Merck Investor Day
These presentations from Merck & Co., Inc., Kenilworth, N.J., USA (the “company”) include “forward-looking statements” within the meaning of the safe harbor provisions of the U.S. Private Securities Litigation Reform Act of 1995. These statements are based upon the current beliefs and expectations of the company’s management and are subject to significant risks and uncertainties. There can be no guarantees with respect to pipeline products that the products will receive the necessary regulatory approvals or that they will prove to be commercially successful. If underlying assumptions prove inaccurate or risks or uncertainties materialize, actual results may differ materially from those set forth in the forward-looking statements. Risks and uncertainties include but are not limited to, general industry conditions and competition; general economic factors, including interest rate and currency exchange rate fluctuations; the impact of pharmaceutical industry regulation and health care legislation in the United States and internationally; global trends toward health care cost containment; technological advances, new products and patents attained by competitors; challenges inherent in new product development, including obtaining regulatory approval; the company’s ability to accurately predict future market conditions; manufacturing difficulties or delays; financial instability of international economies and sovereign risk; dependence on the effectiveness of the company’s patents and other protections for innovative products; and the exposure to litigation, including patent litigation, and/or regulatory actions. The company undertakes no obligation to publicly update any forward-looking statement, whether as a result of new information, future events or otherwise. Additional factors that could cause results to differ materially from those described in the forward-looking statements can be found in the company’s 2018 Annual Report on Form 10-K and the company’s other filings with the Securities and Exchange Commission (SEC) available at the SEC’s internet site (www.sec.gov).
Welcome & Introductions
Ken Frazier, Chairman and Chief Executive Officer

Financial & Value Creation Overview
Rob Davis, Chief Financial Officer and Head of Global Services

Commercial Growth Drivers: KEYTRUDA & Beyond
Frank Clyburn, Chief Commercial Officer

Animal Health Innovation
Rick DeLuca, President, Merck Animal Health

Merck R&D Strategy Overview
Dr. Roger M. Perlmutter, President, Merck Research Laboratories

Pipeline Opportunities
Dr. Roy Baynes, Head of Clinical Development and Chief Medical Officer, and Mike Nally, Chief Marketing Officer

Future of Merck R&D: Panel Discussion
Merck Research Laboratories Leadership: Dr. Dean Li, Dr. Fiona Marshall and Dr. Daria Hazuda

Q&A / Closing Remarks
All

Lunch Break
All

Breakout Sessions
Pipeline Deep Dive
Next Generation Discovery
International Opportunity & China

Additional members of the Merck leadership team to join after Q&A
AFTER MORE THAN 125 YEARS, OUR MISSION REMAINS AS CRITICAL AS EVER

To discover, develop and provide innovative products and services that save and improve lives around the world

Premier science-driven biopharmaceutical company
TODAY’S INDUSTRY LANDSCAPE

CHALLENGES

Rising cost of healthcare and R&D

Pricing policy uncertainty and shift to outcome-based reimbursement in the U.S.

Increased molecular target complexity

Intensified generic and biosimilar competition

OPPORTUNITIES

High unmet medical needs of patients globally

Growing and aging global population

New modalities and technologies accelerating innovation

More efficient and effective clinical trial design through advanced data analytics
EVOLUTION AT MERCK OVER THE LAST 5 YEARS

- Revitalized focus on science-driven, integrated approach to R&D
- Solidified leadership across key pillars of growth
- Strengthened operating model to drive execution globally
- Built energized leadership team and deep bench of talent

Strong momentum for continued growth
CLEAR STRATEGIC PRIORITIES TO DRIVE CONTINUED LEADERSHIP

- Advance pipeline for ongoing scientific breakthroughs
- Unlock full commercial potential of portfolio
- Drive simplification and culture change
- Deliver sustainable, profitable growth
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WELL POSITIONED TO DELIVER STRONG SHAREHOLDER RETURNS

Sustained long-term revenue growth

Meaningful operating margin expansion

Balanced and disciplined capital allocation

Investing in the business to innovate for patients globally
GROWING REVENUE DRIVEN BY DEMAND FOR INNOVATION IN THE FACE OF PRICING HEADWINDS

ONCOLOGY
Leading oncology portfolio with significant growth potential

VACCINES
Durable growth with significant competitive advantages

HOSPITAL / SPECIALTY
Broad portfolio delivering demand-driven growth

ANIMAL HEALTH
Global leader delivering above-industry growth rates

Expect strong revenue growth every year, including 2023 – the year of greatest impact of JANUVIA LOE

¹ Includes specialty products in the pipeline that have not yet launched
FORTIFYING OUR FUTURE AHEAD OF THE CHANGING LANDSCAPE

Becoming a leaner, more efficient, science-driven company to accelerate growth
- Focusing organization and resources on greatest opportunities for growth
- Evolving operating model and culture to be more agile and efficient
- Building optionality for next wave of innovation

Leveraging new digital capabilities and automation
- Better enable innovation
- Expand customer and patient reach
- Enhance supply chain efficiencies
- Simplify back office operations

Creating headroom for innovation and sustainability of our mission
EXPECT MEANINGFUL OPERATING MARGIN EXPANSION & INCREASED ROIC

Non-GAAP SG&A as % of sales

Non-GAAP R&D as % of sales

Non-GAAP Operating margin expansion (%)

Return on Invested Capital (%)\(^1\)

\(^1\)Excludes BD & Goodwill
VALUE-CREATING CAPITAL ALLOCATION STRATEGY

**Commitments**

R&D Investments: Continued investments in internal innovation

CapEx: ~$16 billion of capital projects through 2022 focused on manufacturing capacity for our growth businesses, R&D discovery buildout and IT infrastructure

Dividends: Target payout ratio of 47%-50% over time

**Discretionary**

Business Development: Value-creating, bolt-on acquisitions and strategic collaborations to further enhance portfolio and pipeline

Share Repurchases: Return excess cash to shareholders

Expect to generate significant free cash flow over the next 5 years

Capital allocation priorities over the next 5 years

*Assumes financing consistent with A1 rating*
Bolt-on acquisitions

• Developing portfolio through value-creating acquisitions
• Investments in innovative mechanisms and technologies

Strategic collaborations and licensing

• Meaningful partnerships across all stages of development
• Working with a broad range of partners from academia to biotech to pharma

Completed ~60 transactions in 2018 spanning acquisitions, licensing, technology deals and clinical collaborations

1Peloton expected to close in 3Q 2019
POSITIONED TO DRIVE SUSTAINABLE GROWTH AND SHAREHOLDER VALUE

- **Sustained long-term revenue growth** including 2023 – the year of greatest impact of JANUVIA LOE

- **Meaningful operating margin expansion** through strong revenue growth driving favorable mix and further leveraged by expense productivity, thoughtful resource allocation and simplification

- **Value-creating capital allocation strategy** to enable growth and return of capital to shareholders
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COMMERCIAL PRIORITIES TO DRIVE FURTHER GLOBAL GROWTH

- Build on leading position across key growth pillars
- Capitalize on global growth opportunities
- Successfully execute new launches
CURRENT PILLARS HAVE EXPANSION OPPORTUNITIES AHEAD

ONCOLOGY  VACCINES  HOSPITAL PORTFOLIO

Visibility into growth drivers over the next 5 years
ONCOLOGY: DRIVING GLOBAL LEADERSHIP

Foundational cancer treatment

Market-leading PARPi

Broad-based TKI

27 Indications

15 Tumor types + MSI-H

>200K Patients treated

Strong foundation with long runway for growth ahead
KEYTRUDA: SIGNIFICANT GLOBAL GROWTH OPPORTUNITIES

• Building on leadership in lung with additional reimbursement rolling out across Europe and other markets

• Encouraged by early adoption in RCC and adjuvant melanoma launches

• Excited to extend H&N leadership with recent 1L approval

• Indications expected to more than double over next 5 years
  o Earlier lines of therapy, including adjuvant / neoadjuvant
  o New combinations
  o New tumor types

KEYTRUDA is one of the best-selling drugs 6 years after launch

Source: EvaluatePharma; KEYTRUDA Year 6 sales represent 1Q 2019 sales annualized. Sales in $ billions and not inflation adjusted
LYNPARZA: SET FOR SUSTAINED CLASS LEADERSHIP

- Lynparza has class leadership in the U.S., with ~60% of total PARPi prescriptions
- The only PARPi with 1L maintenance indication in ovarian cancer based on strong results from SOLO-1
- POLO data represents new opportunity in gBRCAm pancreatic cancer patients
- Additional indications with monotherapy and combinations with KEYTRUDA to drive significant growth going forward

Growth opportunities across multiple tumor types

In collaboration with AstraZeneca
LENVIMA: ESTABLISHING AS TKI OF CHOICE

- Approved in markets worldwide in RCC, HCC and differentiated thyroid cancer
- Significant opportunity in China given prevalence of HCC in the market
- Strong commercial collaboration sets foundation for execution in many future indications
- 13 studies in combination with KEYTRUDA, including NSCLC, endometrial carcinoma and RCC

Growth opportunities across multiple tumor types

- Thyroid cancer
- Renal cell carcinoma
- Hepatocellular carcinoma
- Endometrial carcinoma
- Lung cancer
- and more...
ONCOLOGY: POTENTIAL FOR >50 ADDITIONAL INDICATIONS OVER NEXT 5 YEARS

Proportion of expected indications by product

Potential to nearly triple oncology indications by 2023
VACCINES: GROWING GLOBAL BUSINESS WITH NEAR- AND LONG-TERM OPPORTUNITIES

- Significant long-term opportunity for pediatric and adult vaccines growth around the world
- High barriers-to-entry supporting sustained, durable position
- Investing in vaccines manufacturing capacity to increase doses produced globally
- Strong pipeline in pneumococcal disease, respiratory syncytial virus (RSV), cytomegalovirus (CMV), dengue and others

Nearly doubled vaccines revenue since 2010

Merck started recording vaccines sales in the 19 European countries previously part of the SPMSD vaccines joint venture starting in January 1, 2017
**GARDASIL: POSITIONED FOR RENEWED GROWTH**

- Growth driven by global appeals to eliminate cervical cancer
- Reacceleration of growth driven by expansion into new geographies, public and gender-neutral immunization programs and age cohorts
- Fastest pharmaceutical launch in China
- Significant opportunity ahead given only ~3% of the world’s eligible population has received an HPV vaccine

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**Global incidence of HPV-related cancers & diseases**

<table>
<thead>
<tr>
<th>Male</th>
<th>Common</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penile cancer</td>
<td>Oropharynx cancer</td>
<td>Cervical cancer</td>
</tr>
<tr>
<td>11,000</td>
<td>13,000</td>
<td>528,000</td>
</tr>
<tr>
<td>17,300,000</td>
<td>14,400,000</td>
<td>Vulvar &amp; vaginal cancer</td>
</tr>
<tr>
<td>14,400,000</td>
<td>18,200,000</td>
<td>Cervical dysplasia</td>
</tr>
</tbody>
</table>

- Current indications of GARDASIL 9
- Not indicated

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- Millions of cases
HOSPITAL PORTFOLIO: OPTIMIZED BY GLOBAL STRENGTH AND SCALE

BRIDION poised for continued growth worldwide as number of surgeries that use a reversal agent increases

Leading portfolio of antibiotics and antifungals, including novel products

Sizable HAB/VAB pneumonia indication represents new opportunity for ZERBAXA growth

Recent launches build on our HIV legacy and further position us to bring next generation treatments to market
Human health sales outside of the U.S. grew 12% in 1Q 2019

All growth rates exclude the impact of exchange and represent 1Q 2019 vs. 1Q 2018. Growth contributors represent select growth drivers across pillars of growth.

1 Europe primarily represents all European Union countries and the European Union accession markets
CHINA BECOMING NEW PILLAR OF GROWTH

Fastest growing multinational pharmaceutical company

Growth percentage over prior 18 months through 1Q 2019 for Top 15 multinationals.
Source: R&D-Based Pharmaceutical Association Committee (RDPAC) Report

Pivoting portfolio to innovation

Reaching more patients & expanding customer base

Average: 11%

Merck

1. Only includes Human Health portion of business
CONFIDENT IN GROWTH OPPORTUNITIES AND ABILITY TO EXECUTE

Innovative portfolio with significant demand-driven growth

Significant international opportunities, notably in China

World-class commercial teams executing in a changing environment

Commercial foundation for sustained global growth
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MERCK ANIMAL HEALTH IS A MARKET LEADER

- Global scale
- Revenue growth above market
- Strong profit contribution
- Innovative new product solutions
- Technologies that drive customer value
- Merck synergies
STRONG LONG-TERM METRICS FOR THE ANIMAL HEALTH INDUSTRY

At the core of a $34+ billion industry
CAGR mid-single digits¹

Predictable and sustainable growth drivers

Population growth
Rising middle class
Increasing urbanization

¹ Forward-Looking Projection
ANNUAL NET SALES GROWTH (%)

Source: Merck Internal Data, ex-exchange, excluding Zilmax. Industry Review.

MERCK ANIMAL HEALTH: OUTPERFORMING THE INDUSTRY
MERCK ANIMAL HEALTH

Global leader in pharmaceuticals, vaccines, health management solutions and emerging digital technology

800+ Product families

50 Countries

Products in more than 150 Markets

34 Dedicated manufacturing sites

12 Major manufacturing technologies & platforms

9,400 Colleagues

102 BILLION Vaccine doses produced annually

2018 Sales

38% Companion Animal

62% Livestock

29% U.S.

71% International
OUR DIVERSE PORTFOLIO PROVIDES STRENGTH

2018 RESULTS

Revenue by species:
- Poultry: 17%
- Ruminants: 30%
- Swine: 14%
- Companion Animal: 38%
- Aquaculture: 1%

Revenue by therapeutic area:
- Anti-infectives: 11%
- Parasiticides: 26%
- Other: 17%
- Biologics: 46%

Revenue by geography:
- ASIA PAC: 16%
- United States: 29%
- EURAM & Canada: 42%
- LATAM: 13%
- United States: 29%
- All Others: 62%

Revenue by product line:
- Top 10 Products: 38%

OUR DIVERSE PORTFOLIO PROVIDES STRENGTH

2018 RESULTS
DEDICATED ANIMAL HEALTH R&D NETWORK
MERCK ANIMAL HEALTH: CONSISTENT DELIVERY OF SIGNIFICANT NEW PRODUCT APPROVALS

Over 66 Approvals in 5 Years

>150 Geo-expansion licenses annually
**OUR INNOVATION PATHWAYS**

**In-house Discovery and Technology**
- Biologics
- Recombinant vaccines, RP technology
- Emerging diseases
- Delivery technologies

**Merck Research Laboratories**
- Monoclonal antibodies
- Oncology
- Diabetes, atopy, osteoarthritis
- Shared vaccine technologies

**External Partnerships/Business Development**
- Parasiticides
- Internal medicine
- Devices

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**Strategic Advantages**
- Best-in-class
- First-in-class
- Vaccine leadership
- Delivery technologies
- Compound libraries
- Diagnostic labs
MRL Collaborations

VACCINES

- Zoonotic & Emerging Diseases
- Respiratory Diseases
- Enteric Diseases
- Food Safety

BIOPHARMACEUTICALS

- Customer convenience, oral/mucosal delivery, long duration
- Oncology
- Atopy / Allergy

PHARMACEUTICALS

- Anti-Infectives
- Parasiticides & Endectocides
- Production enhancement reproduction, growth
- Non-conventional antimicrobials
- Internal medicine, pain, endocrinology, osteoarthritis
COMPLEMENTARY BUSINESS DEVELOPMENT

Geo-expansion: vaccines, pharmaceuticals
High-growth markets

HARRIS VACCINES
Prondil
Antelliq
Vilsan
Zhejiang Zhengli Antoo Biotech Co
Viscon
Scan Aqua
Vallee
INVESTING IN HIGH-GROWTH ANIMAL HEALTH OPPORTUNITIES

Trends Driving Technology Adoption

- Productivity
- Wellness
- Traceability
- Safety
- Automation

Customer Value

PRODUCTS + CONVENIENCE + PREDICTIVE SOLUTIONS

Market Opportunities

Vaccines & Pharmaceuticals
- Nobivac
- BRAVECTO
- ZUPREVO
- Porcilis
- Innovax
- SLICE

Innovative Delivery Solutions

Technology & Data
- Animal Health Ventures

Antelliq
INVESTING IN DIGITALLY-ENABLED CUSTOMER SOLUTIONS

Antelliq

>500 million animals tagged per year

>100 million pets monitored

>1,100 aqua monitoring stations worldwide

Whisper®
Veterinary Stethoscope

Non-invasive tool that confirms bovine respiratory disease and gauges its severity in eight seconds

Sea lice counter
MERCK ANIMAL HEALTH: OUR COMPETITIVE ADVANTAGE

✓ Broad global portfolio and presence
✓ Innovative products and solutions
✓ R&D excellence and access to MRL expertise
✓ High-quality manufacturing and supply
✓ Investment in digital technology to drive customer productivity
✓ Track record of execution
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BROAD ONCOLOGY STRATEGY TO IMPROVE OUTCOMES FOR CANCER PATIENTS GLOBALLY

- Establish KEYTRUDA as foundational treatment across most tumor types and stages of disease
- Identify patients most likely to benefit using biomarkers
- Broadly explore combinations to reach more patients
- Advance pipeline and pursue strategic collaborations and acquisitions to expand portfolio

Peloton acquisition expected to close in 3Q 2019
KEYTRUDA: BROAD ACTIVITY IN >25 CANCER TYPES

Change from baseline in tumor size (%)

Melanoma  NSCLC  H&N  Urothelial  TNBC  Gastric  cHL
NHL PMBCL  Mesothelioma  Ovarian  SCLC  Esophageal  NPC  Anal
Biliary Tract  HCC  ER+/HER2- BC  Cervical  Thyroid  Salivary  Endometrial
Prostate  GBM  MSI-H CRC  MSI-H non-CRC  Carcinoid  pNET  Merkel Cell

= cancer types with approved indications

Dr. Roy Baynes
KEYTRUDA: REPEATED OVERALL SURVIVAL BENEFITS IN MONOTHERAPY AND IN COMBINATION
KEYTRUDA: STILL IN EARLY INNINGS OF DEVELOPMENT

Continuing to build a wall of data

>1,000 Ongoing clinical trials

>600 Combination trials

>75 Registrational trials underway

>100 Trials in adjuvant / neoadjuvant and earlier lines

>1,000 Ongoing clinical trials
KEYTRUDA: ROBUST I-O PROGRAM IN ADJUVANT / NEOADJUVANT AND EARLIER LINES OF THERAPY

2018
Adjuvant Melanoma (KN-054)
APPROVED

2019
TNBC Neoadjuvant / Adjuvant (KN-522)
cSCC Locally Advanced (KN-629)

2020
NSCLC Adjuvant (KN-091)

2021
HNSCC Adjuvant / Neoadjuvant (KN-689)

2022
Adjuvant Melanoma (KN-716)
RCC Adjuvant (KN-564)
2L NMIBC (KN-057)
MIBC Locally Advanced (KN-676)

2023
Gastric & Esophageal Adjuvant / Neoadjuvant (KN-585)
HNSCC Locally Advanced (KN-412)

2024
NSCLC Neoadjuvant (KN-671)

2025
Adjuvant / Neoadjuvant MIBC (KN-866)
Adjuvant / Neoadjuvant MIBC (KN-905)
HCC Adjuvant (KN-937)
NSCLC Stage I/IIa (KN-867)

2026+
TNBC Adjuvant (KN-242)
cSCC Locally Advanced (KN-630)
ER+ / HER2- Breast Cancer Adjuvant / Neoadjuvant (KN-756)

Many registrational trials with readouts over the coming years
Encouraging results from KEYNOTE-173 show promise in adjuvant / neoadjuvant settings

Cohort A: KNp / KAC
Cohort B: KNpCb / KAC Reg 1
Cohort C: KNpCb / KAC Reg 2
Cohort D: KNpCb / KAC Reg 3
Cohort E: KTCb / KAC Reg 1
Cohort F: KTCb / KAC Reg 2

Pathological Complete Response (%)

N = 60
K = KEYTRUDA
Np = Nab-pac
A = doxorubicin
C = cyclophosphamide
Cb = carboplatin
T = paclitaxel

ypT0 ypN0
ypT0/Tis ypN0
KEYTRUDA: EARLY STAGE PROSTATE CANCER DATA INFORM PHASE 3 DEVELOPMENT PROGRAM

KEYNOTE-365 Cohort A
KEYTRUDA+Lynparza

KEYNOTE-365 Cohort B
KEYTRUDA+Docetaxel

KEYNOTE-365 Cohort C
KEYTRUDA+Enzalutamide

- 11/28 (39%) experienced reduction in tumor burden
- 8/28 (29%) experienced reduction ≥30%

• 30/65 (46%) experienced reduction in tumor burden
• 36/65 (55%) experienced reduction ≤30%

- 12/25 (48%) experienced reduction in tumor burden
- 6/25 (24%) experienced reduction ≥30%

- 10/25 (40%) experienced reduction in tumor burden
- 10/25 (40%) experienced reduction ≥30%
BROADEST PROSTATE CANCER PROGRAM WITH MULTIPLE PH 3 TRIALS ADDRESSING 40% OF PATIENTS

ADT = androgen deprivation therapy; BCR = biochemical recurrence; CRPC = castration-resistant prostate cancer; EBRT = external beam radiation therapy; HSPC = hormone-sensitive prostate cancer; PCa = prostate cancer; RP = radical prostatectomy.

*CI indicates estimated ARCHES approval as of 4Q 2019

<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
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<td>Non-metastatic</td>
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<td>Hormone-sensitive</td>
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<td>Castration-resistant</td>
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<td>Asymptomatic</td>
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<tr>
<td>Symptomatic</td>
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*CI indicates estimated ARCHES approval as of 4Q 2019
LYNPARZA: SHOWING EFFICACY BEYOND WOMEN’S CANCERS

- **1L, nonBRCA, KEYTRUDA combo (KEYLYNK-001)**
- **1L Maintenance BRCA+ (SOLO-1) - Approved**
- **1L Maintenance, All Comers Combo + Bev (PAOLA-1)**
- **PSR, All Comers Combo + Cediranib (GY004)**
- **PRR, All Comers Combo + Cediranib (GY005)**
- **2L+ PSR (SOL02/Study19) - Approved**
- **3L+ PSR, gBRCA Treatment (SOLO3)**
- **mCRPC, All Comers (KEYLYNK-001)**
- **mCRPC, HRRm (PROfound)**
- **mCRPC, All Comers Combo + Abiraterone (PROpel)**
- **1L NSQ NSCLC (KEYLYNK-006)**
- **1L SQ NSCLC (KEYLYNK-008)**
- **HRRm Basket (LYNK-002)**

Collaboration with AstraZeneca

**Ovarian cancer**
- mBC, gBRCA (OlympiAD) - Approved
- HER2- Adjuvant, gBRCAm (OlympiA)

**Breast cancer**
- 1L Maintenance gBRCA (POLO)

**Pancreatic cancer**
- mBC, gBRCA (OlympiAD) - Approved
- HER2- Adjuvant, gBRCAm (OlympiA)

**Prostate cancer**
- 1L Maintenance gBRCA (POLO)
- mCRPC, All Comers (KEYLYNK-001)
- mCRPC, HRRm (PROfound)
- mCRPC, All Comers Combo + Abiraterone (PROpel)

**Lung cancer**
- 1L NSQ NSCLC (KEYLYNK-006)
- 1L SQ NSCLC (KEYLYNK-008)

Demonstrating potential in prostate cancer, pancreatic cancer and more
LENVIMA: POTENTIAL ACROSS BROAD RANGE OF TUMOR TYPES

13 trials studying KEYTRUDA in combination with Lenvima spanning >13 tumor types
EXTENSIVE ONCOLOGY PIPELINE COVERING ALL ASPECTS OF THE TUMOR ENVIRONMENT

1. T-cell priming and trafficking to tumor
   - Antigen-presenting Cell (APC) or Tumor Cell
   - CD27
   - CTLA4
   - CD27
   - CTLA4
   - CVA21
   - Other cancer vaccines and viruses
   - PCVs
   - RIG-I
   - STING

2. Immunosuppressive microenvironment
   - Inhibitory ligand on tumor and stroma
   - Immunosuppressive metabolic environment
   - Suppressive myeloid cells and Treg
   - CCR5
   - CXCR2
   - GITR
   - IDO/TDO
   - ILT3
   - ILT4
   - IL10
   - LAG-3
   - PD-1
   - PD-1/LAG-3 bi-specific
   - PI3K-delta
   - TGFβ
   - TIGIT
   - TLR4

3. Direct tumor cell killing (immunogenic)
   - Activated T cell
   - CDK
   - ERK

4. Activated T cell
   - Antigen-presenting Cell (APC) or Tumor Cell
   - PD-1
   - GITR
   - ILT3
   - ILT4
   - IL10
   - LAG-3
   - PI3K-delta
   - TGFβ
   - TIGIT
   - TLR4

Dr. Roy Baynes
ESTABLISHING LEADERSHIP IN GROWING ONCOLOGY MARKET

- Largest I-O clinical development program in the industry
- Sizable long-term opportunity in new tumor types, including TNBC and prostate cancer
- Broad combination program with Lynparza, Lenvima and others
- Significant long-term opportunities in adjuvant / neoadjuvant settings

Well positioned to grow faster than the market

Worldwide oncology sales ($B)

Source: EvaluatePharma
EARLY STAGE – INCLUDING ADJUVANT / NEOADJUVANT – REPRESENTS SIGNIFICANT PORTION OF CANCER PREVALENCE

<table>
<thead>
<tr>
<th>Tumor Type</th>
<th>Early Stage</th>
<th>Metastatic</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEAD AND NECK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLADDER</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BREAST</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MELANOMA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RENAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LUNG</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: SEER 2018: Cancer Prevalence by Stage in U.S.

18 registrational trials across these tumor types and more, representing meaningful growth opportunity.
ADDRESSING TUMOR TYPES WITH HIGHEST INCIDENCE, INCLUDING BREAST AND PROSTATE

**Breast cancer market expected to grow to $38B by 2028**\(^1\)

- TNBC represents 10-15% and ER+/HER2- represents ~65% of all breast cancers
- Program addresses different stages of disease and lines of therapy

**Prostate cancer market expected to grow to $15B by 2028**\(^1\)

- mCRPC represents 20% and mHSPC represents 20% of all prostate cancers
- Broadest I-O development program addressing all stages of mCRPC and moving into mHSPC

\(^1\)Representative of U.S., EU5, and Japan

EXTENSIVE VACCINES PIPELINE TARGETING DISEASES WITH SIGNIFICANT UNMET NEED

- **HPV**
  - GARDASIL
  - V114 Adults & Peds
  - V116 Other PCVs

- **PCV**
  - MK-1654
  - V172 (Moderna)

- **RSV**
  - V160

- **CMV**
  - V181 Instituto Butantan

- **Dengue**
  - V920

- **Ebola**
  - V172

- **Others**

- **Supporting global appeals to eliminate cervical cancer by improving access to GARDASIL**
- **Need for prevention of residual disease**
- **Increasing gender-neutral vaccination**
- **Major unmet medical need in infants and elderly**
- **Leading non-genetic cause of neurologic disability**
- **Major cause of hemorrhagic fever and death**
- **Partnership with Instituto Butantan allows early access to Phase 3 study results**
- **Licensing application under review at FDA, EMA, WHO and African countries**
- **Addressing key areas of unmet need with broad early vaccine pipeline**

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HPV=Human papillomavirus; PCV=Pneumococcal conjugate vaccine; CMV=Cytomegalovirus; RSV=Respiratory syncytial virus
GROWING GLOBAL DEMAND FOR VACCINES PROVIDES SUSTAINABLE MARKET OPPORTUNITY

Growth over the next decade driven by:

• Increasing Coverage: Driving penetration of inline products in high income markets (U.S./EU)

• Globalization: Expanding markets and increasing penetration for inline and future pipeline products

• Innovation: Launching pipeline products

Global vaccine sales ($B)¹

<table>
<thead>
<tr>
<th>Year</th>
<th>Sales Range ($B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>$35</td>
</tr>
<tr>
<td>2023</td>
<td>$40 - $45</td>
</tr>
<tr>
<td>2028</td>
<td>$55 - $65</td>
</tr>
</tbody>
</table>

+6%

⁴Source: Evaluate Pharma, IMS, Company reports, DCVM projections
# UNIQUE PNEUMOCOCCAL PORTFOLIO TARGETING PROTECTION IN ADULTS AND CHILDREN

<table>
<thead>
<tr>
<th>PNEUMOVAX 23</th>
<th>V114</th>
<th>V116</th>
<th>OTHER PCVs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Foundation of adult prevention</strong></td>
<td><strong>Advancing protection across pediatric and adult populations</strong></td>
<td><strong>Targeted approach to adult prevention</strong></td>
<td><strong>Aiming for broadest protection for pediatric population</strong></td>
</tr>
<tr>
<td>• Unique combination of serotype coverage and cost effectiveness</td>
<td>• Expanded serotype coverage to potentially address the highest burden of pneumococcal disease</td>
<td>• Focus on potential to broaden protection in adult population</td>
<td>• Potential to establish long-term leadership in pediatric market</td>
</tr>
</tbody>
</table>

**Awarded Breakthrough Therapy Designation in Pediatric and Adult Populations**

---

## FOUNDATION

## NEXT-GENERATION PNEUMOCOCCAL PIPELINE
PNEUMOCOCCAL MARKET EXPECTED TO REMAIN LARGE WITH SIGNIFICANT ADDITIONAL OPPORTUNITY

**PEDIATRICS**
- Represent two-thirds of market
- Even with vaccine progress, still close to 500,000 deaths annually in children <5 years old around the world

**ADULTS**
- Significant remaining opportunity driven by aging population, limited National Immunization Programs and low vaccination rates (~400,000 hospitalization per year in the U.S.)

---

**Children <5, % IPD Coverage**
- Residual Disease Post-PCV13

**Adults ≥65, % IPD Coverage**
- Residual Disease Post-PCV13
MULTIPLE PROGRAMS TARGETING A MARKET OF OVER $10B GLOBALLY

**RSV**
- Most common respiratory pathogen in infants with >50,000 hospitalizations each year in the U.S. alone and >3 million hospitalizations globally
- RSV infection occurs in up to 10% of adults 65 and over in the U.S. each year, resulting in >175,000 hospitalizations
- Total RSV market estimated to be >$5 billion

**CMV**
- #1 non-genetic cause of hearing loss in infants in the U.S.
- 0.3 - 2.0% global prevalence of congenital cytomegalovirus
- >$3 billion market size expected globally
- V160 has potential to be first in class

**Dengue**
- 400 million dengue infections annually with 4 billion patients at risk worldwide
- >$3 billion market size across travel and endemic segments
- V181 data suggests potential for all 4 dengue serotypes to be covered by 1 dose
30 YEARS OF HIV INNOVATION CONTINUES

1980s
1983
HIV is discovered

1989
Role of protease published – AZT launches

1990s
1996

2000s
2000
ACHAP¹ Partnership with Botswana and Bill and Melinda Gates Foundation

2010s
2017
MK-8591: Investigational NRTTI for the treatment and prevention of HIV

2020+
2018
CONTINUING TO INNOVATE

MK-8591: Investigational NRTTI for the treatment and prevention of HIV

Many additional mechanisms in early development

¹African Comprehensive HIV/AIDS Partnerships
### MK-8591: UNIQUE PHARMACOLOGY ENABLING POTENTIAL LONG DURATION THERAPY

#### Long-Duration Oral & Implantable

<table>
<thead>
<tr>
<th>Monthly</th>
<th>Implantable</th>
<th>Daily</th>
<th>Weekly</th>
<th>Elimination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continue to simplify HIV care</td>
<td>Radical simplification of HIV care</td>
<td>Maximize simplicity, potency and tolerability</td>
<td>Free patients from daily dosing</td>
<td>Aspiring to cure</td>
</tr>
<tr>
<td>Potential to reduce risk of HIV infection</td>
<td>Daily dosing for antiretroviral suppression</td>
<td>↓↓ Dosing frequency</td>
<td>↑↑ Adherence</td>
<td>Sustained viral response or cure</td>
</tr>
<tr>
<td>↓↓↓ Dosing frequency</td>
<td>↑↑↑ Adherence</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Prevention [PrEP] TREATMENT CURE
HIV REMAINS A PARAMOUNT WORLDWIDE HEALTH THREAT

- **36.9M**
  - Number of people living with HIV

- **1.8M**
  - People newly infected with HIV in 2017

- **940K**
  - AIDS-related deaths in 2017
MK-8591: UNIQUE ATTRIBUTES ALIGN WELL WITH UNMET NEED

MK-8591

Simple, efficacious regimens that support lifelong therapy with high QoL

HIV UNMET NEED

Extended coverage for missed doses (forgiveness)

- Pill fatigue
- Reduced toxicity
- Easy, effective options for PrEP
GEFAPIXANT (MK-7264): EXPLORING ROLE OF P2X3 PATHWAY IN DISORDERS OF SENSORY PATHOLOGY

Development focused on the role of P2X3 receptor mediated signaling in:

- Unexplained or refractory chronic cough
- Visceral pain syndromes
- Altered sympathetic function

Pathologically sensitized afferents send aberrant signals of disease

P2X3 Blockade

Pathologies currently being explored

- Headache/migraine
- Hypertension
- Pathologic cough
- Bronchoconstriction
- Breathlessness
- Sleep apnea
- IBS-C/D
- Urinary urgency
- Bladder/pelvic pain
- Endometrial-related pain
- Neuropathic pain
- Muscle pain
- Itch

Blocking P2X3 receptors restores normal sensory function
GEFAPIXANT (MK-7264): OPPORTUNITY FOR BROAD APPLICABILITY

Chronic cough

Endometrial-related pain

Sleep apnea

Other sensory functions

~29 million Americans suffer from sleep apnea, of which 80% are undiagnosed

10% global prevalence for chronic cough, of which ~20% are refractory chronic cough or unexplained chronic cough

Impacts ~176 million women worldwide

Potential pipeline in a product

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Impacts ~176 million women worldwide.

Potential pipeline in a product.
DIVERSE PIPELINE WITH STRONG GROWTH POTENTIAL THROUGH NEXT DECADE

Durable business with extensive portfolio, and pipeline and global growth opportunity

Innovative pipeline targeting areas of significant unmet need
Welcome & Introductions
Ken Frazier, Chairman and Chief Executive Officer

Financial & Value Creation Overview
Rob Davis, Chief Financial Officer and Head of Global Services

Commercial Growth Drivers: KEYTRUDA & Beyond
Frank Clyburn, Chief Commercial Officer

Animal Health Innovation
Rick DeLuca, President, Merck Animal Health

Merck R&D Strategy Overview
Dr. Roger M. Perlmutter, President, Merck Research Laboratories

Pipeline Opportunities
Dr. Roy Baynes, Head of Clinical Development and Chief Medical Officer, and Mike Nally, Chief Marketing Officer

Future of Merck R&D: Panel Discussion
Merck Research Laboratories Leadership: Dr. Dean Li, Dr. Fiona Marshall and Dr. Daria Hazuda

Q&A / Closing Remarks
All

Lunch Break
All

Breakout Sessions
Pipeline Deep Dive
Next Generation Discovery
International Opportunity & China
EMBEDDING IMMUNOBIOLOGY ACROSS DISCOVERY EFFORTS

- Immunology is linked to most disease states
- Unlocking new opportunities to address unmet needs in areas previously “undruggable”
- Increased understanding of biology and importance of the immune system
- Leveraging experience from immuno-oncology — KEYTRUDA and GARDASIL — across discovery efforts

Immunology is the common thread across disease areas
DELIVERING OUR MISSION ACROSS MODALITIES

- Working across a number of modalities, which allows us to address new and complex biology
- Complexity of biological targets is increasing
- Therapeutic modalities expand the druggable universe
- Choice of modality defines addressable biology and impacts success of the drug

Modality-agnostic approach to research
OVER 150 DISCOVERY & EARLY DEVELOPMENT PROGRAMS ACROSS BROAD SET OF DISEASE AREAS

- Checkpoint / Costimulatory
- Innate Activation / Immunocytokines
- Tumor Intrinsic
- Myeloid and Stromal
- Metabolism
- Virus and Vaccines
- Other

- Neuronal Signaling
- Cell Homeostasis
- Neuroimmunology
- Lipid Biology
- Redox / Stress
- Other

**Therapeutic-agnostic approach**

- Heart Failure
- Vascular Disease
- Complications of diabetes / obesity
- Other

- HIV
- Vaccines
- Antibacterial / Antifungal
- Antivirals
- Other

CRMO\(^1\)
- Cardiovascular, Renal, Metabolic, Other

Immunotherapeutics
- Oncology
  - 35%

ID/Vaccines
- 30%

Neurology
- 20%

% Programs per area

\(^1\) CRMO = Cardiovascular, Renal, Metabolic, Other
NEW DISCOVERY HUBS

• Unleashing the power of Merck Research Labs
• Demonstrating keen scientific experience and insight
• Maximizing the ecosystems of the key scientific and technology innovation hub cities
• Exploring science beyond the boundaries of therapeutic areas

SOUTH SAN FRANCISCO
Our newest, cutting-edge multi-disciplinary research facility

CAMBRIDGE
Exploring emerging areas of disease biology

LONDON
Studying diseases facing aging populations

Reinvigorated discovery network
MERCK’S DISCOVERY STRATEGY

- Human biology drives our approach to discovery
- Understanding of immuno-oncology provides new insights into the role of immunology across every other therapeutic area
- Accessing biology through whatever modality necessary
- Broad and diversified emerging pipeline of unique molecular entities
- New cutting-edge discovery centers and new talent drive our research

Translating breakthroughs in fundamental biomedical research into meaningful new therapeutics and vaccines