestones in -- for purposes of sales milestones become probable, you have to capture those into your gross margin. In the quarter that they become probable, you book first a catch-up milestone. So let's say you're 1 year or 2 years post the deal signing, the launch, you have to catch up in -- all in that 1 quarter the milestone for that period and then you amortize the remainder of the milestone over the life of the patent. So that does create some volatility and pressure in the margin as we move forward. But as we get through the period over the next half dozen years where you see the bulk of those milestones happen, then long term actually, those products become very accretive to the margin going forward because those milestones are behind us, but we're still getting the benefit of the growth. And the only thing I would leave you with because I think we've left you with an important point today, and that is, despite the fact that you're -- we're going to see the pricing pressure I talked about, we have meaningful margin expansion. And I think that is going to continue to set us apart and is really what is going to drive accelerated revenue growth. So we're doing it in the face of those pressures on the back of innovation and the strong demand we have for the pipeline of products we have in the market today.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Thanks, Rob. Rick, why don't you take the question on companion animal?

Richard R. DeLuca - *Merck & Co., Inc. - Executive VP & President of Merck Animal Health*

That'd be great. So we currently have the most innovative flea and tick product on the market, happens to be the largest in the world now. In addition, we've recently launched a triple combination for cats, albeit in a topical form. But we also, as I showed you in the one slide on our key

project areas a number of projects in both parasiticides and endectocides for pets as well as large animals. And also, we have several projects that we're able to get from the Merck assets in the key derm space, the dermatology space that you referred to. So you can count on us launching more innovation in flea and tick in combinations as we move forward in the future.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Thank you.

Teri Loxam - *Merck & Co., Inc. - Senior VP of IR & Global Communications*

All right. Let's move on some other questions here. Looks like Chris Schott has got the microphone.

Christopher Thomas Schott - *JP Morgan Chase & Co, Research Division - Senior Analyst*

Great. Chris Schott from JPMorgan. First one is on this margin theme. I think the top of the graph that you presented had a 40% number there. I don't know if it was illustrative or not. But is that a reasonable target when we kind of capture these different themes you've been talking about as we think about where margins maybe can go as we think 5 years-plus in the Merck story? My second question was going back to the adjuvant opportunity on KEYTRUDA. I guess when you think about the competitive landscape here, do you see study design in patient selecting -- selection resulting in significantly different outcomes maybe like we've seen of Merck or some of its competitors in the metastatic market? Or is adjuvant going to be a situation where time to market really is the key determinant and we're going to maybe see a little bit less variability in the study outcomes?

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

I'll let Roy start with the adjuvant question because he had been...

Roy D. Baynes - *Merck & Co., Inc. - Chief Medical Officer*

Well, in terms of the adjuvant trials, clearly you have already seen suggestions that precision medicine may be important. So we're building precision medicine questions in all of our trials. We do believe, however, that for a number of the adjuvant and neoadjuvant settings, really selecting the right either monotherapy approach or combination approach is going to be critical. Layered on top of precision medicine, I think we have a good idea of how to design these trials. And so we are quite confident as to the approach.

In terms of the uptake, I really probably don't have much to add. It'll be a data-driven discussion.

Robert M. Davis - *Merck & Co., Inc. - Executive VP of Global Services & CFO*

Yes. And to your margin question, clearly we didn't draw those charts exactly to scale, so you don't need to get out your rulers. But if you look at it, really what that is showing you is that we are moving into that ballpark, and we do believe we have meaningful margin expansion as an opportunity looking into the future.

Teri Loxam - *Merck & Co., Inc. - Senior VP of IR & Global Communications*

All right.

Unidentified Company Representative

If I could, I would say, Chris, clinical trial design always matters a lot. Always.

Teri Loxam - *Merck & Co., Inc. - Senior VP of IR & Global Communications*

Okay. I think Vamil has got the microphone up front here.

Vamil Kishore Divan - *Crédit Suisse AG, Research Division - Senior Analyst*

It's Vamil Divan from Crédit Suisse. So the question is one, I guess, for Ken. Nice to see you sticking around longer as the CEO with this increased discussion around succession planning. Maybe you want to share any latest thoughts on your plan as the CEO in the succession planning for the company. And then on the Vaccine side, just 2 quick questions on V114 and then V116. 116 for me is -- it's the first time I was really hearing much about it. If you can share anything more around the strains and sort of the prevalence of the strains that are going to be in that particular vaccine. And on 114, just around timing on when we should see data or maybe time to market for the infant and the adult populations.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Mike, you want to take that?

Michael T. Nally - *Merck & Co., Inc. - CMO & Executive VP*

Yes. So with 116, as I mentioned earlier, we really studied the underlying adult epidemiology and created a tailor-made vaccine based on the serotypes that are most prevalent in the adult market. And so I think it's fair to say that it's a fundamentally tailored construct for that disease. And so we spent a lot of time designing this, thinking through. And we believe, based on the actual evolution of serotypes across the adult market where, because of the tremendous success of PCV7 and PCV13 to actually suppress certain serotypes, there's been an evolution in the adult landscape, and that's what this vaccine specifically targets.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

And on the succession question, I would start by saying that speaking for myself and I believe for the entire team, we're very much focused on the opportunity set right in front of us that we talked about today. This had been hard won but extraordinary opportunities for the company to execute on and to invest in over the next 5 years.

I'll just repeat something that was said before. Everything that we need to drive the kind of growth that we talk about, including the growth that Rob talked about through the JANUVIA patent, actually is already in our hands. And so for us, it's really focusing on executing in the marketplace, focusing in the development space to make sure that we maintain that leadership.

As it relates to succession, the Board is very much focused on that issue. What I can say is I'm extremely pleased by the breadth of the leadership talent and the company, the strength of that leadership talent. And I know that the Board feels the same way, and they will continue to look at when the right opportunity is given the momentum of the company, given what's going on in terms of the opportunities in front of us to make a selection. But I'm extremely confident in the long-term ability of Merck and its board to find the right person to lead this company.

Unidentified Company Representative

And Vamil, the V114 program will be delivering results beginning this year. And the -- however, the bulk of registration-enabling results will come early next year.

Teri Loxam - *Merck & Co., Inc. - Senior VP of IR & Global Communications*

Peter has got the microphone. It looks like he's going to Navin here in the middle.

Navin Cyriac Jacob - *UBS Investment Bank, Research Division - Equity Research Analyst of Specialty Pharmaceuticals and Large Cap Pharmaceutic*

Navin Jacob, UBS. Two questions for the science folks. Number one, maybe we can get at some of the early folks -- early-stage folks involved. On Viralytics, what type of payload are you using? Is it GM-CSF? Or are you trying a multi-payload approach? And how are you overcoming some of the high-level neutralizing antibodies that we were seeing initially? And then with Lynparza and KEYTRUDA, you've started some interesting trials, the [Keeling] trials. We'd love some color, if we can, around the confidence PARP inhibition plus PD-1 particularly in the non-small cell lung cancer setting.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

So Dean, do you want to take the Viralytics question and the early stage?

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

Yes. I mean -- yes. I think that we're very interested in Viralytics. We are interested in moving it forward. You talked about placing a payload within that virus. The initial sort of considerations that we're looking at isn't really focused on adding a payload per se, but there are other programs we're very interested in looking what payloads can be placed in it as well.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

And Roy, do you want to take KEYTRUDA/Lynparza?

Roy D. Baynes - *Merck & Co., Inc. - Chief Medical Officer*

So just to make sure I've got the question right, this is essentially summarizing why we have looked at this in a lung cancer setting, the combination of a PARP inhibitor together with KEYTRUDA. I think this really stems from the observation that prior platinum-treated malignancies seem, in many circumstances, to be quite sensitive to PARP inhibition. Mechanistically, it's not exactly clear why that is. So there's a number of postulates out there. And obviously, we've already established the role of KEYTRUDA in lung cancer. So the question here is in a PARP inhibitor to KEYTRUDA during maintenance space, does that do anything to increase the durability of responses and indeed improve outcomes? So it's grounded on the prior observations of platinum sensitivity in PARP inhibition.

Teri Loxam - *Merck & Co., Inc. - Senior VP of IR & Global Communications*

Okay. Moving on. Next question here. Going back to the room there with Mike.

Unidentified Participant

Wai Chan from Wolfe Research representing Tim Anderson and Wolfe questions. So a follow-up on V116. Can you let us know kind of what the strain coverage is for V116? And then 2 questions on KEYTRUDA focusing on neoadjuvant. When we think about KEYNOTE-522, which is the neoadjuvant in breast cancer, one of the primary endpoints, in fact the first primary endpoint, is in pathological complete response. So the question is will this be accepted for registration by regulators in the context of immuno-oncology. The second question on -- is on adjuvant. So do you think

that Merck will have the first set of adjuvant data in lung cancer? You note in your slides that you will have data coming out in 2021 from KEYNOTE-091, but there is a possibility that some of your competitors might come out in 2020. So if KEYTRUDA is not first, how do you think that could potentially reset or evolve the playing field in lung cancer?

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Roy, I think they're over here.

Roy D. Baynes - *Merck & Co., Inc. - Chief Medical Officer*

So I think let's deal with the second question first because I didn't quite get the first one. So the question around the timing on the lung adjuvant data. That graphic that I put up there shows end dates of trials. All of these trials are under the supervision of data monitoring committees, and there's clearly the potential for proximal readouts based on interim analysis. So this is really just simply indicating the -- just the end date of the study. In terms of 522, just to make sure I got the question right, you are, I think, questioning basically whether pathologic CR would be the basis for registration. And the answer is always it depends. If it's a bigger effect size, we do believe that could well support registration, and there'll obviously be a data-driven discussion.

Teri Loxam - *Merck & Co., Inc. - Senior VP of IR & Global Communications*

And your question was V116, how we're thinking with V116.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Do you want to take that, Mike?

Michael T. Nally - *Merck & Co., Inc. - CMO & Executive VP*

Yes. We're not going to disclose the specific serotypes in 116. As you can appreciate, it's a very competitive market. We -- what we can say is that based on the serotypes that we are -- we have selected for the vaccine, it will cover the vast majority of residual disease in adults.

Teri Loxam - *Merck & Co., Inc. - Senior VP of IR & Global Communications*

Let's -- Peter, why don't you go right in front of me here to Andrew?

Andrew Simon Baum - *Citigroup Inc, Research Division - Global Head of Healthcare Research and MD*

Andrew Baum, Citi. Two questions. First for Ken. You alluded to this right at the beginning, price competition as well as competition through potential government action in relation to KEYTRUDA. Could you share your thoughts on the IPI proposal and the probability you may assess of that becoming a reality? And then second, price competition for KEYTRUDA within non-small cell in the Medicare Advantage segment given your competitors' positions in that segment. And then for Roger and Roy. For Roger, perhaps you could comment on MK-8591. Putting prep to one side in the therapeutic setting, how long is it going to take before a second combination that does not need to be administered daily comes to the market? Obviously, it is -- a once-daily pill has advantages, but where it really differentiates is by using the PK. And whether you're integrating habits can be formulated in order to make that an attractive proposition. And then lastly, on your [Keeling] trials, and this is a long question. On the Keeling trials, how do you see then data from the ORION trial, which your partner, AstraZeneca, is running with olaparib in the maintenance setting, to give you any additional confidence about the potential of olaparib with KEYTRUDA in the non-small cell lung indication?

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Thank you. So let me start with the international price indexing questions. So let me say that I continue to believe that while a lot of discussions are going on in Washington, that there's still a lot of room for the parties to arrive at a middle ground. I think if you listen to most people on The Hill, I think people are not eager to incorporate ex U.S. price controls as a means of determining what the Part B pricing ought to be here in the United States. I think that people understand that these Part B drugs are complex and difficult and they're a vulnerable population. I think it was really important in the Part D context, I know this is not your question, that they protected the 6 protected classes. I do think that while there's a lot of rhetoric going on and there's a lot of concern, and there should be concern, ultimately I think the solutions won't involve that kind of drastic change in the public policy environment. And we're going to continue to engage in the discussion with the administration as it leads up to whether or not they want to take that road. They got something like 4,000 comments, and I think the vast majority there, from patient groups as well as providers, hospitals and everyone else, were so strongly opposed to that idea. I think people understand that, that strikes at the heart of innovation in the United States. So Frank, would you want to take the next one?

Franklin K. Clyburn - *Merck & Co., Inc. - Chief Commercial Officer & Executive VP*

I think you just touched on it, Ken. In Medical Advantage in the U.S. for KEYTRUDA, if you think about Part B, reimbursed drugs are based off of an average selling price reimbursement. And it's a buy-and-build. So right now, we do not see any impact today with regards to KEYTRUDA pricing in the U.S. I think Ken mentioned there may be some changes over time as they're looking at Part B and how it's administered. But today, we do not see any changes.

The other thing I would reinforce, though, is why we've been successful from a payer perspective. And the U.S. has its system, but also outside the U.S. is the very strong overall survival data that we spoke to today. So when we engage with payers and you see the magnitude and the effect that we have in first-line lung cancer, we're very comfortable, based on the data and that value proposition, to engage with payers. Or if the landscape was to change over time, we still think we'll be very well positioned with KEYTRUDA.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Yes. And Rog, do you...

Roger M. Perlmutter - *Merck Research Laboratories - President*

Well, no. I think it's -- this is...

Teri Loxam - *Merck & Co., Inc. - Senior VP of IR & Global Communications*

It's 8591.

Roger M. Perlmutter - *Merck Research Laboratories - President*

It's 8591.

Teri Loxam - *Merck & Co., Inc. - Senior VP of IR & Global Communications*

Yes.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Oh, I'm sorry, yes.

Roger M. Perlmutter - *Merck Research Laboratories - President*

So Andrew, as we talked about a little bit earlier, 8591 is a remarkable molecule. I'll sort of tee this up, and I'll let Daria hit it out of the park.

So 8591, as you know, is extraordinary in terms of its durability, its pharmacokinetics. And we have really very important data to share with you on the doravirine-8591 combination which will be presented very soon to infectious disease meetings. But a few years ago, actually quite a few years ago, I challenged Daria and Emma, and like I said, "So, I mean, you guys have invented all the major classes of HIV-effective therapies, including the original protease inhibitors, the first non-nucleoside reverse transcriptase inhibitor, the actually improved second one, ribavirin, and the first strand transfer inhibitor. So how about you make new ones of all of those that would be compatible with 8591?" And they said, sure, got that. And Daria has been doing that. So we've got a lot of things to work with. So Daria, maybe you want to just sort of tell us where we are.

Daria Hazuda - *Merck & Co., Inc. - VP of Infectious Diseases Discovery & CSO of MRL Cambridge Exploratory Science Center*

Yes. No. Absolutely, Roger. So yes, we've been working very hard to actually make a suitable partner for 8591. And we've been looking at all the major classes and have some really interesting molecules that you've been aware of in the integrase inhibitor space and progressing them towards development. And hopefully, the clinical data will support the preclinical data and we will have a combination that we can dose once weekly. That's our real goal in the treatment space, is to find a partner that will allow us to have an effective combination that can be dosed once weekly as well as a partner that could be co-administered in an implant for a duration of 6 months or more.

Roger M. Perlmutter - *Merck Research Laboratories - President*

Right. And clinical data are just becoming available for some of those programs. Now it's that -- Daria, it's that durability question. It's having something that's potent enough that can hang around for such a long time because you can't get a small molecule that just hangs there for months. I mean it does with 8591, but that's a unique characteristic of the phosphorylated product that sits inside cells.

Teri Loxam - *Merck & Co., Inc. - Senior VP of IR & Global Communications*

And the final question there was around...

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Was still on -- yes, okay.

Teri Loxam - *Merck & Co., Inc. - Senior VP of IR & Global Communications*

Lynparza and evidence in non-small cell.

Roy D. Baynes - *Merck & Co., Inc. - Chief Medical Officer*

And I think the question really was a little broader than that. And that was does the AstraZeneca program inform our program at all. And the simple answer is no. Indeed, we have a firewall as it pertains to the I-O parts of these programs. So really, we collaborate closely on the monotherapy part of the program, but we do not collaborate on the combination part.

Roger M. Perlmutter - *Merck Research Laboratories - President*

Okay.

Teri Loxam - *Merck & Co., Inc. - Senior VP of IR & Global Communications*

Okay. We'll go to our next question. It looks like Jon Miller has got the microphone in the middle.

Jonathan Miller - *Evercore ISI Institutional Equities, Research Division - Associate*

(inaudible) possible?

Teri Loxam - *Merck & Co., Inc. - Senior VP of IR & Global Communications*

No. Okay. Yes.

Jonathan Miller - *Evercore ISI Institutional Equities, Research Division - Associate*

I'm Jon Miller from Evercore ISI. Let's -- we'll start with more specific and go to more general. I have another question on KEYNOTE-522, which starts with neoadjuvant treatment and then continuation treatment after surgery. Will that trial -- if it is registrational -- registration enabling, will that allow you access directly to the adjuvant patients? Or was it only going to be relevant for patients that are diagnosed and given treatment in the neoadjuvant setting, first? Second, on all of your many pipeline slides today, one thing I didn't see was cell therapy or T-cell [improving] therapies, which data -- as data continues to develop, are looking pretty interesting. So what are your thoughts on those sorts of therapies, if that's something that you're interested in? And then maybe on the most general side, one thing that you seemed very proud of and is very, very [encouraging] as the global markets develop is your penetration into China and your strong growth there. What makes Merck's ability to penetrate and do well in China different from the other multinational pharma companies? And is that advantage, as you think, is going to be persistent as that market develops?

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Roy wants to take the 5.

Roy D. Baynes - *Merck & Co., Inc. - Chief Medical Officer*

I can do 522, sure. So as -- the question really was asked is this is really a neoadjuvant -- an adjuvant-type approach and are both (inaudible) registrable was the question. Clearly, the registrational effort is initially focused on the pathologic complete response possibility in the neoadjuvant setting, and that really is a self-contained part of the trial. However, the question here is really not only the randomized question but also the treatment strategy question. So in other words, what happens when a patient actually continues in an adjuvant setting on, for example, KEYTRUDA versus not. So yes, indeed, as a treatment strategy, we do believe it's registrable. Obviously, there's going to be some pretty sophisticated statistical analysis around that. And clearly, the neoadjuvant part of it, if the effect size is large, will be registrable, we believe.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Let's go to Roger then to Frank.

Roger M. Perlmutter - *Merck Research Laboratories - President*

Right. So on the cell-based therapy, I think we continue to be interested in cell-based therapies. We are not intimidated by them. But there are 3 things that probably are worth pointing out. I mean the first is that at the moment, cell-based therapies are directly against hematologic malignancies, and that is because largely you're focused on B cell or a B lineage malignancies where eradication of the underlying normal cell population doesn't bother you too much. That's much harder to do when you're looking at solid tumors, which is clearly an area of high interest for us.

The second issue is that at the moment, the cell-based therapies, for a variety of reasons, are bespoked therapies. It's not something that you can get in a bottle. It's more a procedure, a process than it is actually a therapy in the traditional sense. That may change with the development of allogeneic therapies, particularly those where you've eliminated the endogenous HLA and T-cell receptor structures. And over time, we'll see how that evolves, and that's certainly an area of interest.

On the country-wise, we continue to see improvements with the redirected [license] approach by specific reagents. Those are things you put in a bottle. They are -- behave differently from cell-based therapies, and I think that those are of interest, having been involved in developing the first of them. Now those are things that remain of interest, too. So we look at the total landscape, and we're eager to participate when we see the right opportunity.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Frank, about China?

Franklin K. Clyburn - *Merck & Co., Inc. - Chief Commercial Officer & Executive VP*

Yes. So with China, if you look at what's taking place in China, there was health care reform, there was a lot of initiatives with Healthy China in 2030. And if you look at our strategy, it has aligned up very well with the opportunity in China. And our strategy was really around pivoting to innovation and bringing innovation to China. So if you think about what we're seeing now with GARDASIL, 100 million to 150 million eligible females that are looking to be vaccinated. So that clearly provides great growth for us, and you're seeing it -- and we're seeing that in China. You're also seeing a pivot with Lynparza and Lenvima. And I mentioned hepatocellular cancer. The prevalence in China is well over 100,000 patients with HCC. Well, clearly, having a Lenvima makes a lot of difference. And obviously, the opportunity for lung cancer is one of the largest lung cancer markets in the world. And obviously, the introduction with KEYNOTE-189 in China has helped the growth of KEYTRUDA. So I would say the pivot to innovation, and we see this both in the near term and long term, China becoming a new growth pillar for us.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Okay, thank you.

Teri Loxam - *Merck & Co., Inc. - Senior VP of IR & Global Communications*

Okay. Let's go to the next question. Looks like it's up front.

Louise Alesandra Chen - *Cantor Fitzgerald & Co., Research Division - Senior Research Analyst & MD*

Louise Chen from Cantor. First question I had was with respect to GARDASIL. Is there any way for you to size the opportunity from gender-neutral vaccination, China as well as expansion of manufacturing? And are there still meaningful growth opportunities left here in the United States? And then secondly, on the upcoming ACIP vote, how do you think that recommendation could impact your view of the market for PCV vaccine for those

65 and older? And then lastly, do you still see a good bolt-on acquisition opportunities at reasonable valuations? And if so, what type of companies are you most interested in?

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Okay. So why don't you start, Frank, with the GARDASIL question?

Franklin K. Clyburn - *Merck & Co., Inc. - Chief Commercial Officer & Executive VP*

Yes. So with GARDASIL, if you look at where we are today, clearly we have gender-neutral programs in the U.S., but you're also seeing them roll out in Europe. In fact, there are about 100 countries that have some type of vaccination program but only 30 of them are gender neutral. So (inaudible) to give you a feel. So we think that there are significant growth opportunities going forward with that opportunity and with GARDASIL.

And then I also would refer you back to the fact that even with all of the work that is being done and why we see the opportunity and why we're investing in building additional supply for GARDASIL in particular is only 3% of the world's population that are eligible for an HV (sic) [HPV] vaccine really today are getting that. So we see this as a long-term opportunity not only for gender-neutral programs but also expansion into other geographies, which is why we're making the capital investment we're making.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Mike, why don't you take the [case] on the PCV question?

Michael T. Nally - *Merck & Co., Inc. - CMO & Executive VP*

Yes. So obviously, we studied this very closely given our keen interest with not only with Pneumovax 23 but also our pipeline. And the discussion is a really tough one to call, to be honest. When you look at the cost-effectiveness data that has been presented, it doesn't show the most compelling case for the sequential recommendation. At the same time, the CDC is well aware of the entire pipeline of vaccines that are coming. And I think what the CDC really thinks through carefully are what are the public health ramifications of a policy switch or the potential for a future policy switch. And so you can actually cause mass market disruption if you do that too quickly. And so clearly, they recognize the unmet need in the pneumococcal space. And I think they're trying to balance those 2 different considerations, and I think that's what the working group is really going to debate next week.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

And on the valuation question, I'll take a stab and I'll turn it over to you, Rob.

I think what we found is that a lot of these companies that would be considered for bolt-on opportunities are still fairly richly valued as we sit here today or they have access to enough capital that they don't feel that they want to sell. So it's not as though it's a target-rich environment right now. But I think we are able, I think, successfully, as you've seen us do with Peloton and other deals, to find those unique opportunities where we believe that the scientific value, which, again, I will stress you judge largely based on your own in-house expertise where the scientific value overlaps with the financial value such that we think that those are good opportunities for us.

Robert M. Davis - *Merck & Co., Inc. - Executive VP of Global Services & CFO*

Yes. Not much to add other than we are continuing to prosecute the market fully and have a lot of discussions going on. In many cases, we're still finding often that you don't see willing sellers, I think, given the fact that there's still so much capital flowing into small biotech space in particular.

A lot of people are willing to go it alone because they have the capital to go it alone. So that is not stopping us still from continuing to look. And I think you've seen -- Ken mentioned Peloton, Tilos, Immune Design. We're going to continue to do deals, and I'm confident we're going to continue to find the opportunities. And as we've said, it's -- we're agnostic to therapeutic area. It's about finding the best science. And you're going to see more activity because we recognize it's important. We have a great internal pipeline. We're always looking to augment it. But importantly, we have the capital to deploy, and we're -- we intend to deploy it.

Teri Loxam - *Merck & Co., Inc. - Senior VP of IR & Global Communications*

Ken, let's come up front here to Terence.

Terence C. Flynn - *Goldman Sachs Group Inc., Research Division - MD*

Terence Flynn, Goldman Sachs. Maybe 2 for me. On KEYTRUDA, I was struck by your comment that you felt there was a potentially additive opportunity from the adjuvant setting in contrast of metastatic. I'm just wondering what gives you confidence on that front as I think there's still some debate among physicians about how the sequence IL therapy. So I'd be curious there. And then Dean, I think you mentioned an increase in expansion of different research platform modalities. You didn't mention gene therapy. I would just love your thoughts on kind of where that fits in the future from both a clinical and maybe commercial perspective.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

So Roy, you'll take the KEYTRUDA adjuvant and then Dean will take the (inaudible).

Roy D. Baynes - *Merck & Co., Inc. - Chief Medical Officer*

Right.

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

Yes.

Roy D. Baynes - *Merck & Co., Inc. - Chief Medical Officer*

So typically, metastatic disease most commonly presents as metastatic disease. It's not necessarily the case that you go through all the stages of disease. Oftentimes, the presentation is metastatic. So the idea here is that the adjuvant and neoadjuvant approach is really -- for a number of malignancies will be incremental rather than necessarily competing, if you will.

Dean Li - *Merck & Co., Inc. - Head of Discovery and Transformational Medicine*

Yes. The question about gene therapy, I'll just put 2 layers to it. Oftentimes, when people talk about gene therapy, they're talking about very rare diseases where you're applying gene therapy. In terms of the concept of nucleic acid delivery, we are very interested. You see the collaboration with Moderna. In some sense, that is nucleic acid delivery. And I think another gentleman asked a question about payloads and relationship to viral delivery. I think there was a discussion of Viralytics and those sort of platforms. Those are places that if we wanted to deploy gene deliveries type of things or nucleic acid sort of platforms where we're really strong, which is in I-O space, that would be a great place for us to think about it. But we're probably not going to add the most to the rare disease space. But in this other space, we could contribute to the field for patients.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Okay.

Teri Loxam - *Merck & Co., Inc. - Senior VP of IR & Global Communications*

And I think we've got time for maybe one more question. Who's got the mic? Mike has got the mic back there. Or maybe Dave.

Unidentified Participant

(inaudible) Bank of America. So just first on M&A. I'm just kind of curious to get your thoughts or your appetite on large-scale M&A. And then Rob made some comments about an ability to do a deal of any size. I know that in the last 6 months, (inaudible) highlighted some of the challenges of doing (inaudible) for some of the same reasons that you mentioned, either asset valuation or a non-willingness of sellers. So just your thoughts in terms of appetite to do a large deal. And then my second question about some of the recent KEYTRUDA combination studies, particularly in some of the larger KEYTRUDA end markets like metastatic lung and melanoma. So as you look at some of these KEYTRUDA small-molecule combinations, do you think that these are opportunities -- this is probably a question for Dr. Baynes, an opportunity of all comers or an opportunity in a more enriched subset of patients either with CMV and/or inflammation status?

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

So on a large deal, I think, our aperture is very broad in terms of scanning the opportunities. But I have to be honest, I think our appetite, generally speaking, is less open. And the reason for that is we believe that, first of all, we have extraordinary opportunities to invest in organic growth. And the other side of that is we have to worry about disruption of these opportunities that we have over the next 5, 10 years which are, we believe, abundantly strong.

So all things being equal, which we never -- which never really are equal, I would say our appetite is less for the large deals and more for the mid to smaller deals. But at the end of the day, the question is what is the science that we're acquiring in this deal? How well can we integrate this company? When I say integrate, I mean, IT systems, manufacturing, R&D, broad cultural issues. Those things make us worry a little bit about the big deals, and I don't think there's a story in this industry that most big deals have actually created the value that they said they were going to create at the outset.

Roy D. Baynes - *Merck & Co., Inc. - Chief Medical Officer*

And then was the question -- I just want to make sure I got it right -- was small-molecule combinations with KEYTRUDA or small-molecule versions of PD-1?

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Small-molecule combinations, I believe.

Roy D. Baynes - *Merck & Co., Inc. - Chief Medical Officer*

Combinations. So we think not so much about what we're combining with but where does the science lead us. And as we look at our combinatorial approaches, we had basically taken a holistic science view. We don't have a lot of time to go through all of that right now. But essentially, informed by informative biology, we will certainly look at combinations that make sense. I think a good example would be, for example, the angiogenesis inhibitors and particularly the TKIs. We published in Science a very nice article showing that when we layer angiogenesis signal detection on top of, for example, what we know about mutations and inflammation, there is an additional signature in a proportion of cancers which are indeed

angiogenesis related. And so we brought forward a broad portfolio of, for example, TKI plus PD-1 combinations with exactly that in mind. And the data we looked at have been quite impressive in Phase II. You've already seen our Phase III readout of, for example, axitinib plus KEYTRUDA in the frontline treatment of renal cancer. That's clearly a game changer. And so yes, we're absolutely agnostic as to what the combination is. We'll get the science lead it, and we'll certainly look at any small molecule that makes sense.

Kenneth C. Frazier - *Merck & Co., Inc. - Chairman, President & CEO*

Okay. I want to thank the team for being here for the Q&A. And let me just thank you all for being here also today and for your attention through this entire morning. I would just summarize by saying a few things.

We are not just a KEYTRUDA company, although KEYTRUDA is an extraordinary molecule. It has tremendous growth ahead of it. But we believe we have strength across oncology and the rest of our innovative portfolio. As we've said several times, pipelines and the product, opportunities for products with multiple indications and the ability, importantly, to develop breakthrough treatments for decades to come.

As important as those opportunities are in the product pipeline, I'm also very, very pleased with the people pipeline inside Merck, the leadership team and the capabilities that we have to continue to execute both commercially and scientifically and to deliver strong financial results as well as strong results for patients and for the future.

I'm very confident in our growth prospects. As we've tried to emphasize, we have the assets in hand. To the extent that we're moving towards our pipeline, they are largely derisked assets. And we believe with the talent we have, we're well positioned for repeatable success. So I'll say it again, I believe that going forward in this industry, the companies that succeed will be those who have the capacity and the capability to deliver real innovations that create value for patients, providers and payers. And I think Merck is well positioned to be that kind of company over the near to longer period of time that we have left in front of us.

So let me just end by thanking you for your generous attention today, and thank you again for joining us.
