Moderna Investor Day

R&D and Business Updates

September 12, 2024



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Forward-looking statements and disclaimer

This presentation contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, as amended, including statements regarding: Moderna's focus on ten product approvals through 2027; Moderna's expected regulatory submissions and other anticipated pipeline milestones in 2024; the rate of success of Moderna's platform; Moderna's ability to drive use of its Spikevax and mRESVIA vaccines; Moderna's financial framework through 2028, its ability to reduce R&D expenses through portfolio prioritization and cost efficiencies and its anticipated revenue growth; Moderna's expectation that its respiratory franchise will be profitable in 2024 and beyond; Moderna's expectation that it will break even on an operating cash cost basis in 2028; Moderna's ability to fund its plans without raising additional equity; and the size of the addressable markets being targeted by Moderna's pipeline and Moderna's anticipated product benefits. In some cases, forward-looking statements can be identified by terminology such as "will," "may," "should," "could," "expects," "intends," "plans," "aims," "anticipates," "believes," "estimates," "predicts," "potential," "continue," or the negative of these terms or other comparable terminology, although not all forward-looking statements contain these words. The forward-looking statements in this presentation are neither promises nor guarantees, and you should not place undue reliance on these forward-looking statements because they involve known and unknown risks, uncertainties, and other factors, many of which are beyond Moderna's control and which could cause actual results to differ materially from those expressed or implied by these forward-looking statements. These risks, uncertainties, and other factors include, among others, those risks and uncertainties described under the heading "Risk Factors" in Moderna's Annual Report on Form 10-K for the fiscal year ended December 31, 2023, filed with the U.S. Securities and Exchange Commission (SEC), and in subsequent filings made by Moderna with the SEC, which are available on the SEC's website at www.sec.gov. Except as required by law, Moderna disclaims any intention or responsibility for updating or revising any forward-looking statements contained in this presentation in the event of new information, future developments or otherwise. These forward-looking statements are based on Moderna's current expectations and speak only as of the date of this presentation.

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Introduction

Stéphane Bancel
Chief Executive Officer

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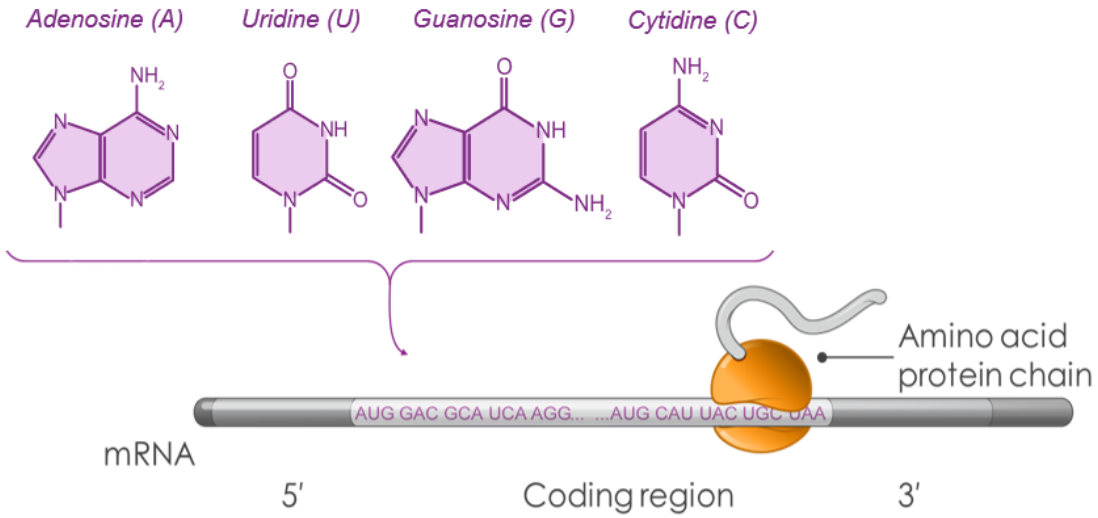
Our vision is becoming reality

Moderna was established with the goal of using mRNA, an information molecule, to treat and prevent disease



Our vision is becoming reality

Moderna was established with the goal of using mRNA, an information molecule, to treat and prevent disease

We have developed an unprecedented number of innovative medicines in a short time

2020

25 development programs

11	preclinical
8	Phase 1
4	Phase 2
1	Phase 3

2024

43 development programs

3	preclinical
11	Phase 1
18	Phase 2
7	Phase 3

Note: numbers do not total as 2020 includes 1 commercial stage program, and 2024 includes 4 commercial stage programs

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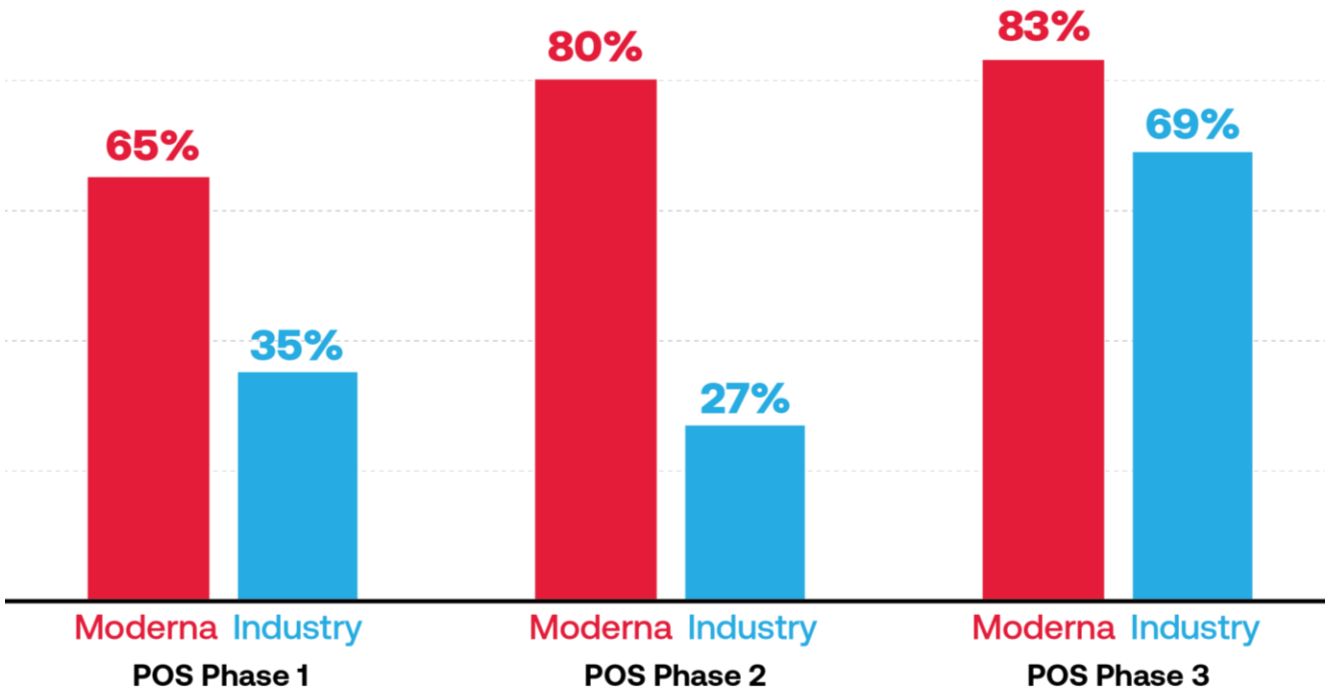
Our vision is becoming reality

Moderna was established with the goal of using mRNA, an information molecule, to treat and prevent disease

We have developed an unprecedented number of innovative medicines in a short time

Our demonstrated probability of success in R&D has been higher than that of traditional biopharma

Moderna's rate of success with our platform technology is higher than industry standard



Statistics for Moderna based upon internal data and are based upon: 23 Phase 1 trials, 10 Phase 2 trials, and 6 Phase 3 trials. Only concluded trials for unique molecular entities are included in data; strain updates for a program are not counted separately. Early trials establishing platform technology not intended for commercialization are excluded from Phase 1 trial counts. Data reported as of September 12, 2024. Industry statistics derived from Wong et al., *Biostatistics* (2019) 20, 2 , pp 273-286.

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We are adapting our business strategy, shaped by our successes and challenges

Broad clinical success of our large pipeline

Challenging commercial realities

Focusing on delivery of ten product approvals

Pacing new R&D investments

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Our 3 priorities

1. Drive use of Spikevax and mRESVIA vaccines

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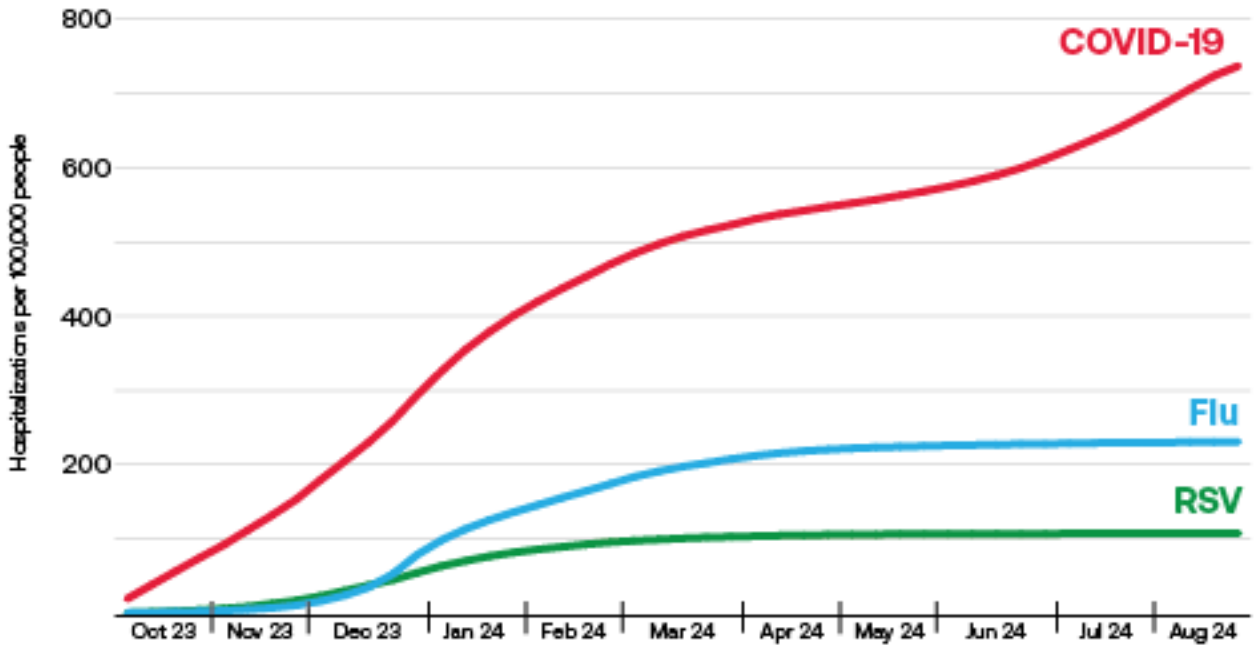
Our 3 priorities

1 Drive use of Spikevax and mRESVIA vaccines

Cumulative rates of respiratory virus-related hospitalizations in the 2023/2024 season in 65+ population in the U.S.



Source: https://www.cdc.gov/resp-net/dashboard/index.html

3X higher COVID-related hospitalizations occurred as compared to Flu during the 2023-2024 season

95% of those hospitalized were not up to date with their COVID vaccination[1]

1. https://www.cdc.gov/respiratory-viruses/risk-factors/older-adults.html

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Our 3 priorities

1 Drive use of Spikevax and mRESVIA vaccines

People 65+ who are hospitalized with COVID may experience a significant impact on their quality of life

~10%
loss of muscle mass over 7 days within immobile older adults can occur with any hospitalization [1,2]

~30%
older adult COVID-19 survivors experience decline in daily activity/independence[3,4]

~30%
risk of readmission within 6 months[5]

~20%
risk of death within 6 months of hospitalization[5,6]

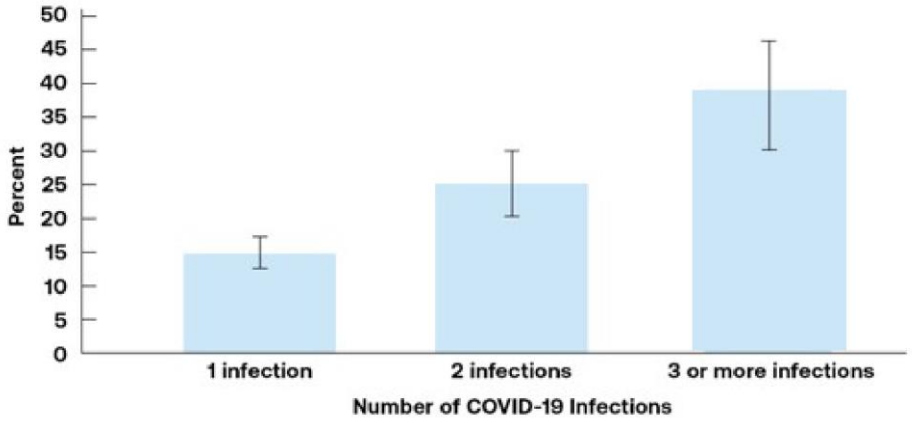
1. H.E. Wald, R. Ramaswamy, M.H. Perskin, et al. J Am Geriatr Soc, 67 (2018), pp. 11-16, https://pubmed.ncbi.nlm.nih.gov/30276809/; 2. Mary M Brennan Geriatric Nursing 2024;55, 373-375 https://doi.org/10.1016/j.gerinurse.2023.11.015 ; 3. Prampart et al. in BMC Geriatrics(s12877-022-03197-y) ; 4. Hosoda, T., Hamada, S. *BMC Geriatr* 21, 638 (2021). https://doi.org/10.1186/s12877-021-02597-w; 5. Oseran A S, Song Y, Xu J, Dahabreh I J, Wadhera R K, de Lemos J A et al. Long term risk of death and readmission after hospital admission with covid-19 among older adults: retrospective cohort study *BMJ* 2023; 382 :e076222 doi:10.1136/bmj-2023-076222 ; 6. Carrillo-Garcia, P., Garmendia-Prieto, B., Cristofori, G. et al. Eur Geriatr Med 12, 1091–1094 (2021). https://doi.org/10.1007/s41999-021-00516-1 ;

Our 3 priorities

1 Drive use of Spikevax and mRESVIA vaccines

The risk of Long COVID poses a risk to people of all ages

The risk of developing Long COVID **goes up** with each new COVID-19 infection[1]



Studies show that **COVID-19 vaccines may reduce the risk of Long COVID by up to 70%**[2]

1. https://www150.statcan.gc.ca/n1/pub/75-006-x/2023001/article/00015-eng.htm; 2. https://www.bmj.com/content/383/bmj-2023-076990

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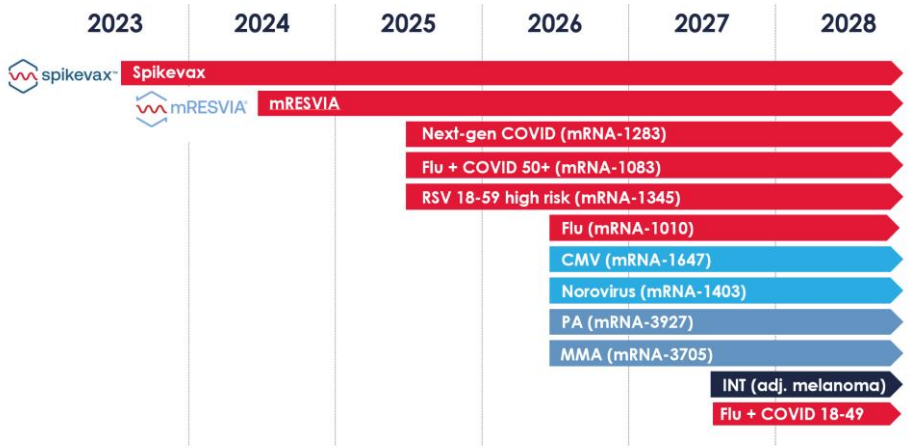
Our 3 priorities

1. Drive use of Spikevax and mRESVIA vaccines

2. Focus on 10 product approvals over the next 3 years to drive sales growth



Our 3 priorities

1. Drive use of Spikevax and mRESVIA vaccines
2. Focus on 10 product approvals over the next 3 years to drive sales growth
3. Deliver cost efficiency across the business and slow the pace of R&D investment, reducing it by $1.1B annually[1]

1. R&D expense of $4.8B in 2024E going to $3.6B-3.8B from 2027 forward

R&D Day Agenda

Introduction	**Stéphane Bancel**, *Chief Executive Officer*
R&D Strategy	**Stephen Hoge, M.D.**, *President*
Respiratory Vaccines • COVID • Flu • Combination vaccines • RSV	**Jacqueline Miller, M.D.**, *SVP, Therapeutic Area Head, Infectious Diseases* **Raffael Nachbagauer, M.D. Ph.D.,** *Executive Director, Infectious Disease Development* **Christine Shaw, Ph.D.,** *VP, Portfolio Head Respiratory Vaccines, Infectious Disease Development*
Latent and Other Vaccines • CMV (Latent) • Norovirus (Enteric)	**Jacqueline Miller, M.D.**, *SVP, Therapeutic Area Head, Infectious Diseases*
Coffee Break	
Rare Disease Therapeutics	**Kyle Holen, M.D.**, *SVP, Head of Development, Oncology and Therapeutics*
Oncology Therapeutics • INT	**Kyle Holen, M.D.** **Michelle Brown, M.D. Ph.D.,** *VP, Portfolio Leadership, INT*
Portfolio Overview	**Stephen Hoge, M.D.**
Financial Review	**Jamey Mock,** *Chief Financial Officer*
Conclusion – Looking Forward	**Stéphane Bancel**
General Q&A	**Stéphane Bancel, Jamey Mock, Stephen Hoge, Jacqueline Miller, Kyle Holen**

R&D strategy

Stephen Hoge, M.D.
President

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Our R&D strategy

2021-2023

Build a pipeline

Invest pandemic proceeds in diverse pipeline

2023-2026

Deliver respiratory approvals

Build large portfolio of 5 commercial vaccines

2026-2028

Deliver non-respiratory approvals

Expand commercial portfolio into cancer, rare diseases, and latent

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Our R&D investments delivered many positive results in the past year

Two major approvals

COVID
mRNA-1273

spikevax™

RSV 60+
mRNA-1345

mRESVIA®
(Respiratory Syncytial Virus Vaccine)

Four positive Phase 3s

Next-gen COVID
mRNA-1283

Flu + COVID (50+)
mRNA-1083

RSV (18-59 HR)
mRNA-1345

Seasonal Flu
mRNA-1010

Proof of concept strengthened by ongoing durability

PA
mRNA-3927

MMA
mRNA-3705

INT: Adj. Melanoma
mRNA-4157

Positive early proof-of-concept data in six other programs

EBV
mRNA-1189

VZV
mRNA-1468

Norovirus
mRNA-1403

Data shared at Vaccines Day

Lyme
mRNA-1982

EBV
mRNA-1195

Checkpoint
mRNA-4359

New positive early-stage data

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Our R&D strategy

2021-2023

Build a pipeline

Invest pandemic proceeds in diverse pipeline

2023-2026

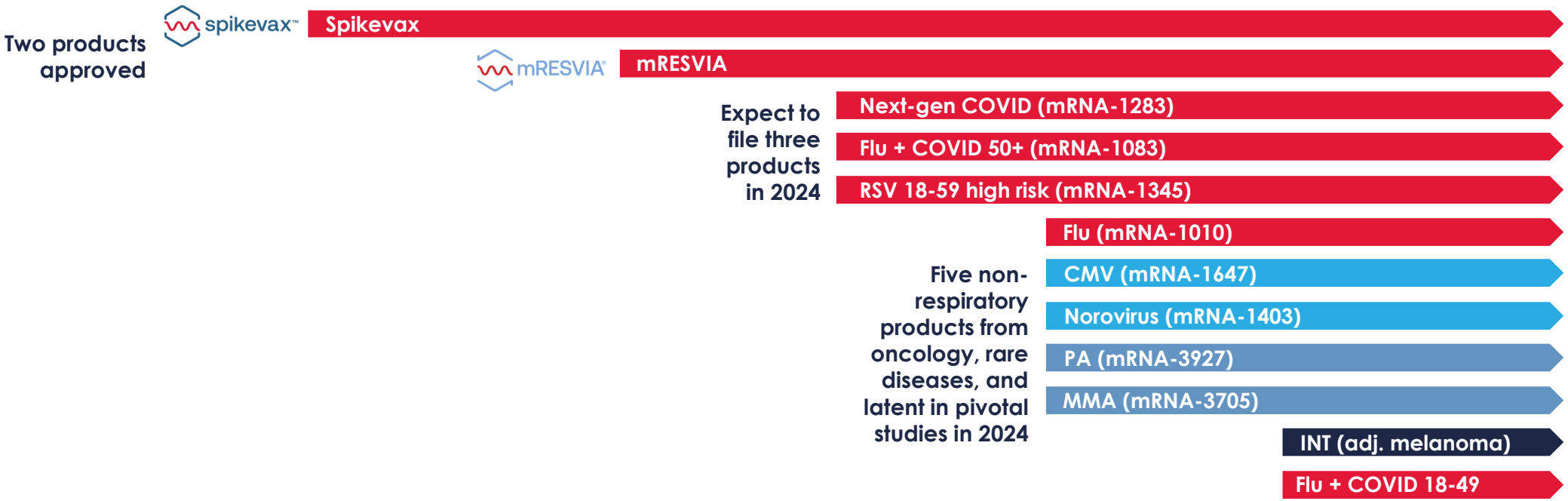
Deliver respiratory approvals

Build large portfolio of 5 commercial vaccines

2026-2028

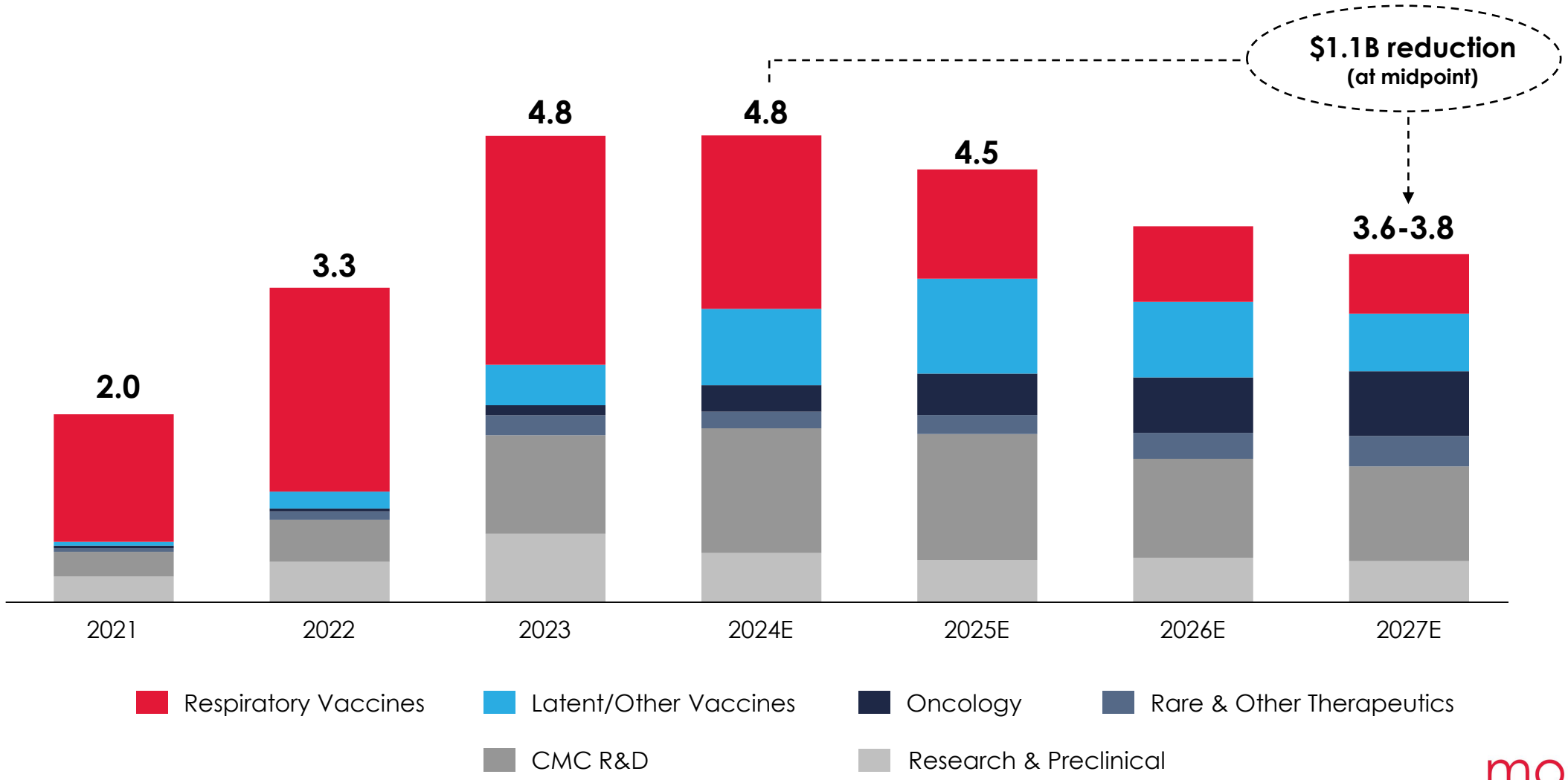
Deliver non-respiratory approvals

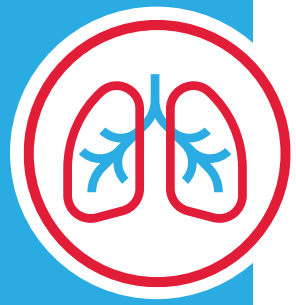
Expand commercial portfolio into cancer, rare diseases, and latent



Pacing new R&D investments will reduce annual R&D expense by $1.1 billion starting in 2027

Moderna R&D investment ($ billion)





Respiratory vaccines portfolio

Jacqueline Miller, M.D.
SVP, Head of Development,
Infectious Diseases,
Research & Development

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COVID-19

Spikevax (mRNA-1273) and
Next-gen (mRNA-1283)

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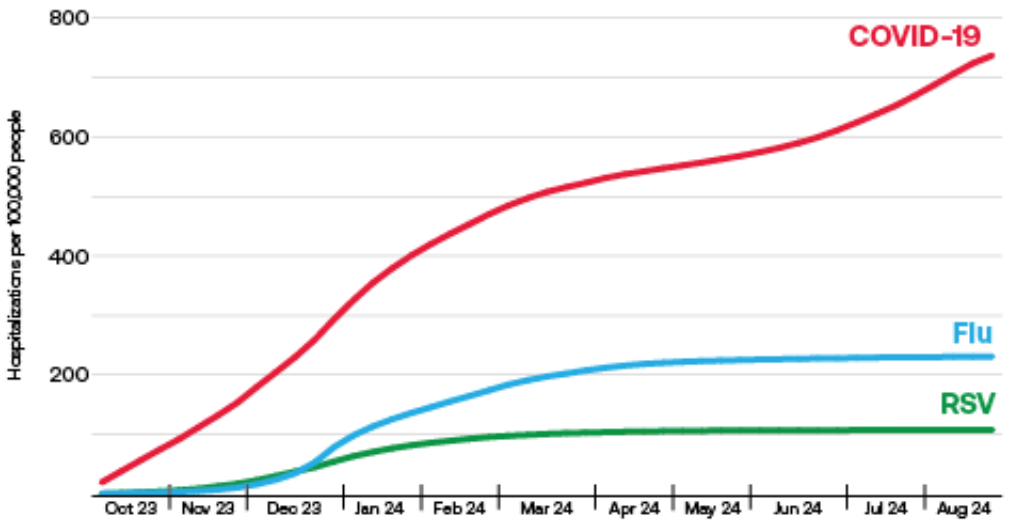
Continued need for COVID-19 vaccines in U.S.

COVID-19 continues to have a significant burden of disease in U.S.

COVID is the leading cause of hospitalizations among respiratory viruses

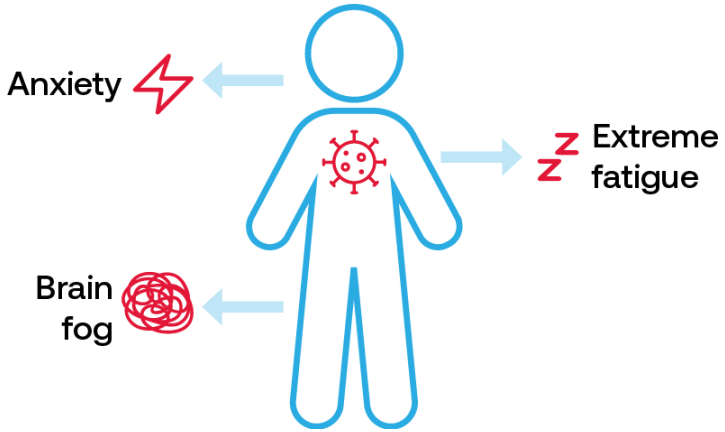
Cumulative rates of respiratory virus-related hospitalizations in the 2023/2024 season in 65+ population in the U.S.[1]



Over 95% of adults hospitalized in 2023-2024 due to COVID-19 had no record of receiving the latest vaccine.[2]

Long COVID data suggests even traditionally low risk groups should be vaccinated

Long COVID can impact many different parts of the body, including the brain, heart, and lungs. Over 200 symptoms of Long COVID have been reported, including symptoms that are difficult to manage.



1. https://www.cdc.gov/resp-net/dashboard/index.html
2. https://www.cdc.gov//risk-factors/older-adults.htmlrespiratory-viruses

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Spikevax (mRNA-1273): Moderna's Spikevax formulas have been approved/authorized and are available in major markets

Our mRNA platform allowed us to pivot quickly to ensure Spikevax availability for all selected strains

North America

Moderna Receives U.S. FDA Approval for Updated COVID-19 Vaccine Targeting KP.2 Variant of SARS-CoV-2

Rest of World

- Taiwan
- Japan
- EU
- UK
- Switzerland
- United Arab Emirates
- South Korea
- Israel

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mRNA-1283 pivotal Phase 3 trial design; sharing vaccine efficacy data today

The Phase 3 was designed to test the immunogenicity, safety and relative vaccine efficacy of mRNA-1283.222 against mRNA-1273.222 in participants 12+ years of age

Design
Randomized 1:1, observer-blind, active-controlled study

Number of participants dosed
11,417 medically stable adults ≥ 12 years old

Vaccination schedule
Single dose of mRNA-1283.222 or mRNA-1273.222

Bivalent vaccine encoding the ancestral and BA.4/5

Duration:
Study participants will be followed up for 12 months after study injection

Site location
US, UK and Canada

Total N= 11,417
Randomization Ratio = 1:1

mRNA-1283.222
n = 5,706

mRNA-1273.222
n = 5,711

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Relative vaccine efficacy (rVE) of mRNA-1283 vs mRNA-1273: success criterion met

Per-Protocol Set for Efficacy

	mRNA-1283 (10 µg) N = 5679	mRNA-1273 (50 µg) N = 5687
Number of participants with COVID-19, n (%)	**9.9%** (560)	**10.8%** (617)
Person-months	**40,778**	**40,782**
Incidence rate per 100 person-months (95% CI)	**1.4** (1.3, 1.5)	**1.5** (1.4, 1.6)
Relative Vaccine Efficacy Based on Hazard Ratio (99.4% CI)[1,2]	**9.3% (-6.6, 22.8)**	
p-value[3]	**0.0005**	

Based on CDC COVID-19 definition

1 rVE =1-hazard ratio, hazard ratio estimated using a stratified Cox proportional hazard model (stratified by age group at randomization) and with treatment group as a fixed effect.
2 Alpha-adjusted 2-sided (99.4%) CI was calculated using the Lan-DeMets O'Brien-Fleming Spending function (nominal one-sided alpha of 0.0028)
3 P-value based on the stratified Cox proportional hazard model to test the null hypothesis log (hazard ratio)>=log(1.1)

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Relative vaccine efficacy of mRNA-1283 vs mRNA-1273 by age group

COVID-19 Events through 31 Jan 2024 - Per-Protocol Set for Efficacy

	12-17 years		18-64 years		≥65 Years	
	mRNA-1283 10 µg N = 491	mRNA-1273 50 µg N = 490	mRNA-1283 10 µg N = 3558	mRNA-1273 50 µg N = 3562	mRNA-1283 10 µg N = 1630	mRNA-1273 50 µg N = 1635
Number of Participants with COVID-19	**5.9%** (29)	**4.7%** (23)	**10.7%** (382)	**11.8%** (422)	**9.1%** (149)	**10.5%** (172)
Incidence rate per 100 person-months (95% CI)	**1.0** (0.7, 1.5)	**0.8** (0.5, 1.2)	**1.4** (1.3, 1.6)	**1.6** (1.5, 1.8)	**1.3** (1.1, 1.5)	**1.5** (1.3, 1.7)
Relative Vaccine Efficacy (95% CI)	**-29.2%** (-123.3, 25.3)		**9.7%** (-3.8, 21.3)		**13.5%** (-7.7, 30.6)	

Highest rVE point estimate in those ≥65 years old

Based on CDC COVID-19 definition
rVE =1-hazard ratio, hazard ratio was estimated using a Cox proportional hazard model and with treatment group as a fixed effect.

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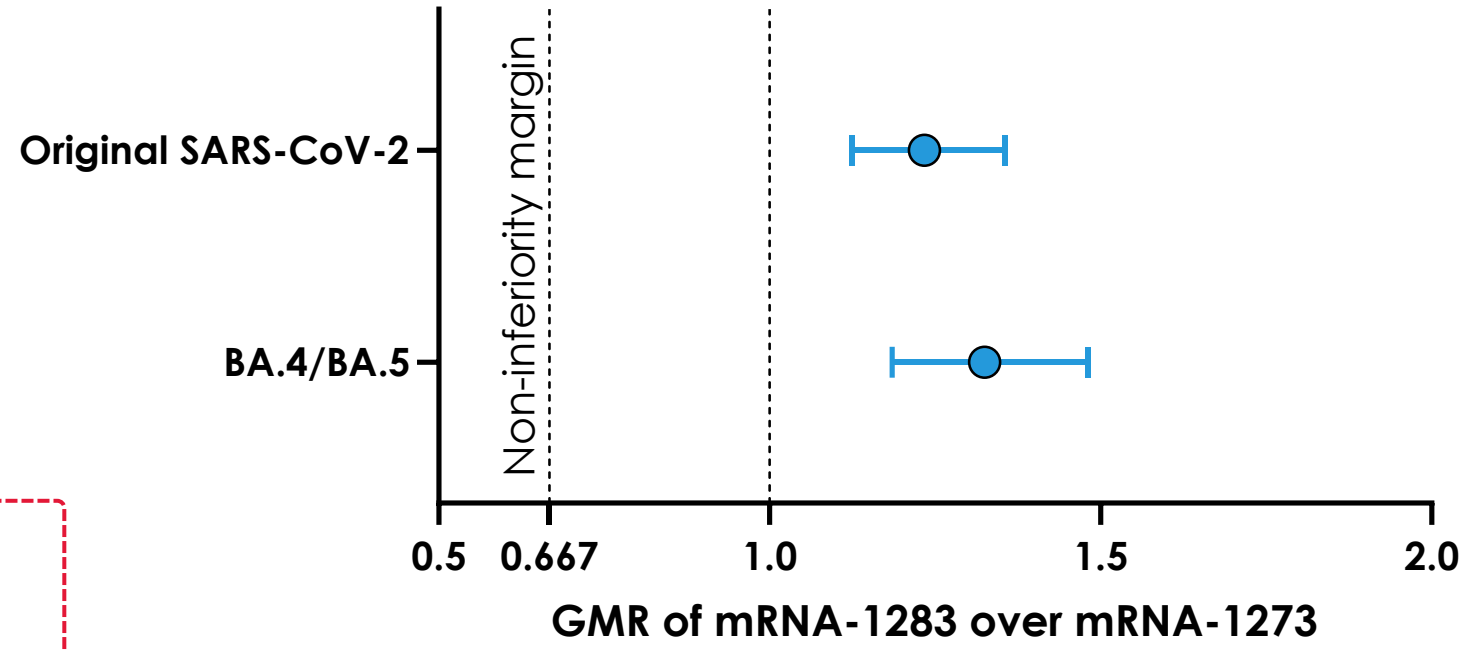
mRNA-1283.222 elicited higher antibody response against both BA.4/5 and original SARS-CoV-2 compared to mRNA-1273.222

Geometric mean ratio (GMR) of mRNA-1283.222 vs mRNA-1273.222 against BA.4/BA.5 and original SARS-CoV-2 based on a randomly selected immunogenicity subset*

- mRNA-1283 arm (N=621), mRNA-1273 arm (n=568)



Success Criteria Met

- GMR[1] non inferiority:
  Lower 95% CI of GMR >0.667
- Seroresponse rate[2] difference non-inferiority:
  Lower 95% CI of difference > -10%

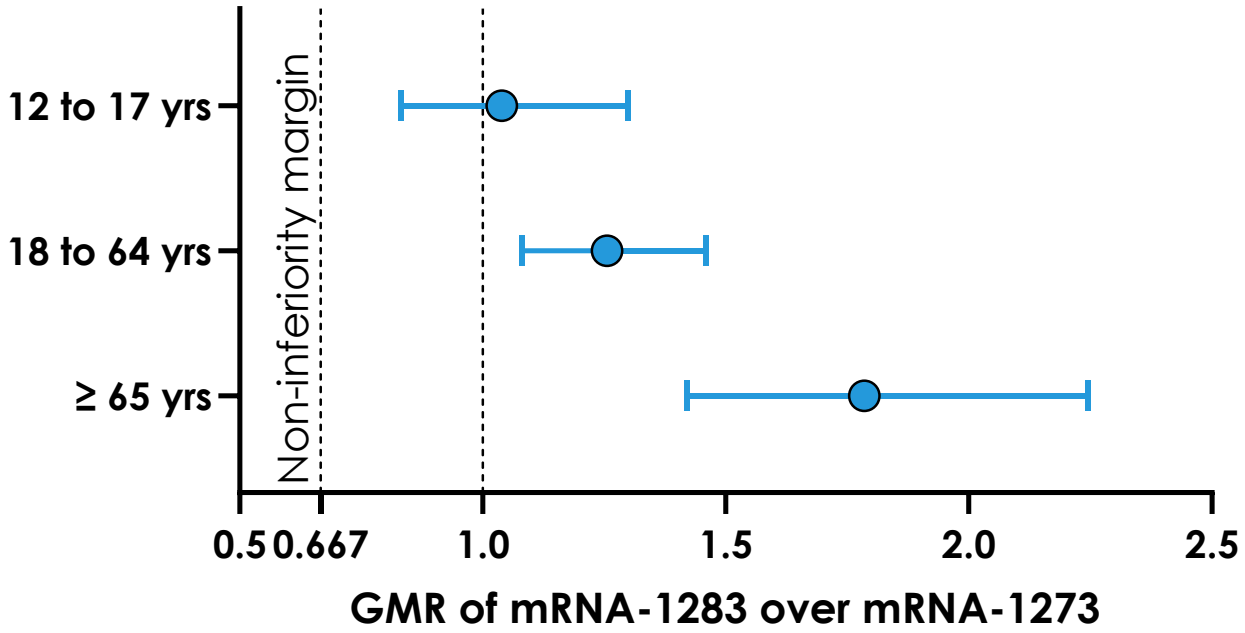
* Per protocol immunogenicity subset was used to assess immunogenicity objectives. The PPIS consisted participants from immunogenicity subset) who received the planned dose of study vaccination, have pre-booster and Day 29 neutralizing antibody data, and had no major protocol deviations that impact immunogenicity data.

1 ANCOVA model adjusting for SARS-CoV-2 infection status pre-vaccination, randomization age group, number of prior doses and type of last COVID-19 vaccine (mRNA Omicron bivalent, mRNA original monovalent, non-mRNA vaccine). Coefficients for Least Square Means use margins.

2 Seroresponse primary definition = an antibody value change from baseline below the LLOQ to >=4 × LLOQ, or at least a 4-fold rise if baseline is >= LLOQ and <4 × LLOQ, or at least a 2-fold rise if baseline is >=4 × LLOQ; 3 95% CI is calculated using the Miettinen-Nurminen (score) confidence limits

mRNA-1283.222 antibody response against BA.4/5 compared to mRNA-1273.222 by age group

Geometric mean ratio (GMR) of mRNA-1283.222 vs mRNA-1273.222 against BA.4/BA.5 based on a randomly selected immunogenicity subset*



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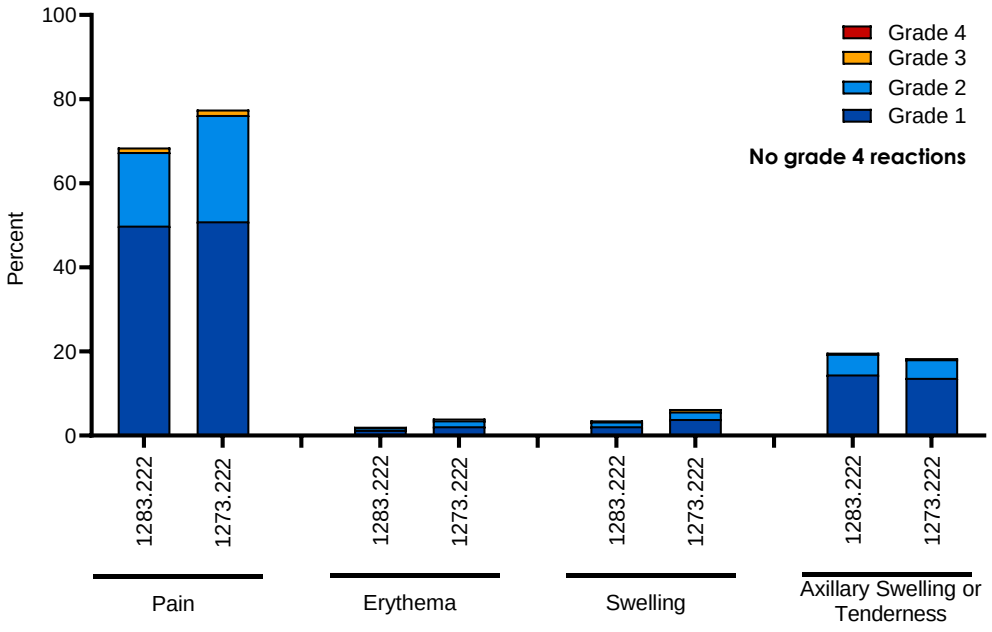
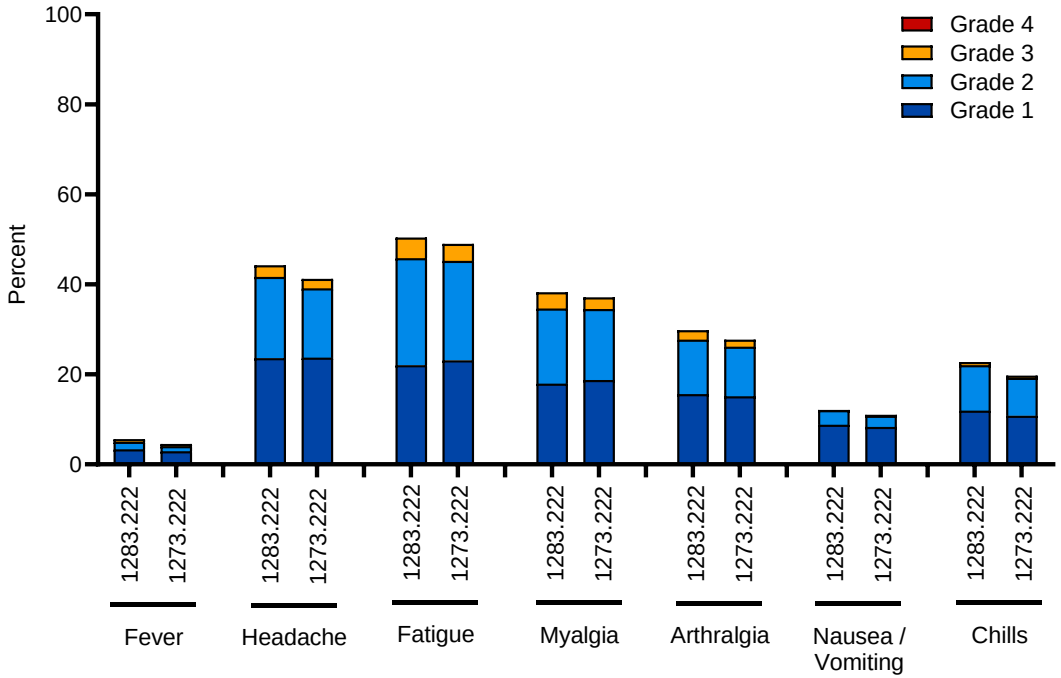
Reactogenicity profile of mRNA-1283 similar to mRNA-1273

Overall Local Reactogenicity: 70.3% mRNA-1283.222 vs. 78.4% mRNA-1273.222



Solicited Safety Set: 1283.222 N=5707, 1273.222 N=5711

Overall Systemic Reactogenicity: 64.4% mRNA-1283.222 vs. 64.2% mRNA-1273.222



Solicited Safety Set: 1283.222 N=5707, 1273.222 N=5711

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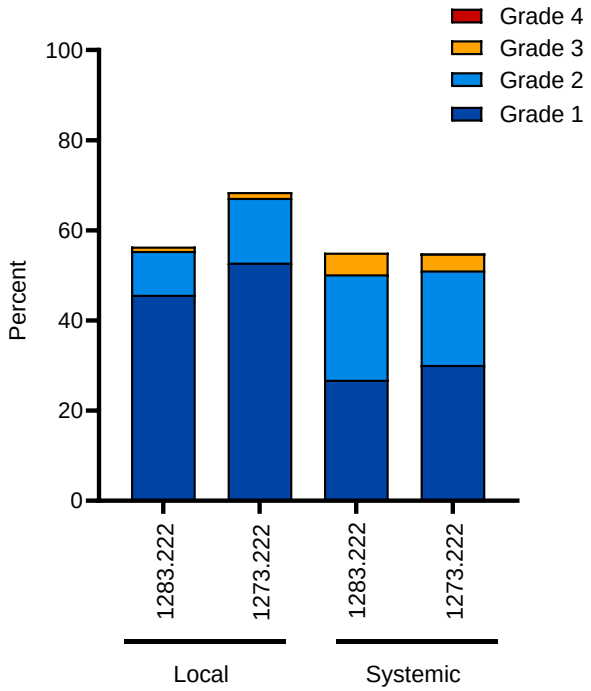
Reactogenicity profile of mRNA-1283 versus mRNA-1273 in Phase 3 study by age group

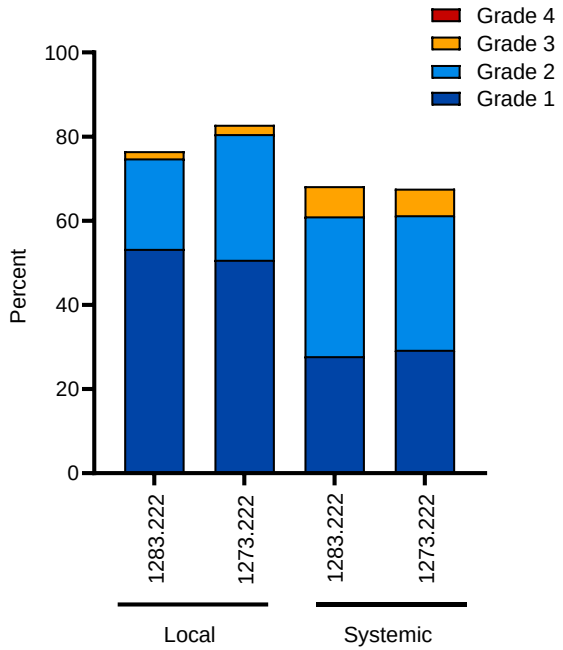
A dose of mRNA-1283.222 vs. mRNA-1273.222

≥ 65 years old



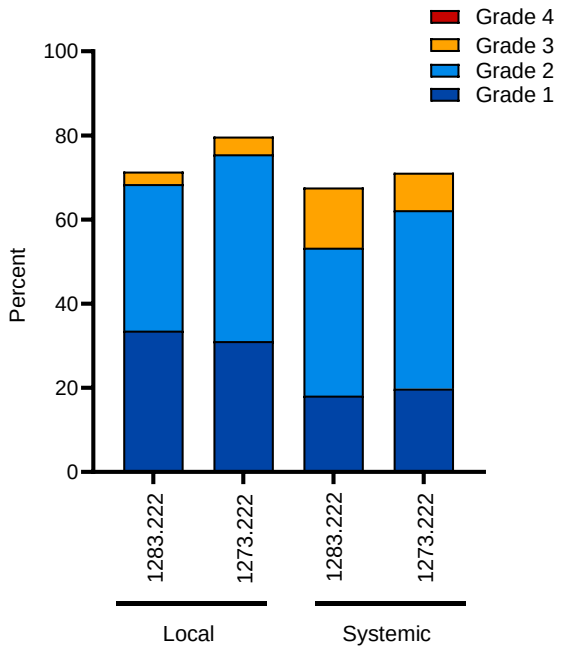
n=1632 mRNA-1283 arm
n=1637 mRNA-1273 arm

18-64 years old



n=3573 mRNA-1283 arm
n=3574 mRNA-1273 arm

12 to 17 years old



n=497 mRNA-1283 arm
n=495 mRNA-1273 arm

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mRNA-1283 pivotal Phase 3 safety

- mRNA-1283 was well-tolerated and its safety and reactogenicity profile was consistent with the known safety profile of mRNA-1273
- No deaths or discontinuations of vaccination were reported as related to mRNA-1283
- Myocarditis and pericarditis have rarely been reported with mRNA-1273 and are important identified risks for mRNA-1273. No events of myocarditis or pericarditis were reported for mRNA-1283 in clinical studies

Next-gen COVID-19 vaccine mRNA-1283 summary and next steps

Vaccine efficacy	• Pre-specified relative vaccine efficacy (rVE) objective met • rVE of mRNA-1283 non-inferior compared to mRNA-1273 • rVE point estimate highest in participants ≥ 65 years old
Immunogenicity	• Pre-specified immunogenicity objectives met • mRNA-1283.222 elicited higher titers against both BA.4/5 and original SARS-CoV-2 at a lower dose compared to mRNA-1273.222
Reactogenicity / Safety	• Local reactions trend lower with mRNA-1283 than mRNA-1273 • Systemic reactions following mRNA-1283 similar to mRNA-1273 • No safety concerns identified for mRNA-1283
Next steps	• Expect to submit for approval in 2024, and intend to use a Priority Review Voucher

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Influenza

Raffael Nachbagauer, M.D., Ph.D.
Influenza Portfolio Lead

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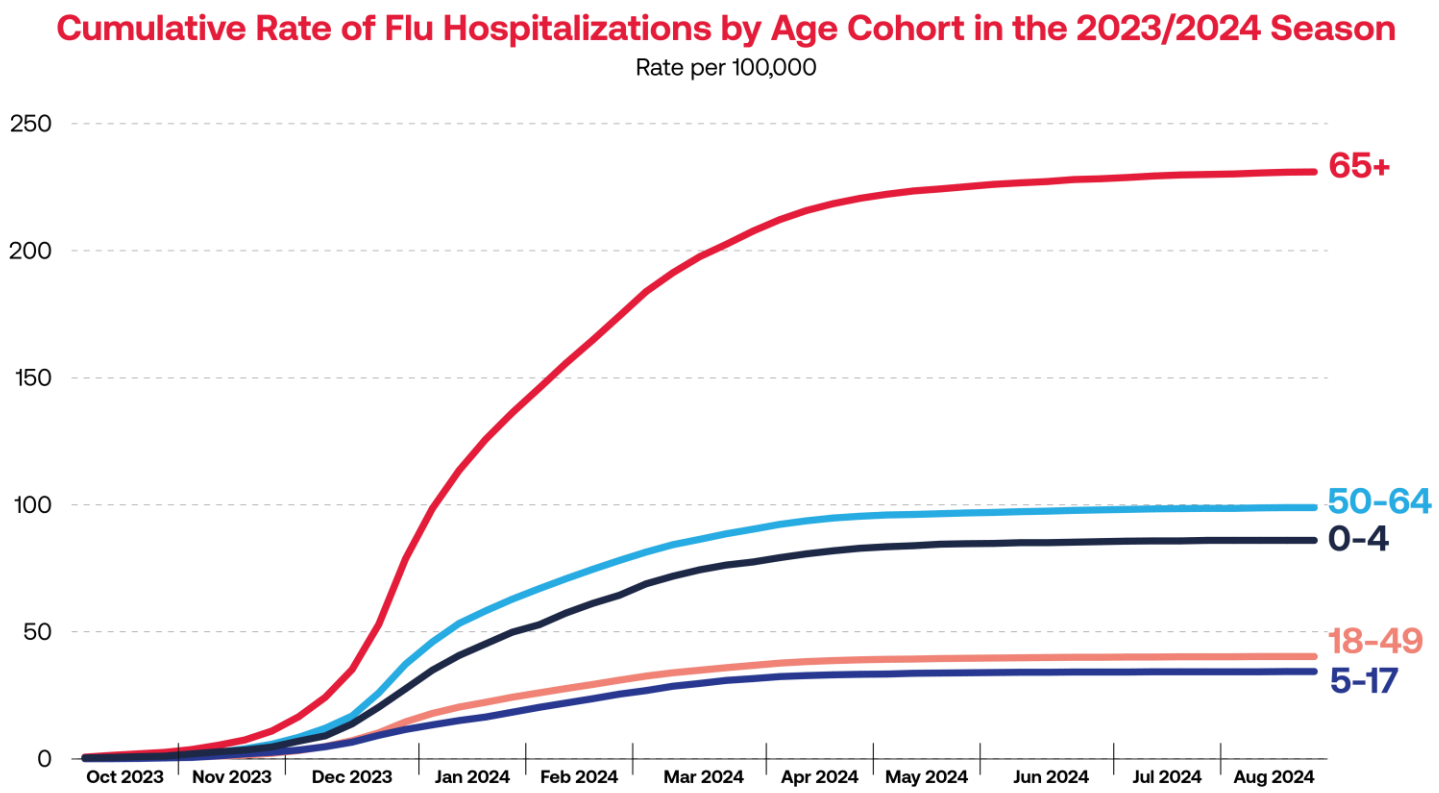
Seasonal influenza causes respiratory illnesses leading to hospitalizations across age groups, especially in older adults



SOURCE: https://www.cdc.gov/flu/weekly/influenza-hospitalization-surveillance.htm

Our mRNA platform will allow us to quickly reformulate based on the current year's strain

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mRNA-1010 Phase 3 older adult study overview

Study was designed to test the immunogenicity and safety of an optimized composition of mRNA-1010

Design
Randomized, observer-blind, active control study of optimized mRNA-1010

Participants
3,003 medically stable adults ≥65 years old

Vaccination schedule
Single dose of mRNA-1010 or Fluzone HD

Duration: 6 months
Participants were followed up for 6 months

Site locations
Northern hemisphere (United States)

Total N= 3,003

Randomization Ratio= 1:1

mRNA-1010 (50 µg)
N=1,507

Fluzone HD
N=1,496

8 primary endpoints: GMT and SCR across 4 strains mRNA-1010 vs Fluzone HD

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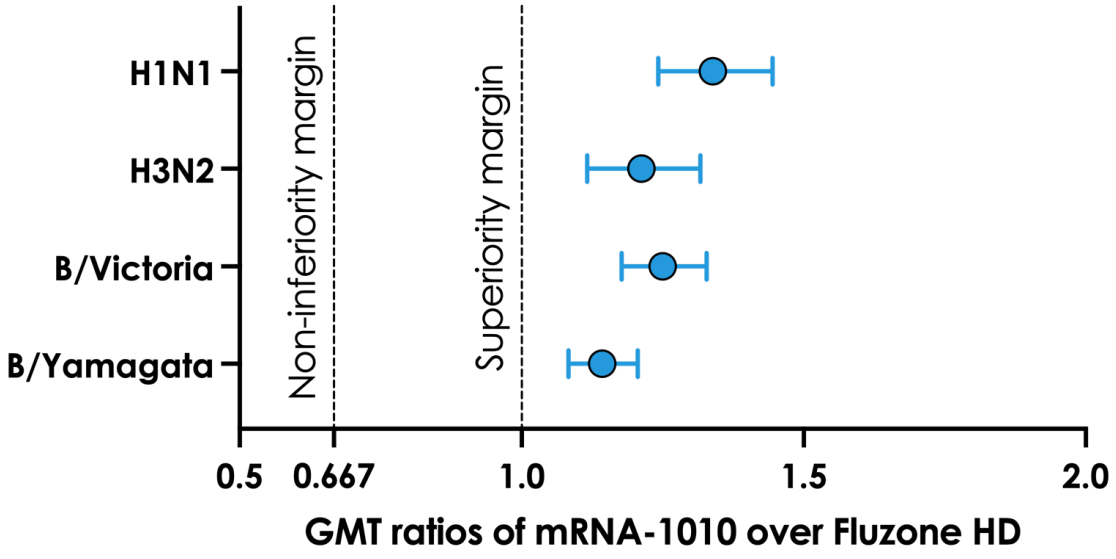
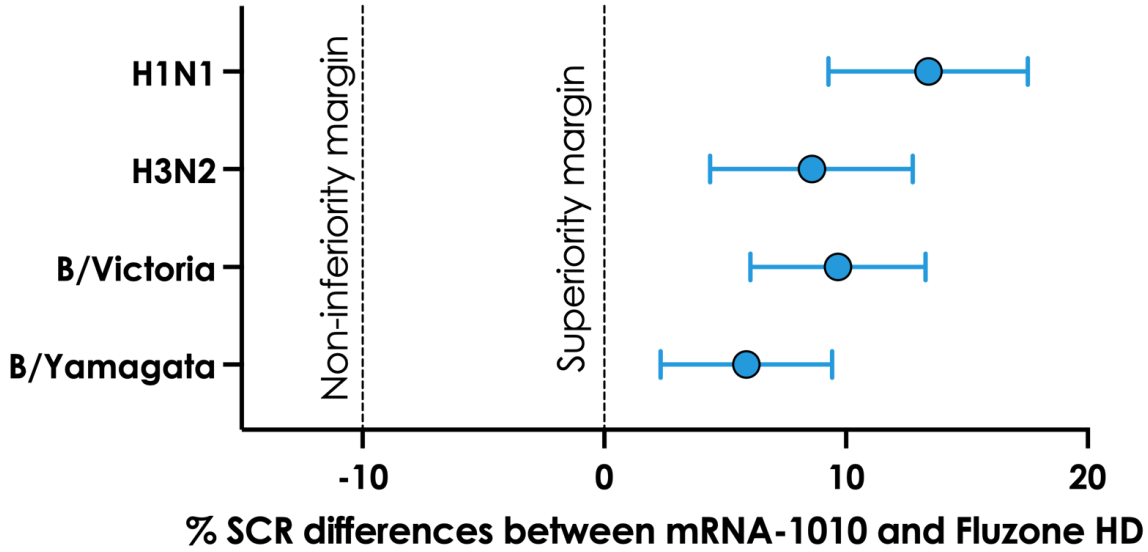
mRNA-1010 met all primary immunogenicity endpoints compared to Fluzone HD in P303

GMT ratios



Seroconversion rates

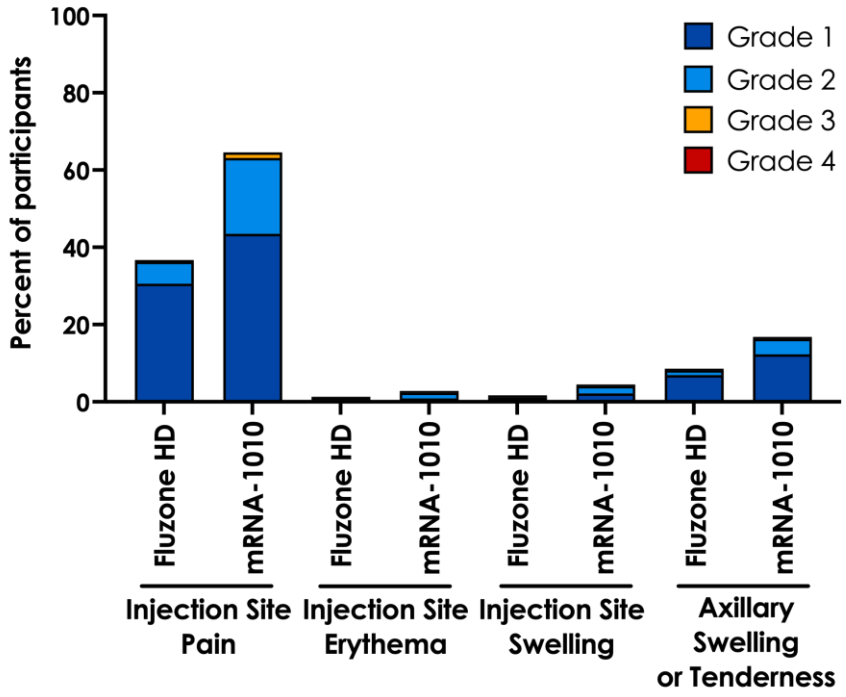


- Immunogenicity criteria for licensure according to regulatory guidance were met for all 8 co-primary endpoints
  - GMR
  - Seroconversion rates
- Superior GMTs and seroconversion rates were observed for mRNA-1010 for all four strains

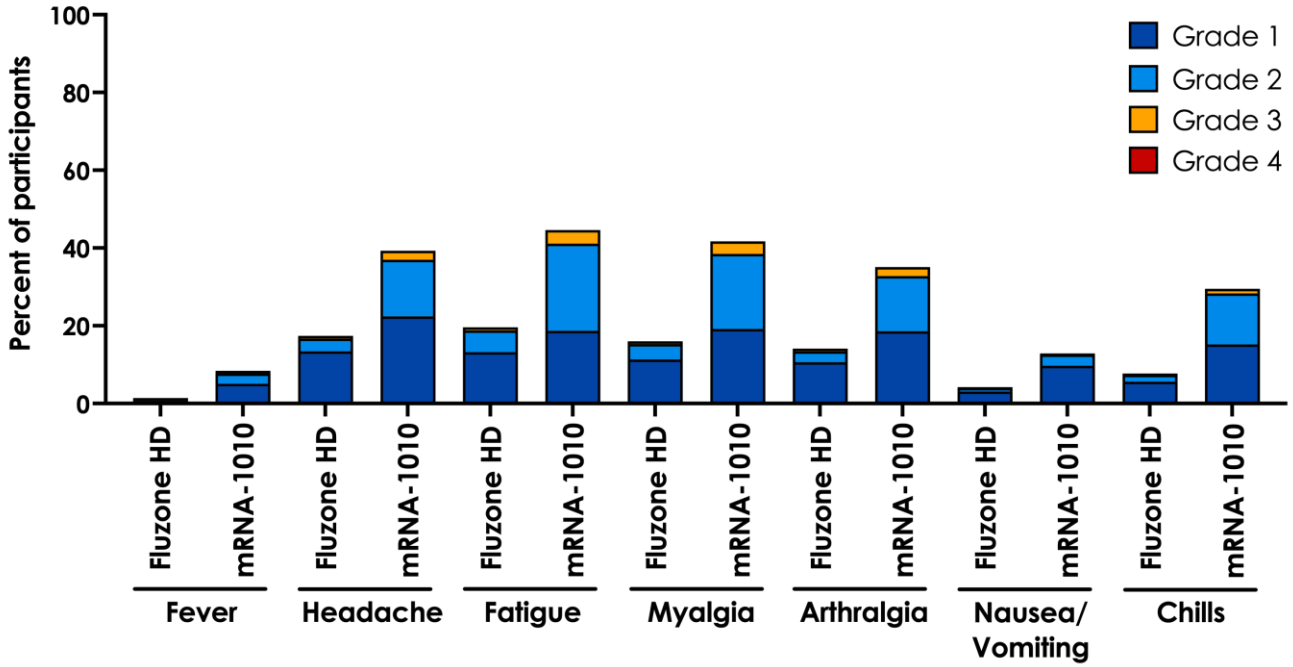
*Error bars indicate 97.5% confidence intervals

mRNA-1010 showed acceptable, but higher reactogenicity compared to Fluzone HD

Local Solicited Adverse Reactions



Systemic Solicited Adverse Reactions



- The majority of solicited ARs were grade 1 or grade 2 in severity
- The most common local solicited ARs were injection site pain and axillary swelling; the most common systemic solicited ARs were headache, fatigue, myalgia and arthralgia.

mRNA-1010 Phase 3 older adult safety

- Unsolicited AEs were reported at similar rates between mRNA-1010 and the active comparator groups
  - Profiles were similar based on frequency, severity, seriousness, relatedness as assessed by the investigator, and types of events
- No myocarditis/pericarditis events were identified
- Rates of SAEs up to end of study were similar between mRNA-1010 and the active comparator
- Overall, no safety concerns were identified for mRNA-1010
- An acceptable tolerability and safety profile was observed

mRNA-1010 vaccine efficacy study (P304)

Design
Randomized, observer-blind, active control study of optimized mRNA-1010

Participants
~56,000 medically stable adults ≥50 years old across two seasons with ~34,000 in first season

Vaccination schedule
Single dose of mRNA-1010 or Fluarix

Duration
6 months

Site locations
Northern hemisphere countries

Season 2 study only to commence if success criteria not met in season 1

Season 1 Total N= ~34,000 Randomization Ratio = 1:1	Season 2 Total N= ~22,000 Randomization Ratio = 1:1
mRNA-1010 N= ~17,000	mRNA-1010 N= ~11,000
Fluarix N= ~17,000	Fluarix N= ~11,000

Primary Endpoint:

- Relative efficacy of mRNA-1010 to an active comparator in preventing protocol-defined influenza like illness caused by any strain confirmed RT-PCR
- Safety and reactogenicity

Flu (mRNA-1010) summary and next steps

Immunogenicity

- Immunogenicity criteria were met for all 8 co-primary endpoints for GMT ratio and seroconversion rates

Reactogenicity / Safety

- Showed an acceptable reactogenicity profile, with the majority of solicited adverse reactions reported as grade 1 or 2 in severity
- No safety concerns were identified for mRNA-1010

Next steps

- Moderna is no longer pursuing accelerated approval for the regulatory submission of mRNA-1010, and will focus its resources on the submission of flu + COVID combination vaccine (mRNA-1083)
- We plan to start a confirmatory vaccine efficacy study for mRNA-1010 in 2024, funded by previously announced project financing through Blackstone Life Sciences

Respiratory Combinations

Christy Shaw, Ph.D.
Vice President, Portfolio Head, Respiratory Vaccines

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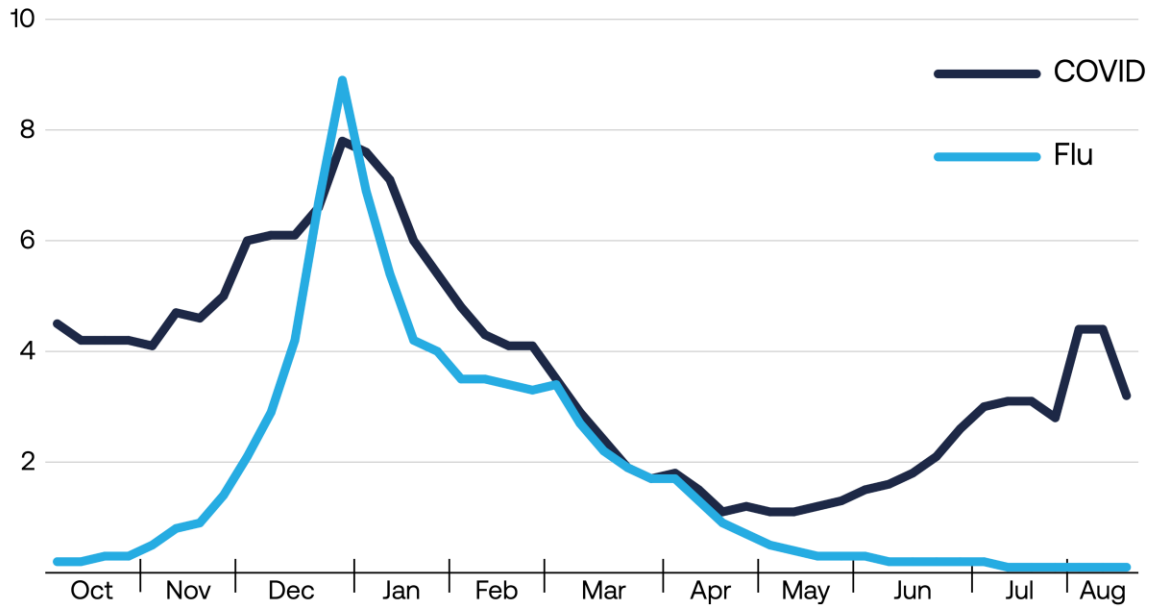
The burden of flu and COVID underscores the importance of a combination vaccine to potentially increase vaccine uptake in the U.S.

Offering a combo vaccine could push the COVID vaccine rate closer to that of flu, with the potential to substantially lower the combined burden of disease

Still thousands of hospitalizations each week in the U.S.

Hospitalization rate per 100K population in the 2023/2024 season



SOURCE: https://covid.cdc.gov/covid-data-tracker/#covidnet-hospitalization-network
https://www.cdc.gov/flu/weekly/influenza-hospitalization-surveillance.htm

Vaccine uptake in the U.S.

COVID-19 vaccination coverage rate (VCR) 2023/2024[1]:

as of 04/27/2024

41%
65 years of age or older

25%
50-64 years of age

Influenza VCR in 2023/2024[2]:

as of 05/11/2024

74%
65 years of age or older

52%
50-64 years of age

1. https://www.cdc.gov/vaccines/imz-managers/coverage/covidvaxview/interactive/adult-coverage-vaccination.html
2. https://www.cdc.gov/flu/fluvaxview/dashboard/vaccination-dashboard.html

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mRNA-1083-P301 Phase 3 study; presenting data charts today

Study was designed to test the immunogenicity and safety of mRNA-1083

Design
Randomized, observer-blind, active control study

Participants
~8,000 adults ≥ 50 years of age

Vaccination schedule
2 injections on Day 1 (mRNA-1083 + placebo or licensed influenza vaccine + COVID-19 vaccine)

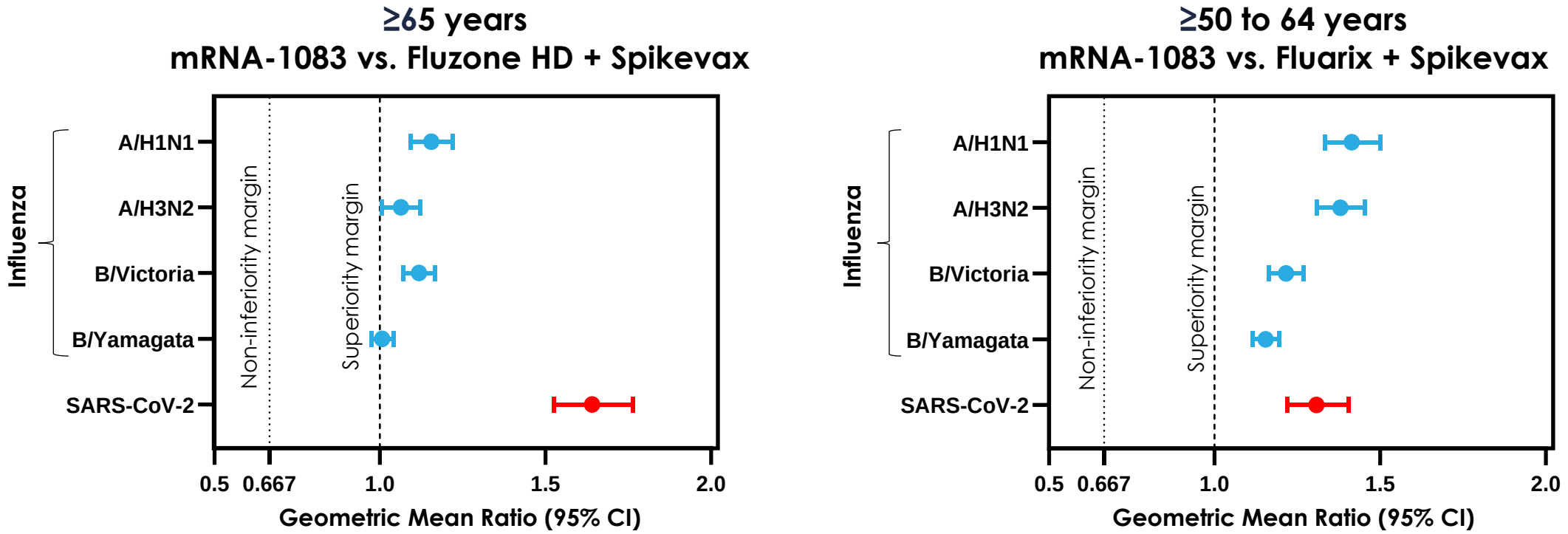
Duration: 6 months
Participants followed up for 6 months

Site locations
Northern hemisphere (United States)

Phase 3 clinical study

Cohort A: Ages ≥ 65 years	Cohort B: Ages ≥ 50 to 64 years
mRNA-1083 + placebo N~2000	mRNA-1083 + placebo N~2000
Fluzone HD + Spikevax N~2000	Fluarix + Spikevax N~2000

mRNA-1083 met all primary immunogenicity endpoints in Phase 3

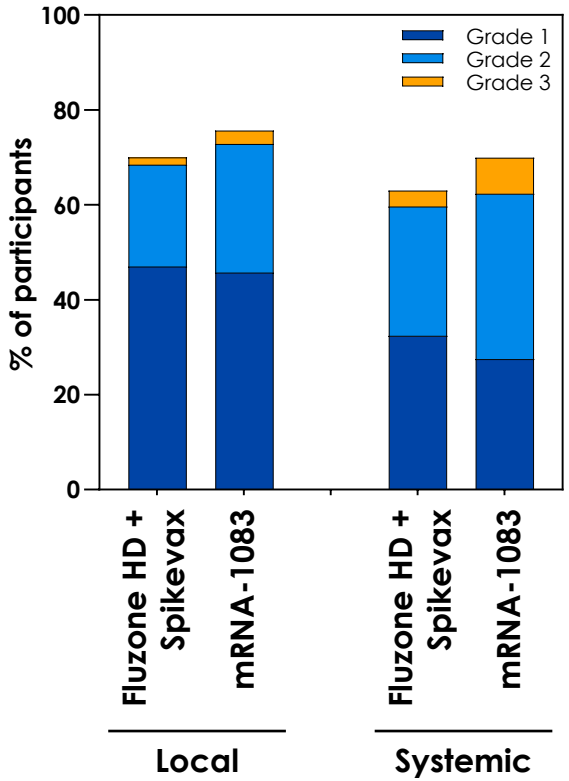


- Noninferiority criteria were met for all immunogenicity endpoints (GMT ratios; seroconversion and seroresponse rates)
- mRNA-1083 induced a higher antibody response compared to licensed influenza/COVID-19 vaccines, including Fluzone HD, for 3 clinically relevant influenza strains (A/H1N1, A/H3N2, B/Victoria) and SARS-CoV-2

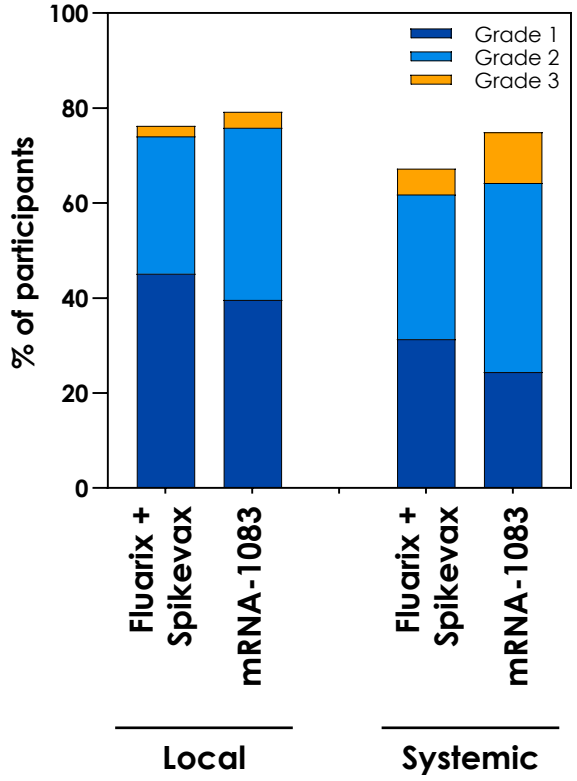
mRNA-1083 showed an acceptable reactogenicity profile compared to co-administered influenza and COVID-19 vaccines

- Majority of solicited adverse reactions reported as grade 1 or 2 in severity and of short duration
- Reactogenicity was lower in 65+ cohort than in the ≥50 to 64 years of age cohort

Cohort A: ≥65 years



Cohort B: ≥50 to 64 years



Grade 4 systemic SARs were ≤ 0.1% and were balanced between mRNA-1083 and comparator groups
Data from D91 primary analysis

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mRNA-1083 safety

- The rates of unsolicited AEs were similar across groups
- No deaths, SAEs or adverse events leading to study discontinuation were considered related to mRNA-1083
- No events of myocarditis or pericarditis were reported that were considered related to mRNA-1083
- Overall, no safety concerns were identified for mRNA-1083
- An acceptable tolerability and safety profile was observed

Flu + COVID combo (mRNA-1083) summary and next steps

Immunogenicity

- mRNA-1083 met all 10 co-primary immunogenicity endpoints in Phase 3 study
- mRNA-1083 elicited a higher immune response against SARS-CoV-2 and clinically relevant influenza strains in both 50–64-year-old and 65 + year old cohorts
- Antibodies are established surrogates of protection against influenza and COVID-19

Reactogenicity / Safety

- mRNA-1083 showed an acceptable safety and reactogenicity profile compared to co-administered influenza and COVID-19 vaccines
- No safety risks were identified

Next steps

- Expect to submit for approval in 2024, and intend to use a Priority Review Voucher

RSV

mRNA-1345

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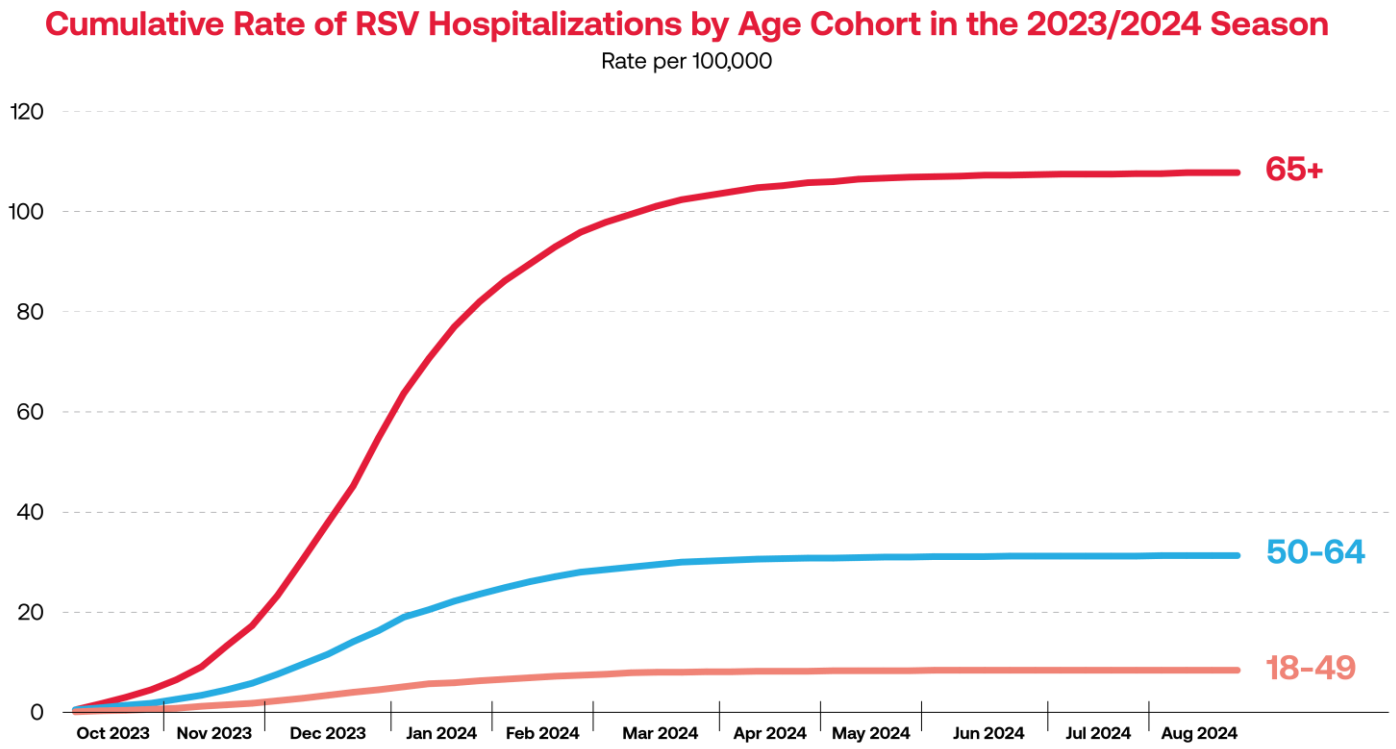
RSV hospitalization rate is markedly higher in the older adult population



SOURCE: https://www.cdc.gov/rsv/php/surveillance/rsv-net.html

Study shows that RSV vaccine uptake at 66% in older adults would reduce outpatient care by up to 53.6%, hospitalizations by up to 60.5%, and RSV-related deaths up to 60.4%.[1]

1. Moghadas, S. M., et al. (2023). Cost-effectiveness of Prefusion F Protein-based Vaccines Against Respiratory Syncytial Virus Disease for Older Adults in the United States. Clinical Infectious Diseases. doi.org/10.1093/cid/ciad658

mRESVIA (mRNA-1345): Moderna's RSV vaccine for adults 60 and older has been approved in multiple regions

North America

Moderna Receives U.S. FDA Approval for RSV Vaccine mRESVIA

Rest of World

- EU
- Qatar

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mRNA-1345 Phase 3 P303 Part A: High-risk adults 18 to <60 years

Study designed to test the immunogenicity and safety of mRNA-1345 in high-risk adults 18 to < 60 years of age

Design
Randomized, double-blind study

Participants
1,003 high risk adults aged 18 to <60 years

Vaccination schedule
Single dose of mRNA-1345

Duration
24 months

Site locations
United States, UK, Puerto Rico, and Canada

mRNA-1345 P303 Part A
High risk adults 18 to < 60 years

Randomization
Ratio= 1:1

mRNA-1345 (50 µg)	mRNA-1345 (dose level 2)
N=501	N=502

Primary immunogenicity endpoint:
GMT of 50 µg mRNA-1345 in high-risk adults (18 to < 60 years) compared with 50 µg mRNA-1345 in pivotal P301 efficacy study (≤ 60 years)

High risk is defined as Coronary artery disease and/or congestive heart failure, Chronic lung disease, or Stable type 1 or type 2 diabetes mellitus controlled with at least 1 medication started 90 days or more prior to Day 1

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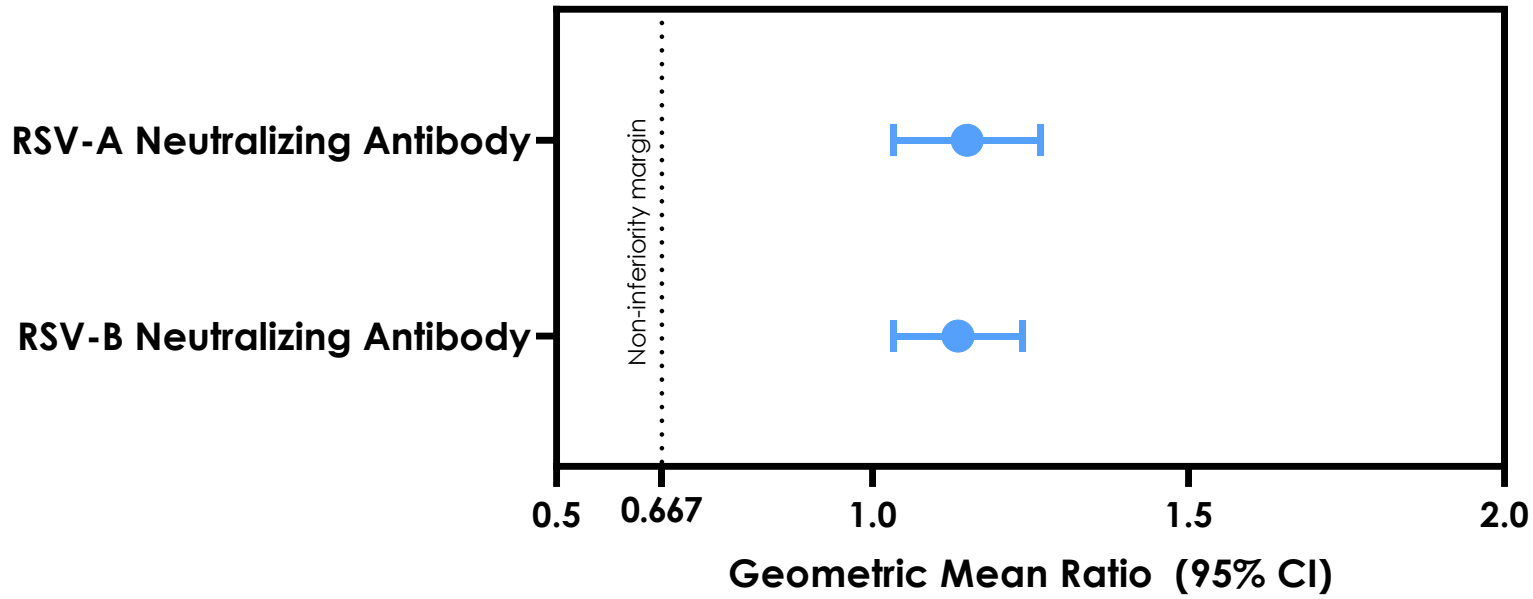
mRNA-1345 met all primary immunogenicity endpoints in high-risk adults 18 to < 60 years

High risk adults 18 to < 60 years compared to pivotal P301 efficacy study (≥ 60 years)



GMR non-inferiority criteria were met (LB of the 2-sided 95% CI of GMR > 0.667)

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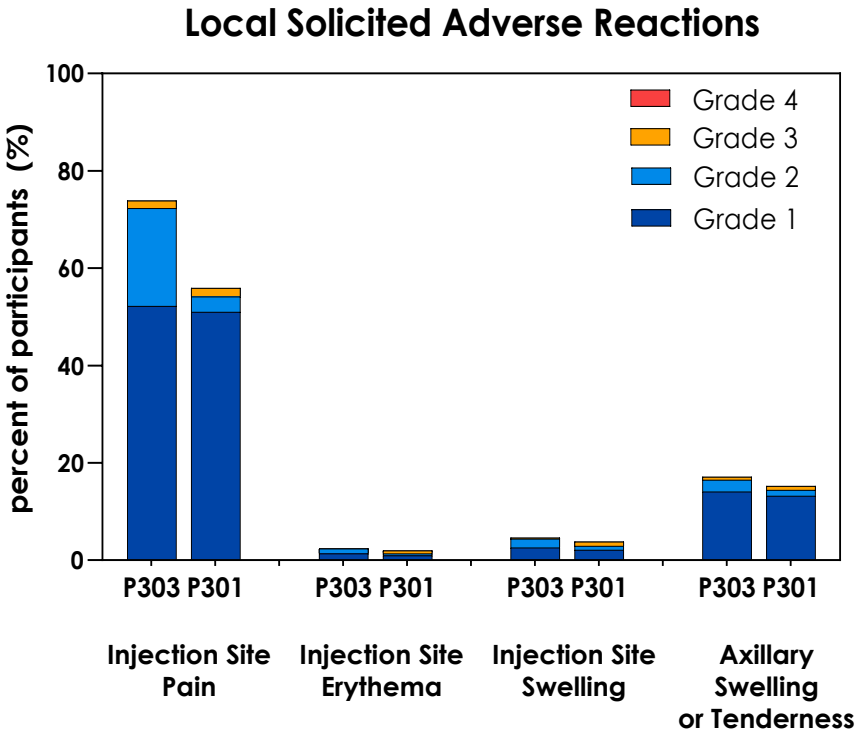
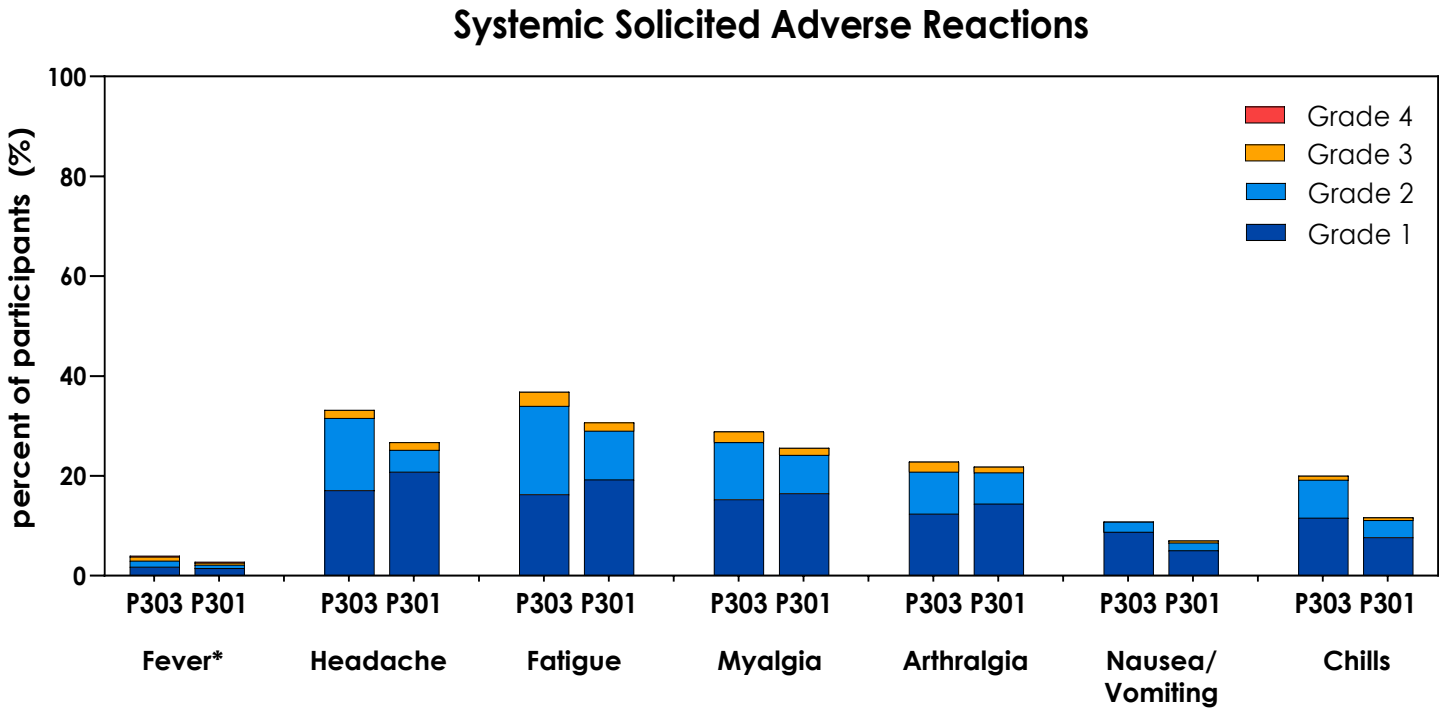
mRNA-1345 50 µg dose was well-tolerated in high-risk adults 18 to < 60 years





P303: High risk 18 to < 60 years
P301: Pivotal efficacy study; ≥ 60 years

**1 grade 4 fever was verified as data error*

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mRNA-1345 Phase 3 18–59-year-olds at high risk Part A safety

- mRNA-1345 50 µg dose was well tolerated in 18–59-year-olds at high risk of RSV-LRTD
- The tolerability of 50 µg of mRESVIA in 18-59 year old high risk adults was comparable to that observed among older adults in the pivotal efficacy study P301
- Up to 28 days after vaccination, there were no related unsolicited adverse events resulting in study discontinuation, deaths, AESI, or related SAEs
- No events of anaphylaxis related to vaccination, thrombocytopenia, Guillain Barre Syndrome, or acute disseminated encephalomyelitis (ADEM) were reported after vaccination
- No new safety concerns to alter the existing mRESVIA safety assessment were identified

Summary

Immunogenicity

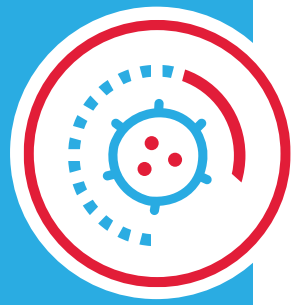
- mRNA-1345 met all primary immunogenicity endpoints in high-risk adults 18 to < 60 years
- Demonstration of non-inferiority compared to immune responses in the pivotal efficacy trial (P301; ≥ 60 years), thus inferring effectiveness in this high-risk younger adult population

Reactogenicity / Safety

- mRNA-1345 50 µg dose was well-tolerated with no new safety concerns identified in high-risk adults 18 to < 60 years

Next steps

- Expect to submit sBLA for U.S. approval in 2024, and intend to use a Priority Review Voucher



Latent + other viruses vaccines portfolio

Jacqueline Miller, M.D.
SVP, Head of Development,
Infectious Diseases,
Research & Development

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CMV

mRNA-1647

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Cytomegalovirus (CMV) Overview

CMV is the most common infectious cause of birth defects in the U.S.[1]

Several billion dollars in annual healthcare costs[2]

Sequelae include:

- **At birth:** microcephaly, chorioretinitis, seizures, sensorineural hearing loss
- **Long term:** cognitive impairment, cerebral palsy, seizure disorder, sensorineural hearing loss

1 in 200

babies in the U.S. are **born with a congenital CMV infection** (CMV infection is present at birth)

1 in 5

will have severe, **life-altering health problems**

(1) CDC, https://www.cdc.gov/cmv/congenital-infection.html
(2) Grosse, Scott et al. "Economic assessments of the burden of congenital cytomegalovirus infection and the cost-effectiveness of prevention strategies," *Seminars in perinatology*, 2021, https://doi.org/10.1016/j.semperi.2021.151393

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CMV vaccine (mRNA-1647) Phase 3 trial accruing cases with interim analysis expected to be triggered in 2024

Randomized, observer-blind, placebo-controlled study to evaluate the **efficacy, safety and immunogenicity of mRNA-1647 to evaluate prevention of primary infection**

Enrollment complete in the U.S. and internationally across 290 sites globally

Participants older than 20 years of age were enrolled only if they had contact with young children

Primary efficacy analysis will be triggered based on accrual of primary infection cases

Phase 3 trial design

3 dose course: D1, D57, D169

CMVictory

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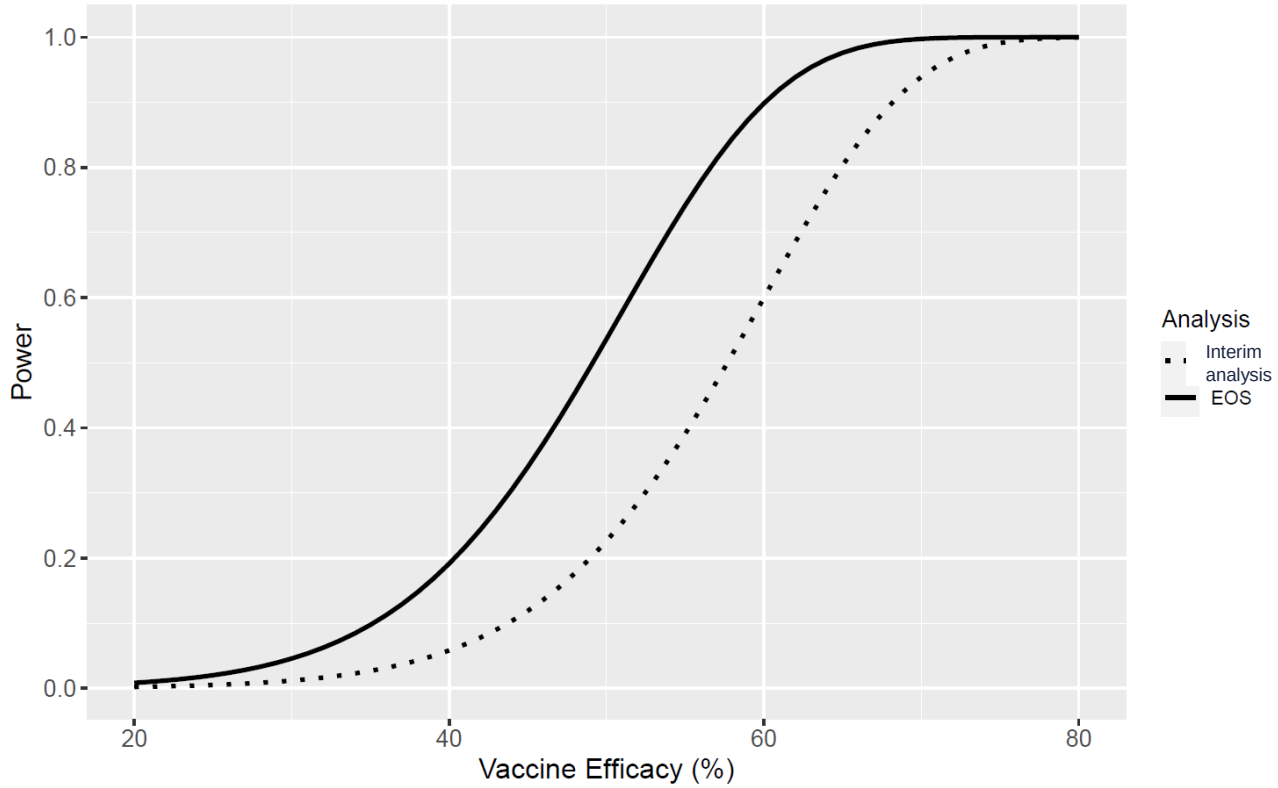
Overview of primary efficacy endpoint

CMVictory

Efficacy Boundaries with Alpha-allocation between 2 Planned Analyses

	Approximate # of Cases	One-sided Alpha	VE: Efficacy Bound
Interim Analysis	81	0.5%	~ 57.7%
End of Study (EOS) Analysis	112	2.0%	~ 49.1%



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CMV (mRNA-1647) Phase 3 vaccine summary and next steps

Addressing disease burden

- CMV is the most common cause of congenital infection worldwide[1]
- Moderna's CMV vaccine targets two antigens, the pentamer and the glycoprotein B (gB) antigen

Latest updates

- CMV Phase 3 trial is accruing cases

Next steps

- Data Safety Monitoring Board (DSMB) will evaluate vaccine efficacy from the interim analysis when the trial has accrued 81 confirmed cases
- Expect interim analysis to be triggered in 2024

Sources: (1) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8453618/

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Norovirus

mRNA-1403

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Among enteric viruses, norovirus is a leading cause of diarrheal disease globally resulting in substantial health care burden

Norovirus is associated with 18% of all acute gastroenteritis worldwide[1]

The **highest incidence is in children**; morbidity and mortality greatest in children in low-income countries

In high-income countries, **older adults and immunocompromised patients are at highest risk of severe outcomes**, including death

The **burden of norovirus among older adults is expected to rise** along with societal aging and an increased need for institutionalized care

	United States (per year)[2]	Global (per year)[2,3]
Infections	**~20M** infections	**~685M** infections
Deaths and hospitalizations	**~900** deaths (mostly older adults) **~100K** hospitalizations	**~200K** deaths (~50K among children)
Societal costs	**~$2B** in healthcare costs and lost productivity	**~$60B** in healthcare costs and lost productivity

1. Ahmed, S.M., et al., Global prevalence of norovirus in cases of gastroenteritis: a systematic review and meta-analysis. Lancet Infect Dis, 2014.
2. https://www.cdc.gov/norovirus/burden.html
3. https://www.who.int/teams/immunization-vaccines-and-biologicals/diseases/norovirus

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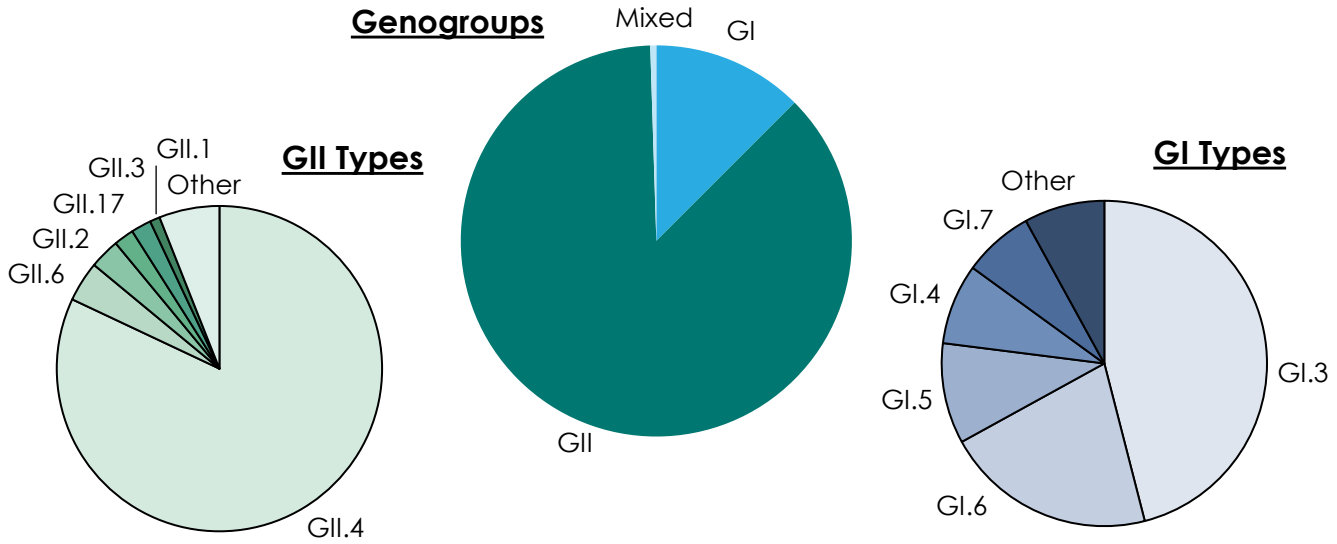
Noroviruses are a diverse group with limited cross-genotype protection, allowing for repeated infections throughout life

Norovirus has broad variant variability; The virus is classified into 10 genogroups and 49 genotypes

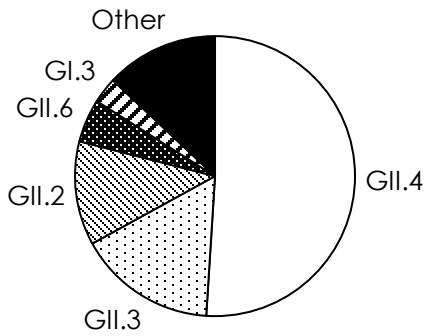
Vaccine development has been challenging to date due to the broad and shifting diversity of genotypes which requires frequent vaccine updates

To protect against >70-80% of noro-AGE in young children and older adults, a multivalent vaccine design is required

Norovirus genogroups and genotypes in long term care facility outbreaks in the US
2009-2018
Adapted from Calderwood et al, 2022



Global distribution of norovirus genotypes among hospitalized children <5, NoroSurv
2016-2020



NoV, norovirus; VP1, major capsid protein; Cannon et al Emerging Infect. Dis. 2021; Calderwood et al. Clin Infect Dis 2022; Carlson KB et al npj Vaccines 2024

mRNA technology provides ability to make multivalent VLPs that can be quickly updated

mRNA vaccines allow for intracellular production of multi-valent virus-like particles (VLPs)

These VLPs are structurally similar to native virions and mimic major antigenic features including the display of critical epitopes

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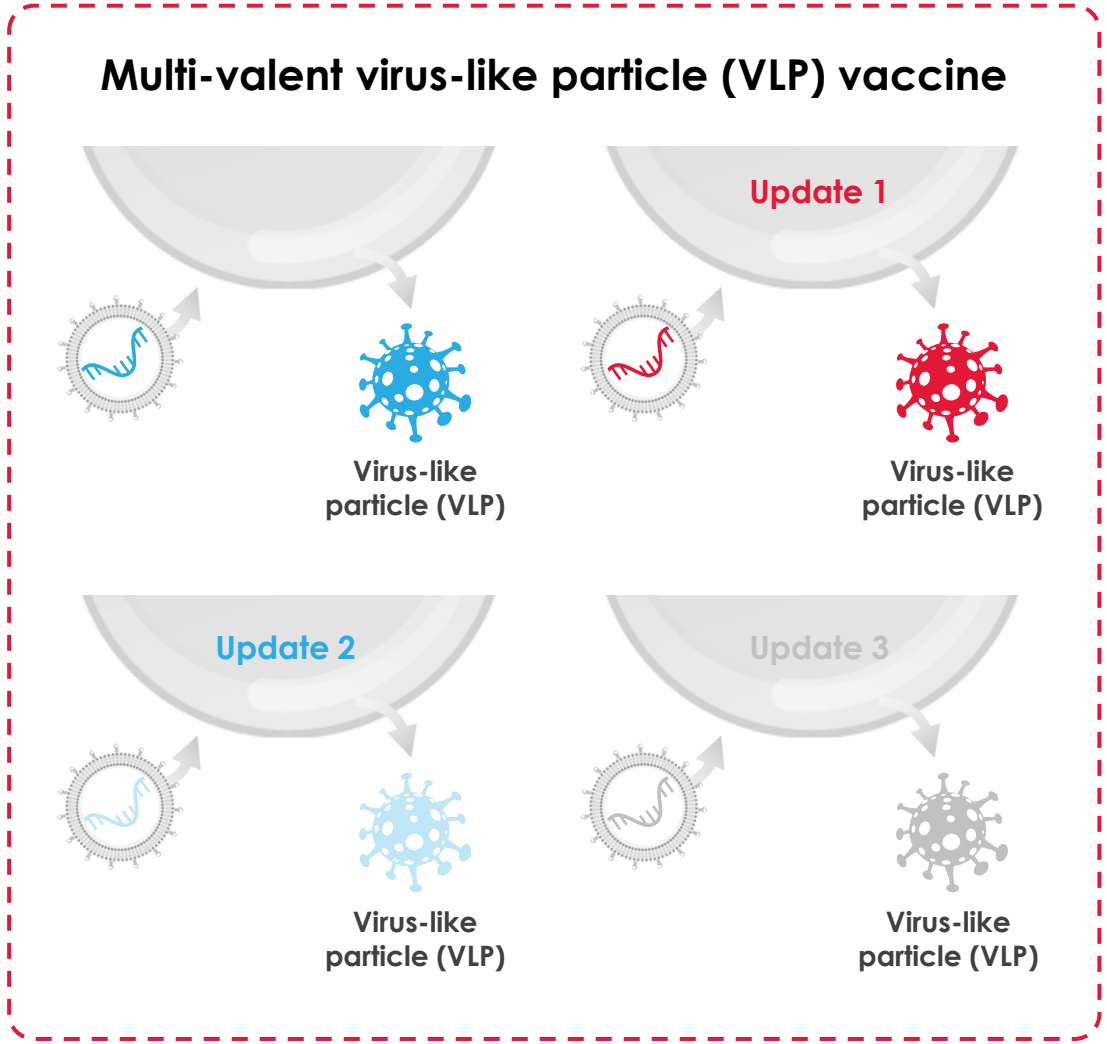
mRNA platform provides the ability to make multivalent compositions that can quickly be updated based on real world data from ongoing epidemiologic surveillance



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mRNA-1403/1405 Phase 1 trial design; presenting additional data today

The Phase 1 was designed to evaluate the safety, reactogenicity and immunogenicity of mRNA-1403 and mRNA-1405 in participants 18-49 and 60-80 years of age

Design
Randomized, observer-blind, placebo-controlled study

Number of participants
664 healthy volunteers 18-49 or 60-80 years old*

Vaccination schedule
1-2 doses of mRNA-1403, mRNA-1405 or placebo in 0,1 month schedule

Duration:
Participants will be followed up for 12 months after last study injection

Site location
US

Total N = 664
11 arms, n~60 per arm

2 x mRNA-1403 Dose Level 1	**2 x mRNA-1405** Dose Level 1
2 x mRNA-1403 Dose Level 2	**2 x mRNA-1405** Dose Level 2
2 x mRNA-1403 Dose Level 3	**2 x mRNA-1405** Dose Level 3
2 x mRNA-1403 Dose Level 4	**2 x mRNA-1405** Dose Level 4
1 x Placebo, 1 x mRNA-1403 Dose Level 4	**1 x Placebo, 1 x mRNA-1405** Dose Level 4
2 x Placebo	

*>40% of participants enrolled were 60-80 years old

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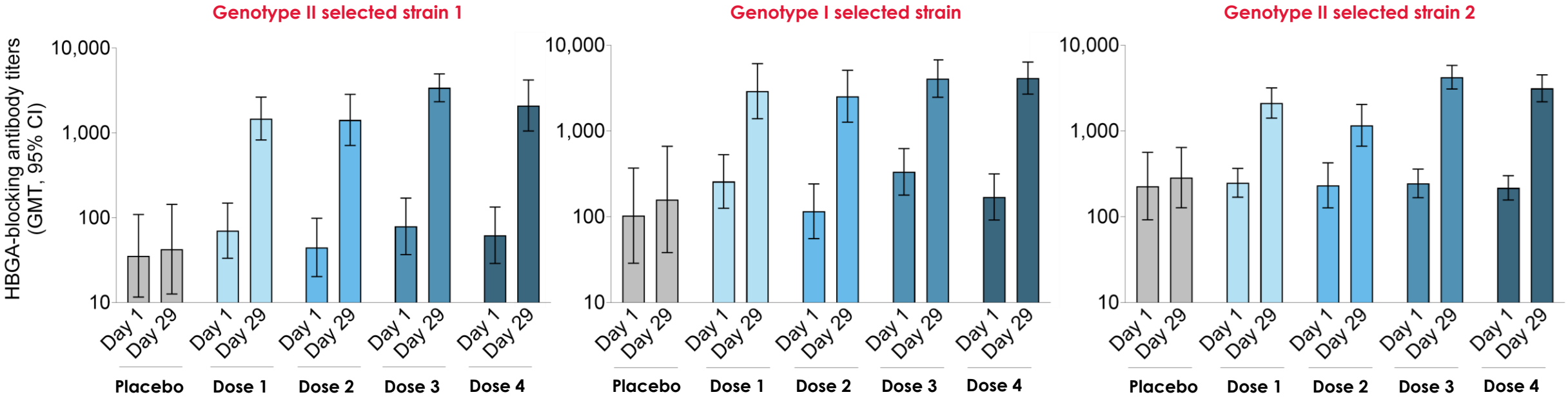
A single dose of mRNA-1403 also elicited robust HBGA-blocking antibody titers against vaccine-matched NoV genogroup I and II genotypes in older adults

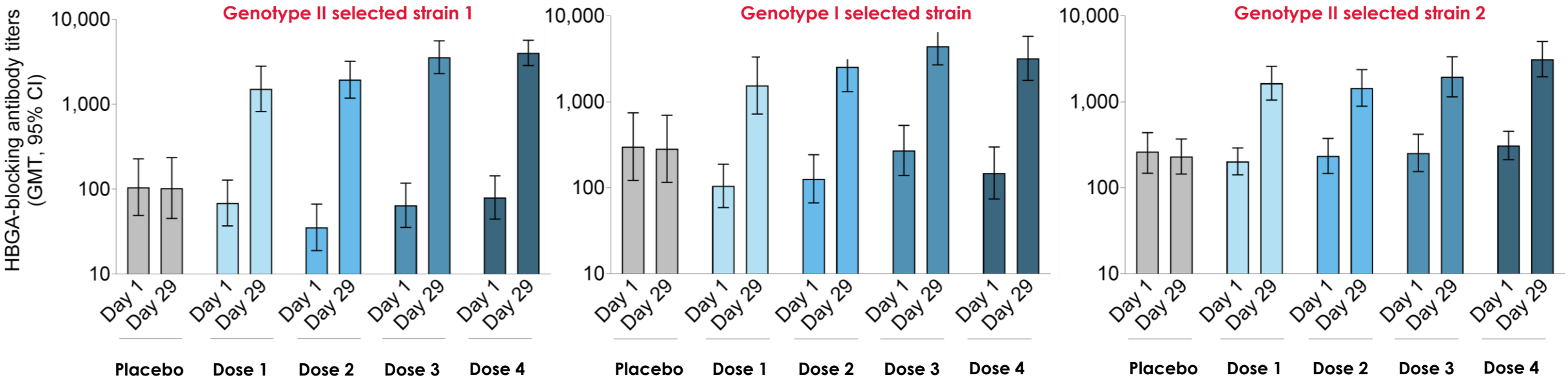
Older adults (60-80 years old)



HBGA, Histo-blood group antigen; NoV, norovirus

A single dose of mRNA-1403 elicited robust HBGA-blocking antibody titers against vaccine-matched NoV genogroup I and II genotypes in younger adults

Younger adults (18-49 years old)



HBGA, Histo-blood group antigen; NoV, norovirus

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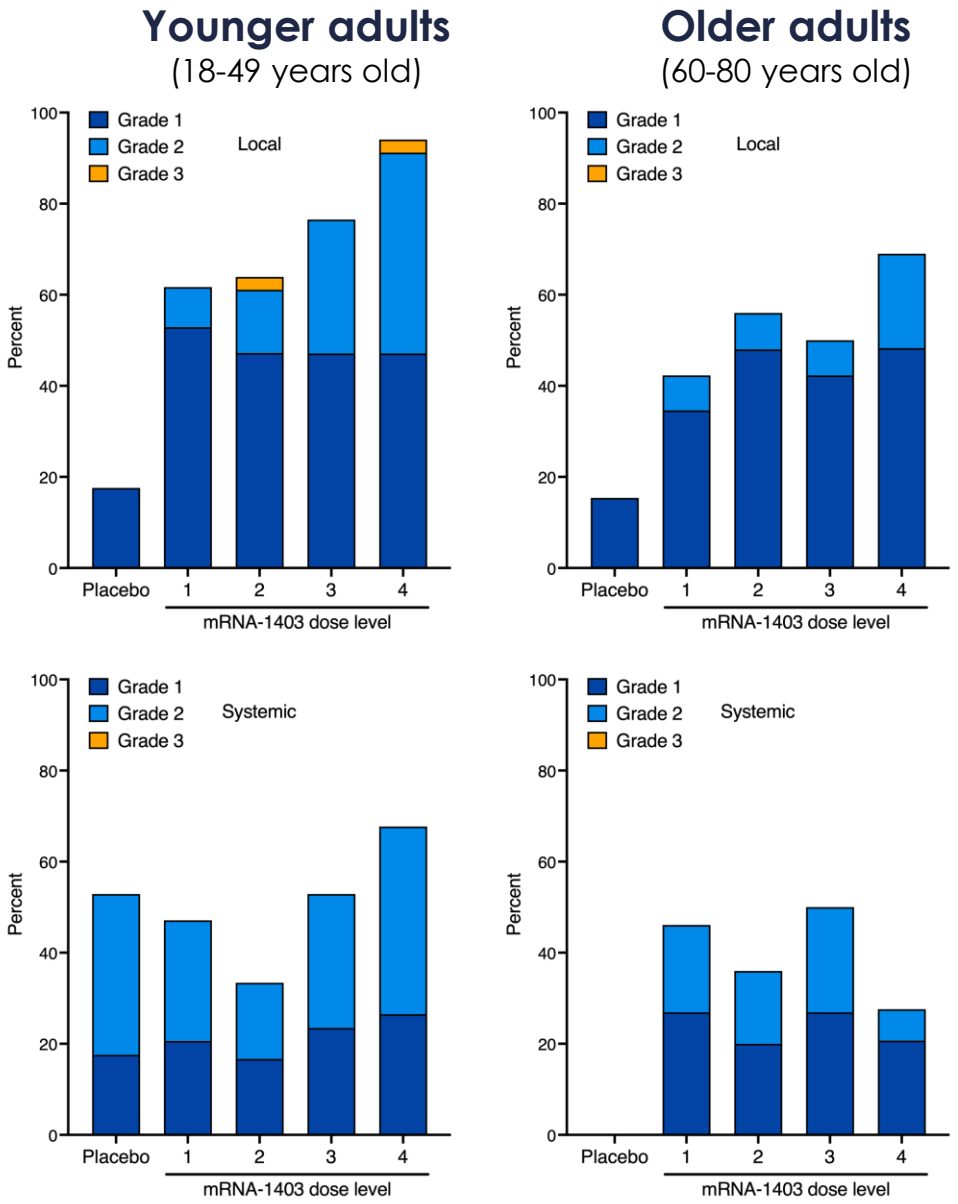
Single dose of mRNA-1403 was well-tolerated across all dose levels evaluated

Data from interim analysis on mRNA-1403 candidate through completion of Day 29 visits

Single dose of mRNA-1403 showed a favorable reactogenicity profile across dose levels evaluated with most solicited adverse reactions reported as grade 1 or 2 and few grade 3 reactions



Norovirus mRNA-1403 Phase 1 Safety

- No safety concerns were identified through data cut-off
- There were no deaths or AEs leading to study withdrawal through data cut-off
- Within 28 days after any injection, there were no SAEs, AESIs, deaths, or AEs leading to study withdrawal reported.
- None of the SAEs and AESIs reported through data cut-off were assessed as related to study injection
- No clinically meaningful or dose-dependent trends in unsolicited AEs were evident among participants who received mRNA-1403 vs. placebo

mRNA-1403 Phase 3 study design

Phase 3 was designed to test the efficacy, safety and immunogenicity of a trivalent norovirus vaccine

Design
Randomized, observer-blind, placebo-controlled study

Number of participants
~25,000 adults ≥ 18 years old (~20,000 ≥ 60 yo; ~5000 ≥ 18 and ≤59 yo)

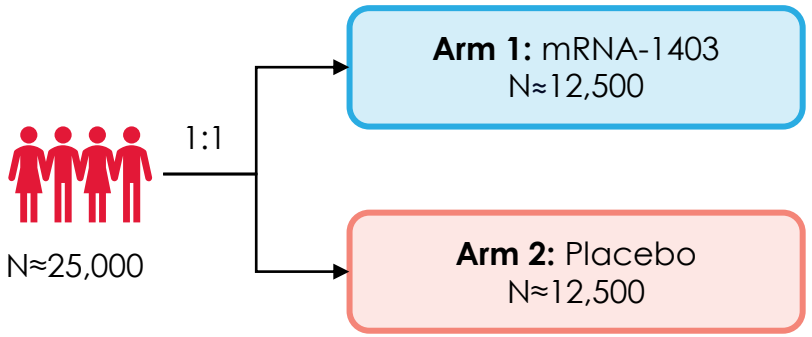
Vaccination schedule
Single dose of mRNA-1403 or Placebo

Duration
~25 months including screening period

Site location
Northern Hemisphere (United States, Canada, UK, Japan)

Southern Hemisphere and Equatorial Region (Argentina, Colombia, Panama, Chile, Australia)

Phase 3 Study Design



NOVA
301 TRIAL

Norovirus summary

Immunogenicity	• Robust HBGA-blocking antibody titers observed against vaccine-matched norovirus genogroup I and II selected strains across all dose levels evaluated • Similar mRNA-1403 induced HBGA-blocking antibody titers observed in younger adult and older adult age groups
Reactogenicity / Safety	• No mRNA-1403 related safety concerns identified through interim analysis data cut-off • Single dose of mRNA-1403 was well-tolerated and showed a favorable reactogenicity profile across dose levels
Next steps	• Advancing into Phase 3 study

Rare disease therapeutics portfolio

Kyle Holen, M.D.
SVP, Head of Development, Therapeutics and Oncology, Research & Development

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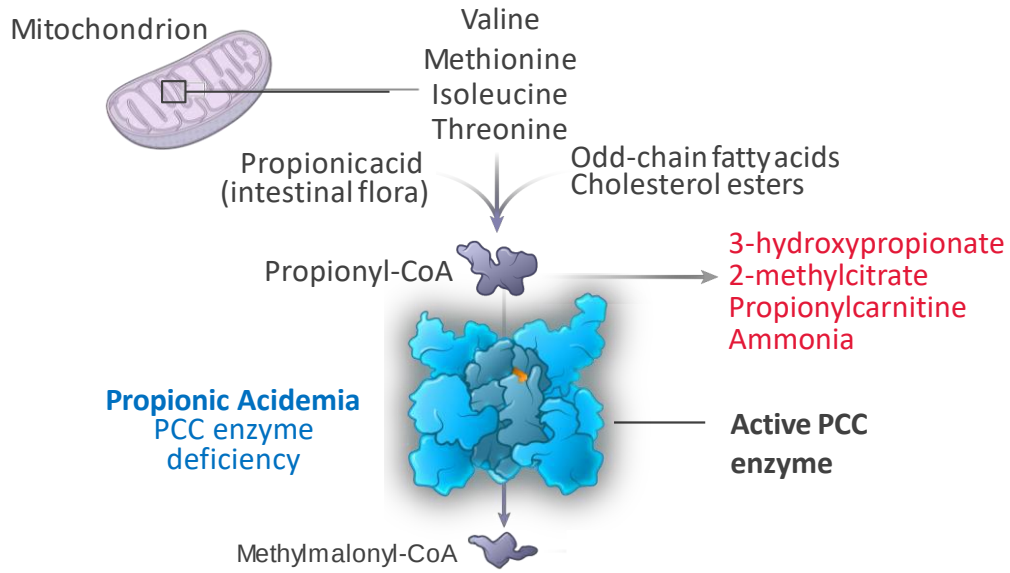
PA

PA therapy (mRNA-3927) encodes for an intracellular enzyme

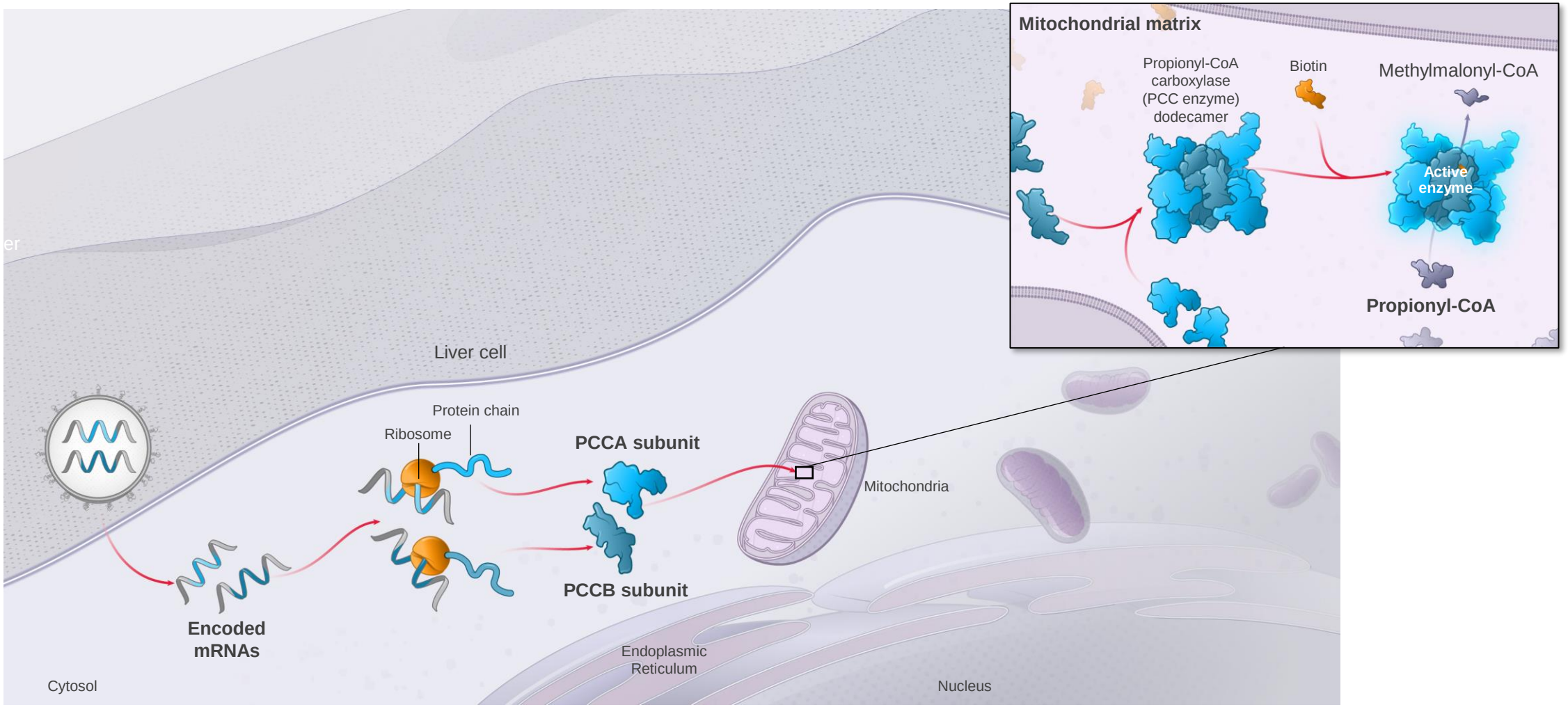
Moderna's mRNA therapy for PA (mRNA-3927) encodes for two proteins that form the deficient enzyme



PA biology

- **Changes in the *PCCA* and *PCCB* genes cause propionic acidemia**
  - These genes provide instructions for making two parts (subunits) of the propionyl-CoA carboxylase enzyme
  - Change in the *PCCA* or *PCCB* genes affect the normal function of the PCC enzyme and prevent the normal breakdown of propionyl-CoA
- As a result, propionyl-CoA and other **harmful compounds** accumulate causing acute **metabolic decompensation** events and **damage to the brain** and other organs, causing the serious health problems associated with propionic acidemia

mRNA-3927 encodes for PCCA and PCCB subunit proteins to form an active PCC enzyme



Ongoing Phase 1/2 study designed to evaluate safety and pharmacology of mRNA-3927 in participants with PA

Arm 1 enabled dose selection, enrollment is ongoing in Arm 2 dose expansion, and Arm 3 infant cohort

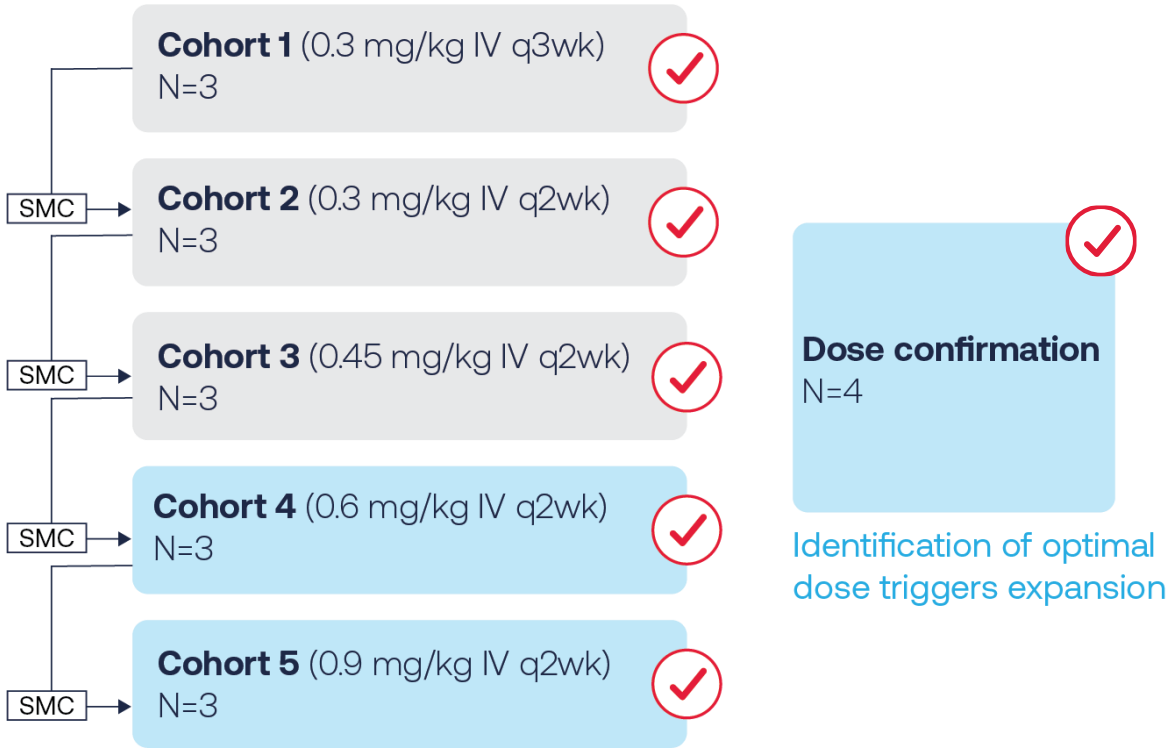
Primary endpoints: Safety and PK/PD

Secondary endpoints: Incidence and severity of adverse events and change in plasma biomarkers (Hydroxypropionic acid (3-HP) and methylcitric acid (2-MC))

Exploratory clinical endpoints: Metabolic decompensations events (MDE), cardiac function, quality of life

Current demographics: Participants aged 1-26 have been enrolled; 13 participants have completed the study

Phase 1/2 Trial Design (3 + 3 design)



PA: mRNA-3927-P101 Study Design

PART 1: Dose Optimization

Patients enrolled to better understand the dose

Participants ≥ 1 Year of Age
N=22

PART 2: Dose Expansion

Patients enrolled to better understand efficacy

Participants ≥ 1 Year of Age
N=15

PART 3: Infants

Patients enrolled to expand age cohort to include infants

Participants <1 Year of Age
N=10

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PA: Overall Phase 1/ 2 clinical experience

As of August 22, 2024, 22 participants have been dosed

- Thirteen participants have >1 year of dosing
- 31.3 cumulative patient-years of experience on study drug
- Longest duration of treatment is 3.1 years and median duration 1.45 years
- Over 722 intravenous doses administered
- Study is ongoing; dose was defined at 0.6mg/kg with an option to increase or decrease per protocol
- The majority of participants have elected to continue on Open Label Extension (OLE) Study

1 Patient had a history of recurrent pancreatitis prior to enrollment

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Metabolic decompensation events (MDEs) are serious, clinically significant events in organic acidemias

Presentation of MDEs in PA and MMA

- PA & MMA are characterized by intermittent life-threatening **MDEs**
- Patients with PA & MMA commonly present with an MDE soon after birth
- MDEs are a major contributor to mortality and long-term irreversible sequelae, such as brain damage

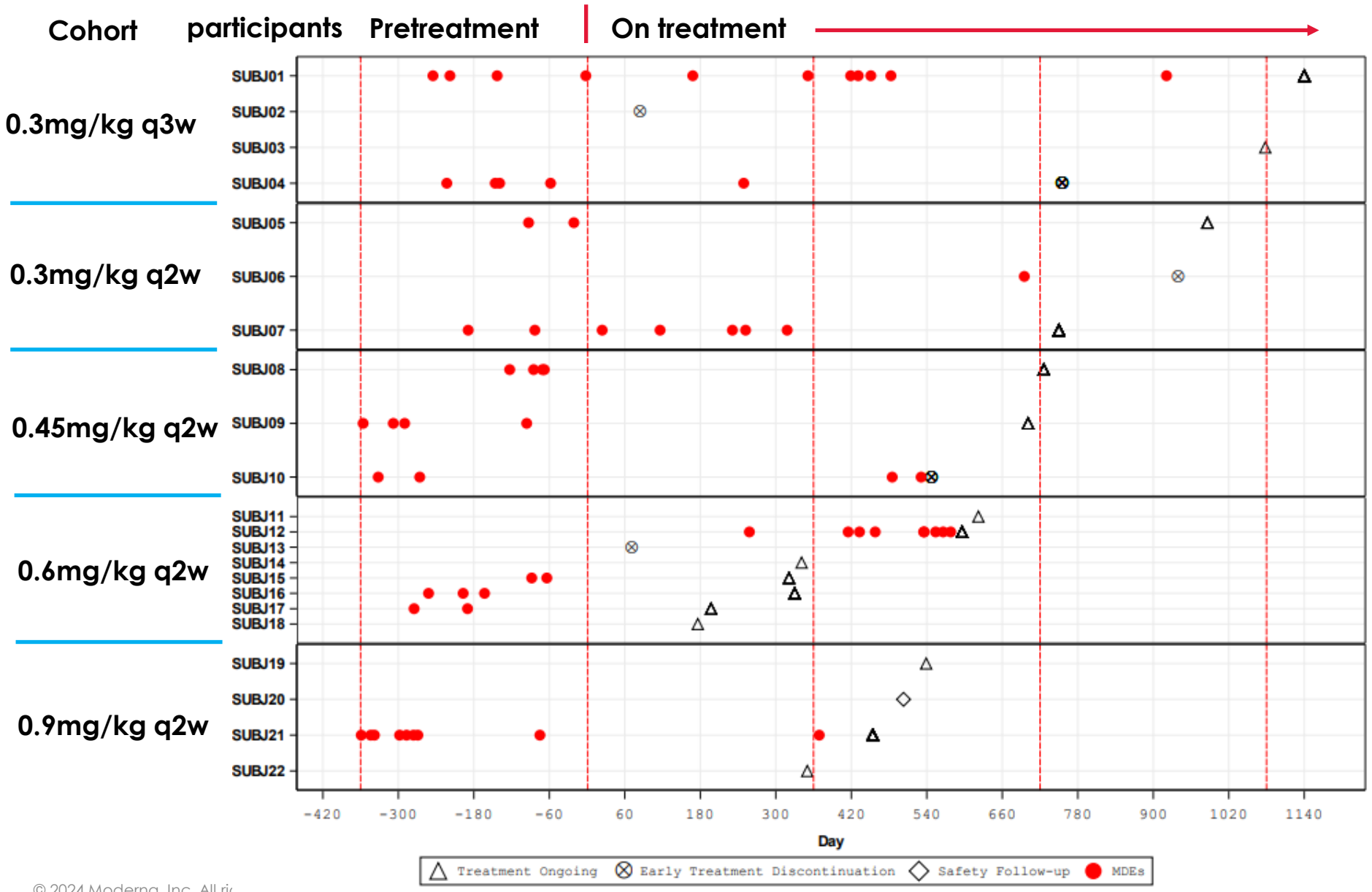
Identification and measurement of MDEs

MDEs can be objectively identified in a patient with clinical deterioration and:

- Signs or symptoms, including vomiting, anorexia, lethargy, or seizure
- Metabolic acidosis (pH <7.35)and in many cases high ammonia
- Needs acute medical care (ER or hospitalization)

- **Regulators have provided initial support for MDE as a clinically meaningful endpoint measure for therapeutic trials in patients with Propionic Acidemia**
- **Discussions with key regulators for MMA are on-going**

Summary of metabolic decompensation events (MDEs)



Relative risk for MDE among patients with prior MDE (95% CI)

Overall: 0.27 (0.101, 0.711)

Q2W: 0.19 (0.046, 0.808)

Data cut: 28May24

PA: relative MDE risk reduction improves and continues to show benefit

MDE	Data as of 25 Aug 2023	Data as of 24 May 2024
Overall RR (95% CI)	0.29 (0.106, 0.813)	0.27 (0.101, 0.711)
Q2W Dosing RR (95% CI)	0.20 (0.035, 1.134)	0.19 (0.046, 0.808)

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PA: Safety

- Generally well-tolerated to date
- No dose limiting toxicities
- Five cases of drug related serious adverse events reported in two participants (Vascular device (VD) infection Grade 2, VD infection Grade 3, Infusion site erythema Grade 2, and two Pancreatitis Grade 3)
- Mild to moderate infusion related reactions were reported in <10% of doses administered

28 May 2024 Data Cut

PA (mRNA-3927) summary and next steps

Clinical Results and Experience

- Early results suggest potential decreases in annualized MDE frequency and PA-related hospitalizations compared to pre-treatment
- Cumulative treatment duration of over 31.3 patient years
- Open label extension study: Majority of patients have elected to continue on open label extension study

Safety

- Generally well-tolerated to date with no events meeting protocol-defined dose-limiting toxicity criteria

Next steps

- Based on ongoing conversations with the regulators, we intend to begin to generate pivotal trial data in 2024

MMA

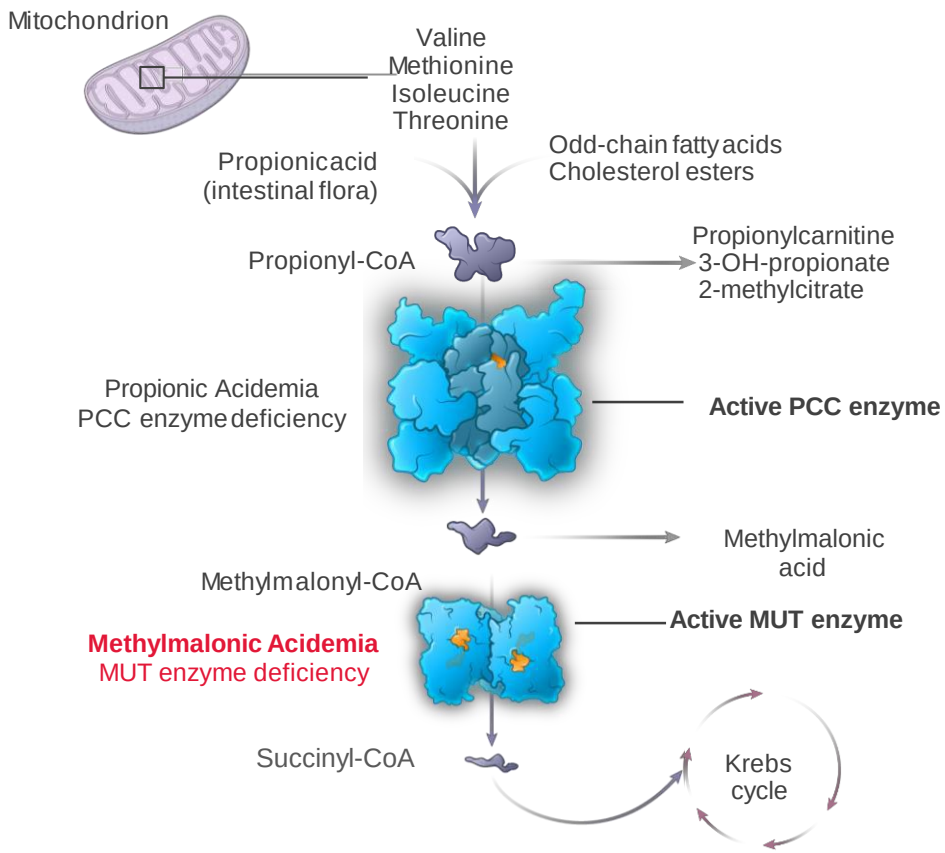
Overview of methylmalonic acidemia (MMA) due to MUT deficiency

Methylmalonic acidemia (MMA) refers to a rare, autosomal recessive acidemia

It is caused by a defective or missing MUT enzyme (methylmalonic CoA mutase)

Changes in the *MMUT gene* causes methylmalonic acidemia

- Gene provides instructions for making an enzyme called methylmalonyl CoA mutase
- Changes in the gene disrupt the function of the enzyme and prevent the normal breakdown of molecules



Methylmalonic acidemia (MMA) has no approved therapies

Primarily a pediatric disease with onset in early infancy; significant mortality and morbidity

Treatment: There is no approved therapy for MMA

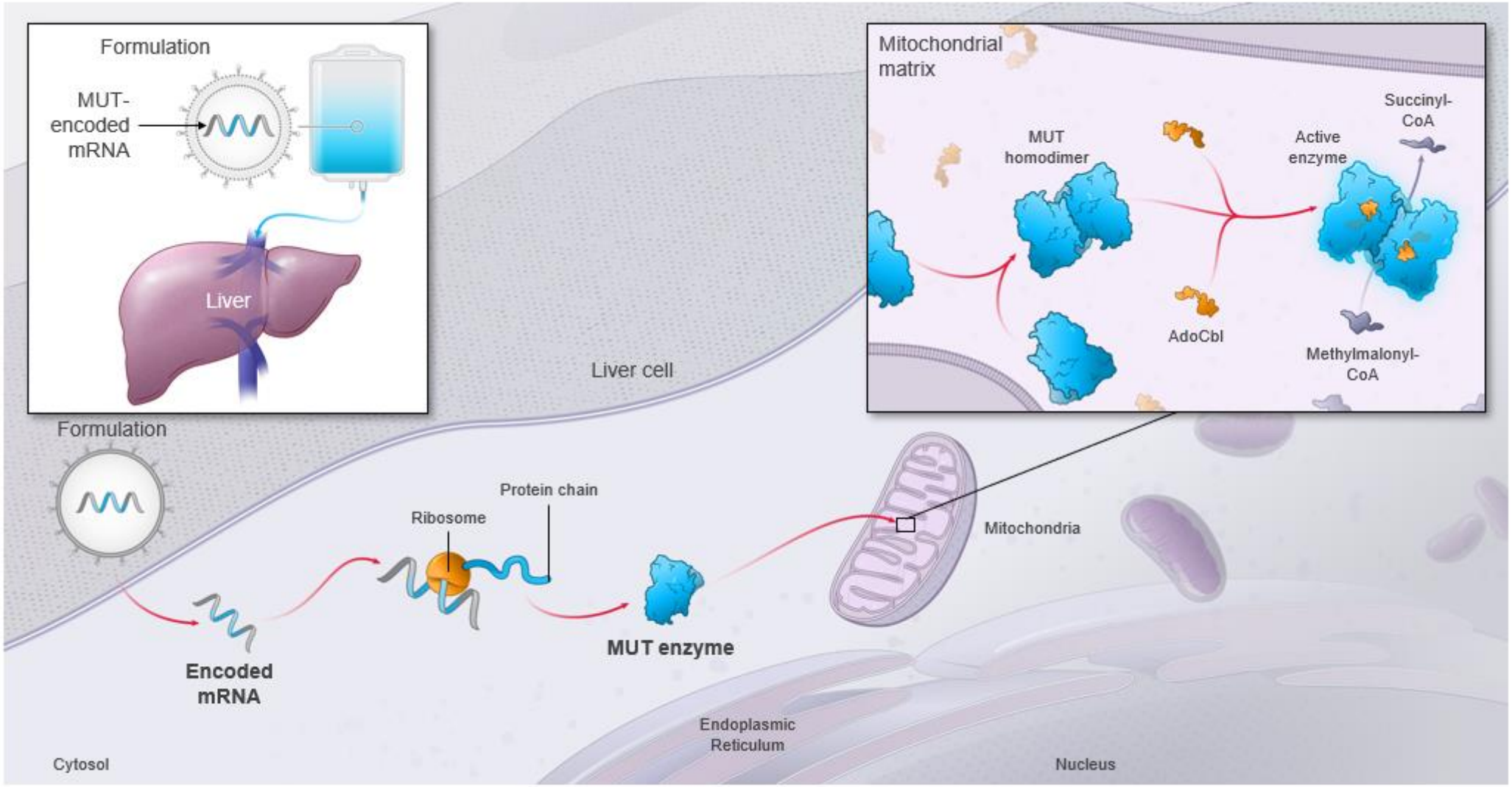
Current interventions include:

- Protein-restricted diet, carnitine supplementation
- Carbaglu® approved for the treatment of hyperammonemia
- Liver and/or kidney transplant

MMA Clinical Manifestations

- Recurrent episodes of **life-threatening metabolic decompensations (MDEs)**
- MDEs can require **intensive care** and result in **metabolic strokes** that can lead to **life long neurologic injury**
- **Impaired growth**
- Progressive involvement of **multiple organ systems:**
  - Optic neuropathy
  - Increased risk of pancreatitis
  - Chronic renal failure
  - Cardiomyopathy
  - Osteoporosis which can lead to fractures
  - Impaired hematopoiesis that can result in anemia, leukopenia, and/or thrombocytopenia

mRNA-3705 encodes the intracellular MUT enzyme



Note: AdoCbl = cofactor adenosylcobalamin

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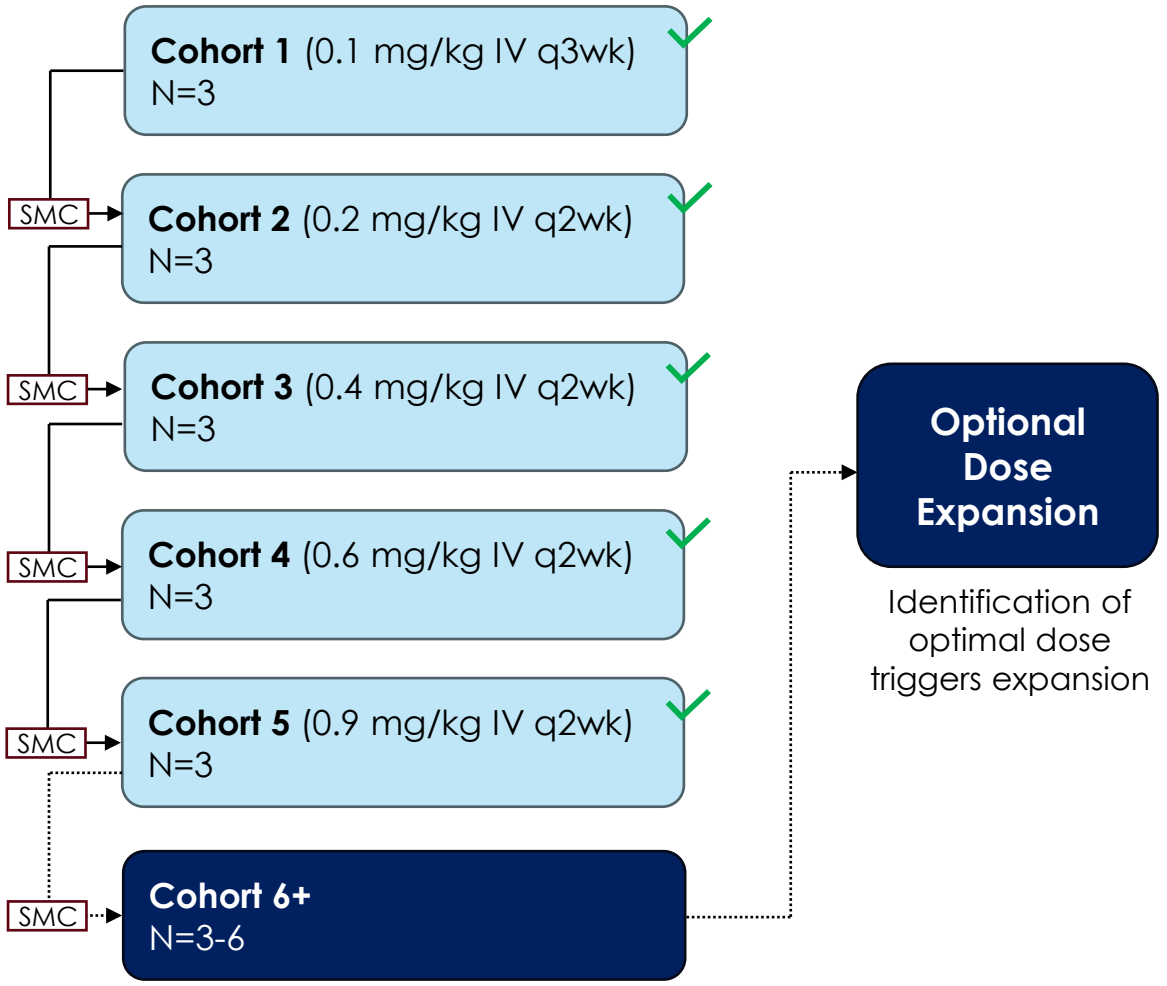
Ongoing Phase 1/2 study designed to evaluate safety and pharmacology of mRNA-3705 in participants with MMA

Dose Optimization Stage Endpoints:

- **Primary endpoints:** safety and tolerability
- **Secondary endpoints:** Pharmacokinetic parameters and change in blood methylmalonic acid and 2-methylcitrate (2-MC)
- **Exploratory clinical endpoints:** Include metabolic decompensation events (MDEs), MMA-related hospitalizations, patient-centered outcome measures

Treatment period is 10 doses, after which participants may enter an extension study

P101 Dose Optimization Design (3 + 3 design)



SMC: safety monitoring committee
✓: Fully enrolled

As of 08 Apr 2024

mRNA-3705-P101: Summary of demographics and baseline characteristics

	Cohort 1 0.1 mg/kg Q3W (N=3)	Cohort 2 0.2 mg/kg Q2W (N=3)	Cohort 3 0.4 mg/kg Q2W (N=3)	Cohort 4 0.6 mg/kg Q2W (N=3)	Cohort 5 0.9 mg/kg Q2W (N=3)	Total (N=15)
Age at enrollment, median (years)	12.17	2.67	7.83	18.75	6.08	7.83
Min, Max	4.5, 14.4	2.5, 39.5	5.8, 16.0	4.3, 32.6	3.1, 8.5	2.5, 39.5
Age at disease onset, median (months)	0	0	3	11	0	0
Min, Max	0	0, 1	0, 10	0, 117	0, 52	0, 117
Sex, n						
Male	1	1	1	2	3	8
Female	2	2	2	1	0	7
Weight						
Weight at baseline, median (kg)	25.2	13.2	22.6	60.1	22.5	22.6
Min, Max	19.5, 40.7	12.2, 57.1	16.2, 53.4	16.3, 66.0	17.0, 23.2	12.2, 66.0
Phenotype						
Mut0	3	3	3	2	2	13
Mut-	0	0	0	1	1	2

Data as of 08 Apr 2024

mRNA-3705: Clinical experience to date

As of April 8, 2024*:

- Fifteen participants have been dosed, with a total of 384 doses administered
- Total cumulative treatment duration among all participants is ~17.3 patient-years
  - Median treatment duration among all participants is 1.05 patient-years
  - Maximum participant treatment duration is 2.3 patient-years
- Generally well-tolerated to date with no discontinuations due to safety and no events meeting protocol-defined dose-limiting toxicity criteria
- All participants who have completed the treatment period of the main study have opted to enter a long-term extension study
- Both P101 and Extension studies are ongoing

*Data include both on-going mRNA-3705-P101 and Extension studies

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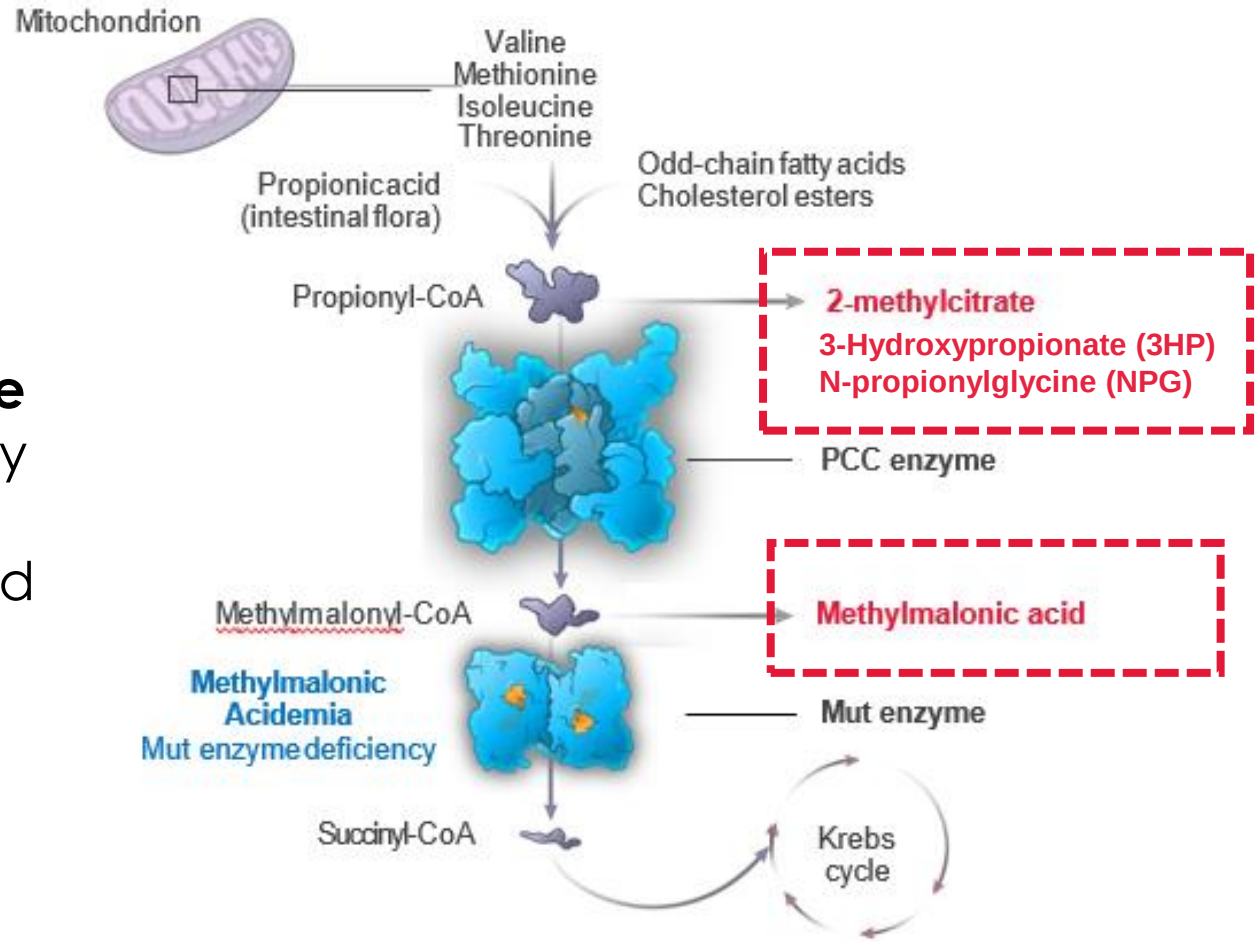
Biomarkers to evaluate pharmacodynamics of mRNA-3705

Methylmalonic acid and 2-methylcitrate represent **primary biomarkers** proximal to the enzyme deficiency

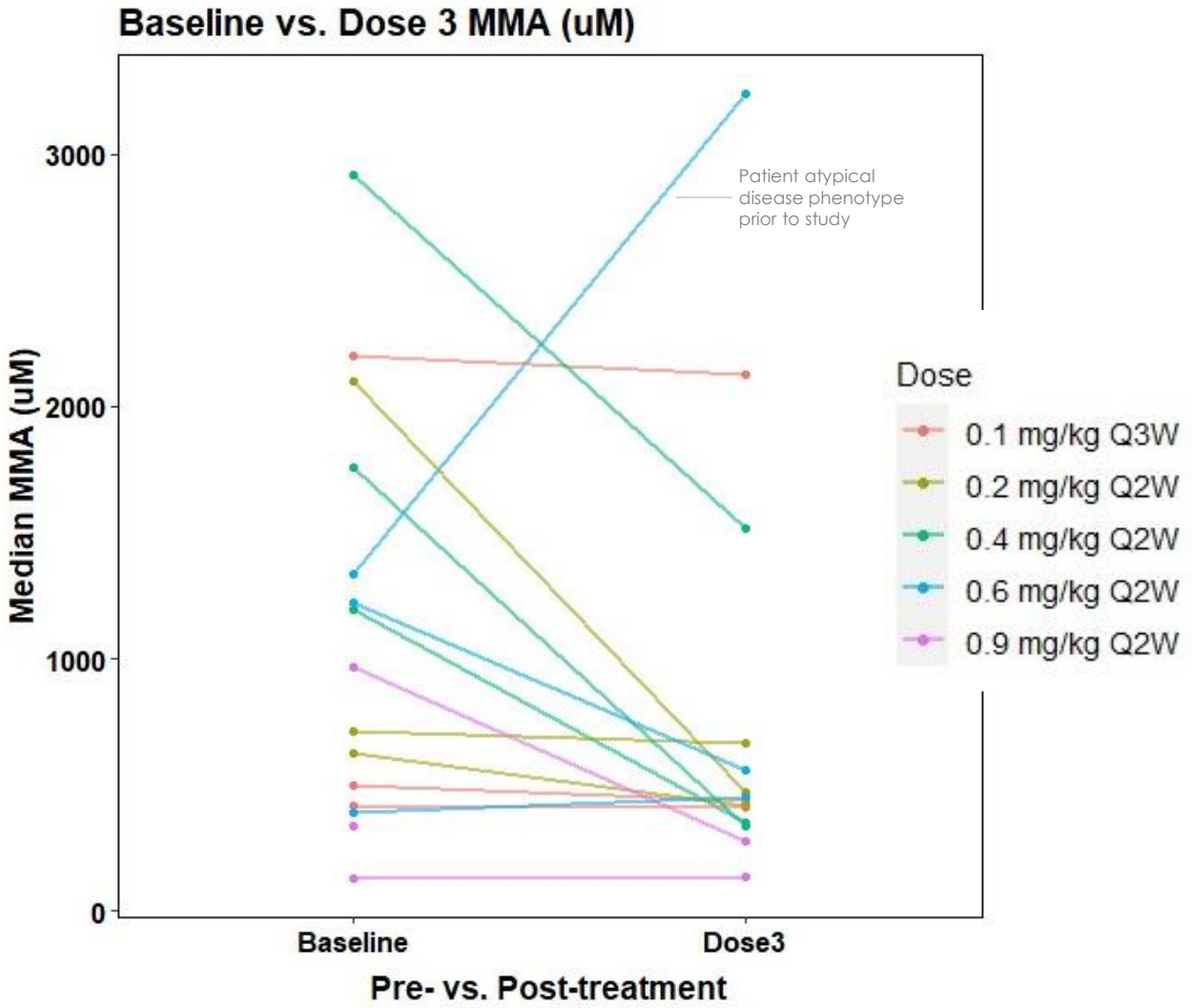
Changes in concentrations of methylmalonic acid generally **correlate with disease severity** and natural history data suggest that changes in methylmalonic acid may be associated with clinical events

There are **no clinically validated** biomarkers for MMA



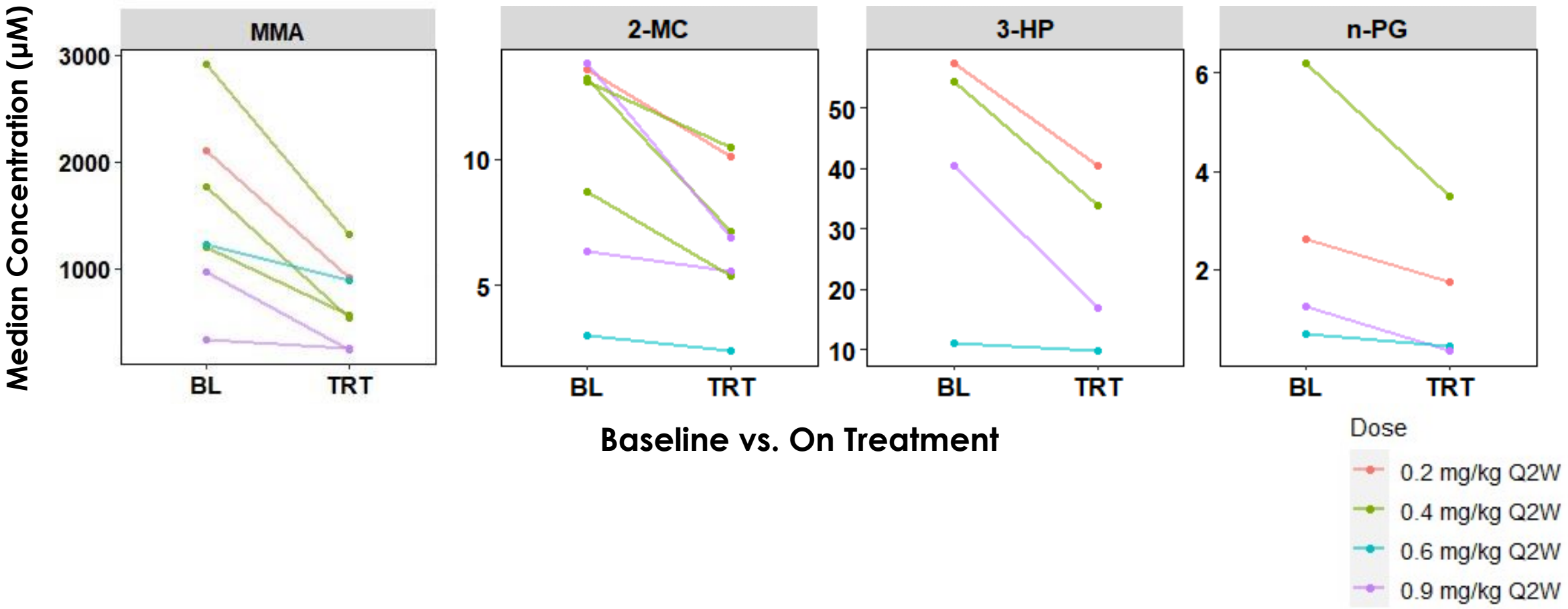
mRNA-3705-P101: pattern of biomarker response mirrors that seen in liver transplant

- Liver transplant is thought to promote metabolic stability in patients with MMA
- MMA levels typically decrease after liver or liver/kidney transplant, particularly in patients with the highest pre-transplant levels
- MMA levels post transplant are typically ~300µM
- mRNA-3705 treatment is associated with reductions in blood MMA in study participants with higher pre-treatment MMA levels treated with doses of 0.4 mg/kg Q2W or higher
- One participant in the 0.6 mg/kg cohort with a mild, atypical disease phenotype did not show a reduction in MMA



Data as of 08 Apr 2024

mRNA-3705-P101: Participants who demonstrate reductions in MMA also show changes in other pathway biomarkers

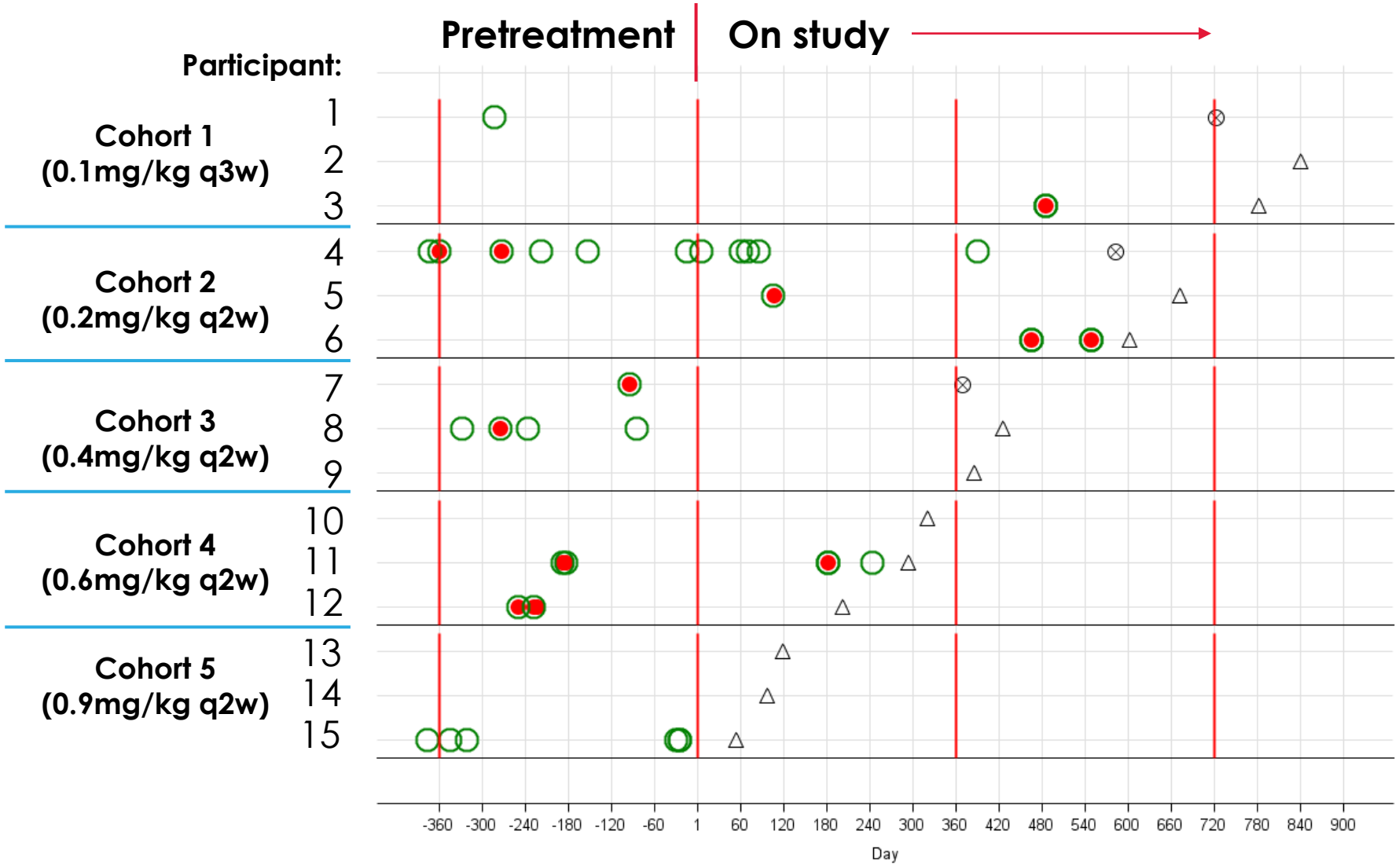


Participants with at least a 25% reduction in MMA levels are shown

Data as of 08 Apr 2024

mRNA-3705-P101: Promising initial data on clinical endpoints

Trends towards fewer MMA-related hospitalizations and Metabolic Decompensation Events (MDEs)



MMA-related hospitalizations:
Year prior to study entry: 0.95/year (SE: 0.4)
On study: 0.5/year (SE: 0.248)

MDEs:
Year prior to study entry: 0.57/year (SE: 0.249)
On study 0.28/year (SE: 0.133)

SE: Standard Error

Data as of 08 Apr 2024

Safety of mRNA-3705: Overall summary to date

- No deaths or discontinuations due to safety-related reasons
  - Three discontinuations in the extension for non-safety reasons
- No events meeting dose-limiting toxicity criteria have been observed
- 1 serious adverse event (AE) assessed as related to mRNA-3705 by the investigator:
  - Event of "body temperature increased" (CTCAE grade 2, resolved). Patient has continued on treatment
- Drug related adverse events were mostly mild or moderate (CTCAE grade 1 or 2)
- Most common AEs are pyrexia (n=5), upper respiratory tract infection (n=5), and vomiting (n=5)
- Less than 5% of administered doses associated with infusion-related reactions

As of April 8, 2024

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US FDA Support for Clinical Trials Advancing Rare Disease Therapeutics (START) Pilot Program

As part of FDA's initiative to accelerate the pace of development in rare diseases, mRNA-3705 was **1 of 4 programs** to be accepted into the CBER START pilot program on May 29, 2024.

Features:

- Enhanced regulatory interactions beyond formal meetings to allow for rapid, more frequent ad-hoc communication mechanisms
- Access to all review disciplines
- Milestone driven to support significant regulatory activities (initiation of pivotal study, pre-BLA meeting)

CAMBRIDGE, MA / ACCESSWIRE / June 6, 2024 / *Moderna, Inc. (NASDAQ:MRNA) today announced that the U.S. Food and Drug Administration (FDA) has selected mRNA-3705 for the Support for Clinical Trials Advancing Rare Disease Therapeutics (START) pilot program. mRNA-3705 is an investigational therapeutic for methylmalonic acidemia (MMA) due to methylmalonic-CoA mutase (MUT) deficiency.*

"We are excited about this opportunity and proud that our investigational mRNA therapeutic for MMA was selected by the U.S. FDA for the START pilot program. This selection highlights the promise of Moderna's innovative mRNA platform beyond vaccines and the potential this novel medicine may have in addressing the serious and unmet medical needs of MMA," said Kyle Holen, M.D., Moderna's Senior Vice President and Head of Development, Therapeutics and Oncology. "Selection for this program will enable enhanced communication with the U.S. FDA, resulting in acceleration of our development program as we prepare for pivotal study initiation for mRNA-3705 in 2024."

MMA (mRNA-3705) summary and next steps

Clinical Results and Experience

- Early results suggest potential decreases in annualized rates of MMA-related hospitalizations and MDEs compared to pre-treatment ratees
- Reductions in methylmalonic acid and other pathway biomarkers in participants, particularly at doses of at least 0.4 mg/kg Q2W
- Cumulative treatment duration of over 17 patient years

Safety

- Generally well-tolerated to date with no discontinuations due to safety and no events meeting protocol-defined dose-limiting toxicity criteria

Next steps

- Identify an optimal dose
- Continued engagement with FDA (via START) and other global regulators
- On track to begin generating pivotal data in 2024

Oncology therapeutics portfolio

Kyle Holen, M.D.
SVP, Head of Development, Therapeutics and Oncology, Research & Development

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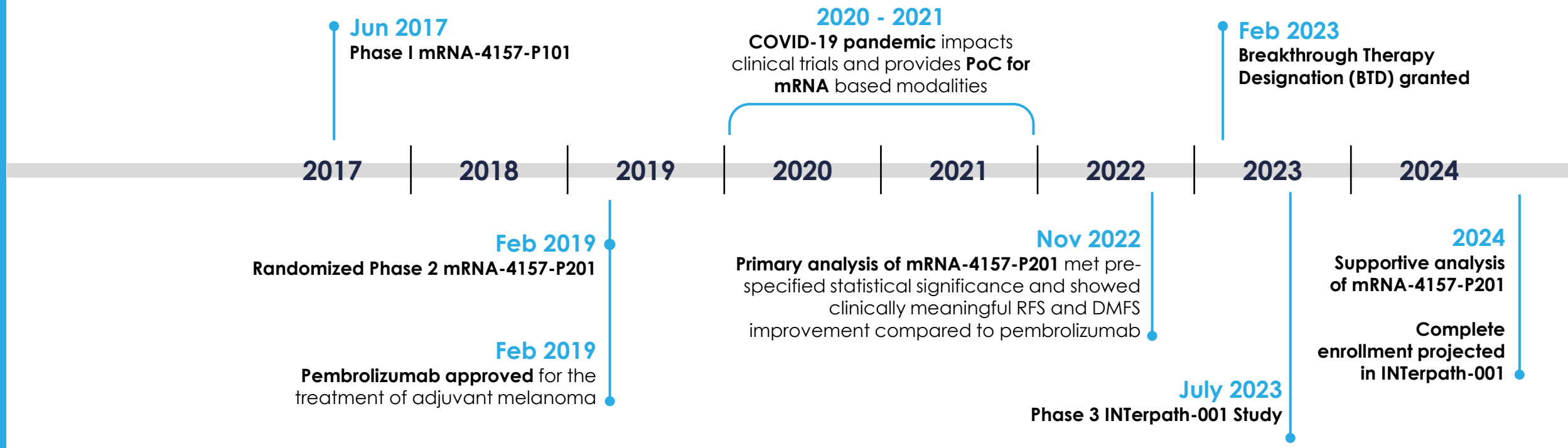
INT developmental history builds on decades of scientific advancements

1960 – Current: mRNA and LNP advancements

1970 – Current: Tumor associated antigen modalities fail to demonstrate meaningful clinical improvement; increased focus on neoantigens

1977 – Current NGS advancements and development of BIX algorithm; Validation of in silico prediction vs. ex vivo results



Karikó K, Buckstein M, Ni H, Weissman D. *Immunity*. 2005 Aug;23(2):165-75. Karikó K, Muramatsu H, Welsh FA, Ludwig J, Kato H, Akira S, Weissman D. *Mol Ther*. 2008 Nov;16(11):1833-40. Andries O, Mc Cafferty S, De Smedt SC, Weiss R, Sanders NN, Kitada T. *J Control Release*. 2015 Nov 10;217:337-44. Tanji H, et al. Nat Struc Mol Biol. 2015;22(2):109-15 Edwards DK & Carfi A. *Curr Opin Immunol*. 2022;77:102214.Hassett KJ, et al. Mol Ther Nucleic Acids. 2019;15:1-11. Marganti, S. Role of next-generation sequencing technologies in personalized medicine. P5 eHealth: An Agenda for the Health Technologies of the Future Nature Cancer | VOL 3 | August 2022 | 911–926 R Cristescu et al. Science Oct 2018

Honoring Dr. Jeff Weber

Jeffrey S. Weber, MD, PhD, FASCO, an internationally recognized pioneer in melanoma and cancer immunotherapy, died on August 19, 2024. He most recently served as Deputy Director of the Laura and Isaac Perlmutter Cancer Center at New York University (NYU) Langone Health.

Dr. Weber served as the primary investigator of the Phase 2 INT adjuvant melanoma study.

Phase 2 INT adjuvant melanoma study: 3-year update

Michelle Brown

Vice President, Portfolio Leadership, INT

LBA9512

2024 ASCO ANNUAL MEETING

Individualized neoantigen therapy mRNA-4157 (V940) plus pembrolizumab in resected melanoma: 3-year update from the mRNA-4157-P201 (KEYNOTE-942) trial

Jeffrey S. Weber,[1] Muhammad Adnan Khattak,[2] Matteo S. Carlino,[3] Tarek Meniawy,[4] Matthew H. Taylor,[5] George Ansstas,[6] Kevin B. Kim,[7] Meredith McKean,[8] Ryan J. Sullivan,[9] Mark B. Faries,[10] Thuy Tran,[11] C. Lance Cowey,[12] Theresa M. Medina,[13] Jennifer M. Segar,[14] Victoria Atkinson,[15] Geoffrey T. Gibney,[16] Jason J. Luke,[17] Elizabeth I. Buchbinder,[18] Georgina V. Long,[19] INT Research and Development Author Group,[20,21,a] Robert S. Meehan[20]

[a]Manju Morrissey,[20] Igor Feldman,[20] Vasudha Sehgal,[20] Huzhang Mao,[20] Jia Guo,[20] Min Liu,[20] Anjali Rao,[20] Wei Zheng,[20] Praveen Aanur,[20] Lakshmi Srinivasan,[20] Mo Huang,[21] Tal Zaks,[20] Michelle Brown,[20] Tracey Posadas[20]

[1]Laura and Isaac Perlmutter Cancer Center at NYU Langone Health, New York, NY, USA; [2]Hollywood Private Hospital and Edith Cowan University, Perth, Australia; [3]Melanoma Institute Australia and Westmead Hospital, Sydney, Australia; [4]Saint John of God Subiaco Hospital, Subiaco, Australia; [5]Earle A. Chiles Research Institute, Portland, OR, USA; [6]Washington University School of Medicine, St Louis, MO, USA; [7]California Pacific Medical Center Research Institute, San Francisco, CA, USA; [8]Sarah Cannon Research Institute, Nashville, TN, USA; [9]Massachusetts General Hospital, Boston, MA, USA; [10]The Angeles Clinic and Research Institute, Los Angeles, CA, USA; [11]Yale-New Haven Hospital, New Haven, CT, USA; [12]Baylor Charles A. Sammons Cancer Center, Dallas, TX, USA; [13]University of Colorado, Aurora, CO, USA; [14]University of Arizona Cancer Center, Tucson, AZ, USA; [15]Princess Alexandra Hospital, Woolloongabba, Australia; [16]Lombardi Comprehensive Cancer Center, Washington, DC, USA; [17]UPMC Hillman Cancer Center, Pittsburgh, PA, USA; [18]Dana-Farber Cancer Institute, Boston, MA, USA; [19]Melanoma Institute Australia, Sydney, Australia; [20]Moderna, Inc., Cambridge, MA, USA; [21]Merck & Co., Inc., Rahway, NJ, USA.

Sponsored by Moderna, Inc., in collaboration with Merck Sharp & Dohme LLC, a subsidiary of Merck & Co., Inc., Rahway, NJ, USA.

2024 ASCO ANNUAL MEETING #ASCO24

PRESENTED BY: Jeffrey S. Weber, MD, PhD

ASCO AMERICAN SOCIETY OF CLINICAL ONCOLOGY
KNOWLEDGE CONQUERS CANCER

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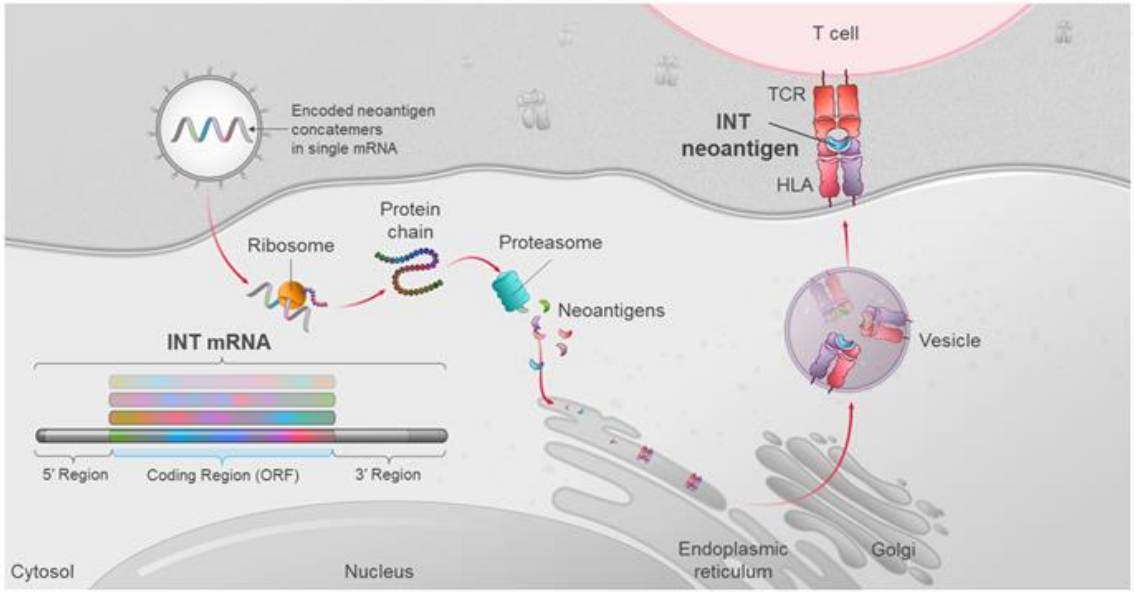
Background/Introduction



mRNA-4157 (V940) is a novel, mRNA-based individualized neoantigen therapy designed to increase endogenous antitumor T-cell responses by targeting unique patient tumor mutations

In the primary analysis of the phase 2 mRNA-4157-P201 (**KEYNOTE-942**) trial (median planned follow-up, 23 months), patients with completely resected high-risk stage IIIB–IV cutaneous melanoma receiving mRNA-4157 + pembrolizumab had **prolonged RFS and DMFS** versus pembrolizumab alone[1]

Objective: Assess 3-year median planned follow-up (median [range], 34.9 [25.1–51.0] months)

DMFS, distant metastasis-free survival; RFS, recurrence-free survival.

1. Weber JS, et al. *Lancet*. 2024;403:632-644.

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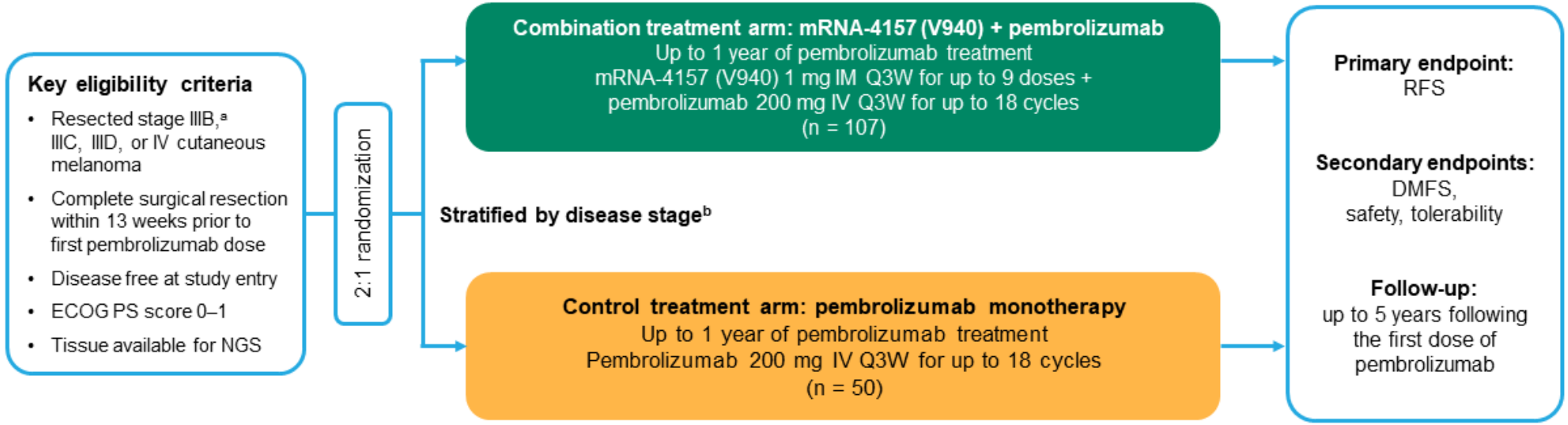
mRNA-4157-P201/KEYNOTE-942 (NCT03897881) study design

Randomized, phase 2, open-label study in patients with adjuvant resected melanoma at high risk of recurrence



Designed with 80% power to detect a hazard ratio of 0.5 with 40 RFS events (with a 1-sided alpha of 0.1 per protocol)
Primary analysis **triggered after a minimum of 1-year planned follow-up[c]** (November 14, 2022 data cut) and at least 40 RFS events have been observed. DMFS analysis was prespecified for testing following positive RFS in the ITT population

Supportive analysis was **triggered after a minimum of 2 years of planned follow-up[c]** (November 3, 2023 data cut)
Median planned follow-up[c]: ~3yrs

[a]Patients with stage IIIB disease were eligible only if relapse occurred within 3 months of prior surgery of curative intent; [b]According to the 8th edition of the American Joint Committee on Cancer Staging Manual [c]Defined as the time from the first dose date (or date of randomization if not treated) to date of clinical cut-off.
ECOG PS, Eastern Cooperative Oncology Group performance status; IM, intramuscular; ITT, intent-to-treat; IV, intravenous; NGS, next-generation sequencing; Q3W, every 3 weeks.

2024 ASCO ANNUAL MEETING #ASCO24

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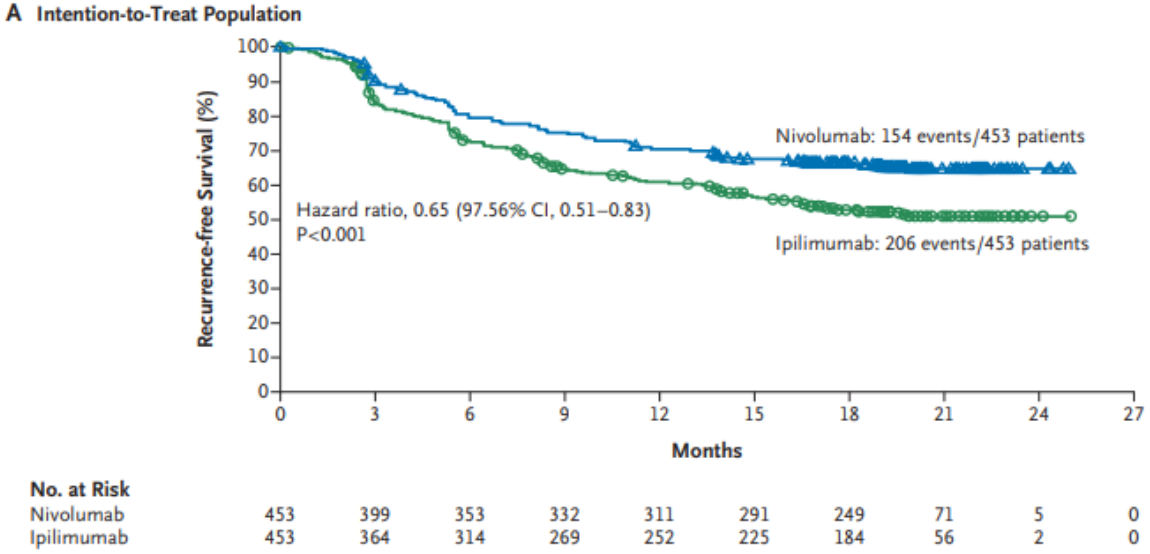
RFS of pembrolizumab control arm in P201 consistent with historical studies Checkmate-238 and Keynote-054

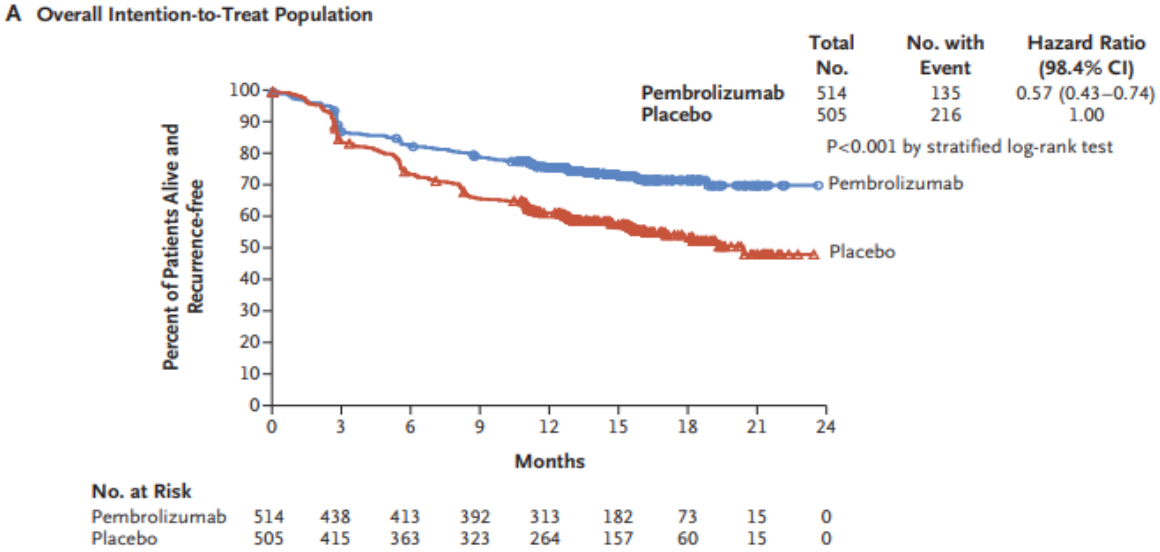
Increasing confidence in the treatment effect observed with the INT + pembro combination over pembro monotherapy

Checkmate-238 12mo RFS: 70.5% vs. 60.8%



Primary RFS analysis in the ITT Population, Minimum follow-up 18mo

Keynote-054 12mo RFS: 75.4% vs 61.0%

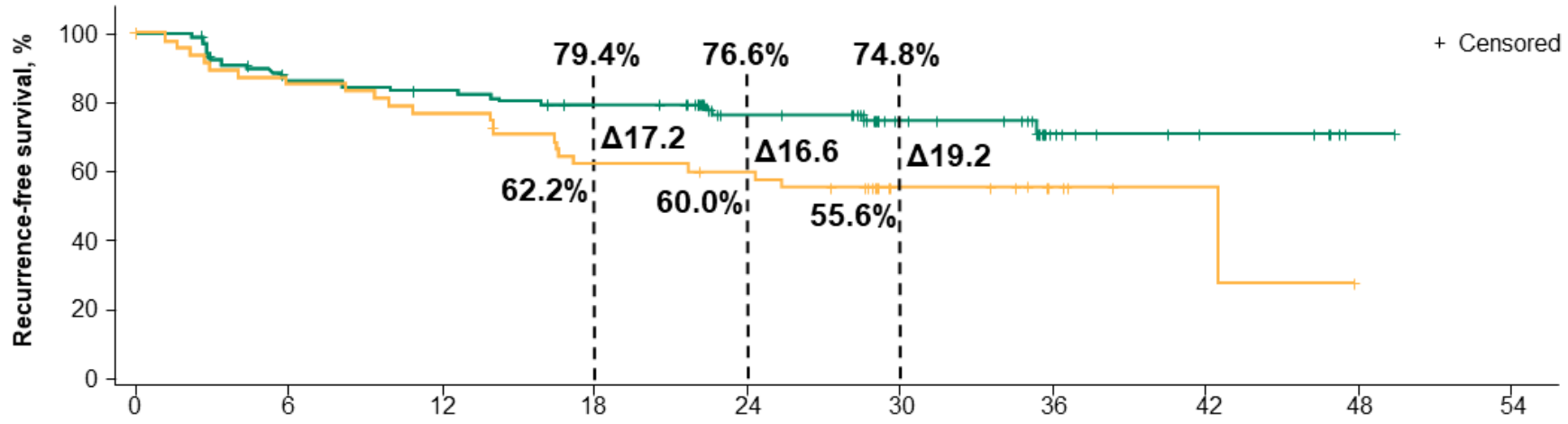


Primary RFS analysis in the ITT Population, Median f/u 15mo

1. Checkmate-238:A Phase 3, Randomized, Double-blind Study of Adjuvant Immunotherapy With Nivolumab Versus Ipilimumab After Complete Resection of Stage IIIb/c or Stage IV Melanoma in Subjects Who Are at High Risk for Recurrence Weber, Jeffery et al., The New England Journal of Medicine (2017), https://www.nejm.org/doi/full/10.1056/nejmoa1709030
2. Keynote 054: Adjuvant Immunotherapy With Anti-PD-1 Monoclonal Antibody Pembrolizumab (MK-3475) Versus Placebo After Complete Resection of High-risk Stage III Melanoma: A Randomized, Double- Blind Phase Trial of the EORTC Melanoma Group. Eggermont, Alexander et al., The New England Journal of Medicine (2018), https://doi.org/10.1056/NEJMoa1802357

LBA9512

Sustained improvement of RFS primary efficacy endpoint



Patients at risk										
mRNA-4157 (V940) + pembrolizumab	107	87	83	77	52	29	12	6	1	0
Pembrolizumab	50	41	37	29	27	10	5	2	0	0

	Median (95% CI), months	Events, % (n/N)	Hazard ratio (95% CI)[a]
mRNA-4157 (V940) + pembrolizumab	NE	23.4 (25/107)	0.510 (0.288–0.906) *P* = 0.019[b]
pembrolizumab	42.51 (16.59–NE)	44.0 (22/50)	

[a]The hazard ratio and 95% CI for mRNA-4157 (V940) + pembrolizumab versus pembrolizumab were estimated using a Cox proportional hazards model with treatment group as a covariate, stratified by disease stage (stages IIIB or IIIC or IIID vs stage IV) used for randomization. The *P* value is based on a 2-sided log-rank test stratified by disease stage (stages IIIB or IIIC or IIID vs stage IV) used for randomization; [b]Formal hypothesis testing of RFS was performed using November 2022 data cut. *P* value reported above used the November 2023 data cut; it's nominal and not for formal hypothesis testing. NE, not estimable.

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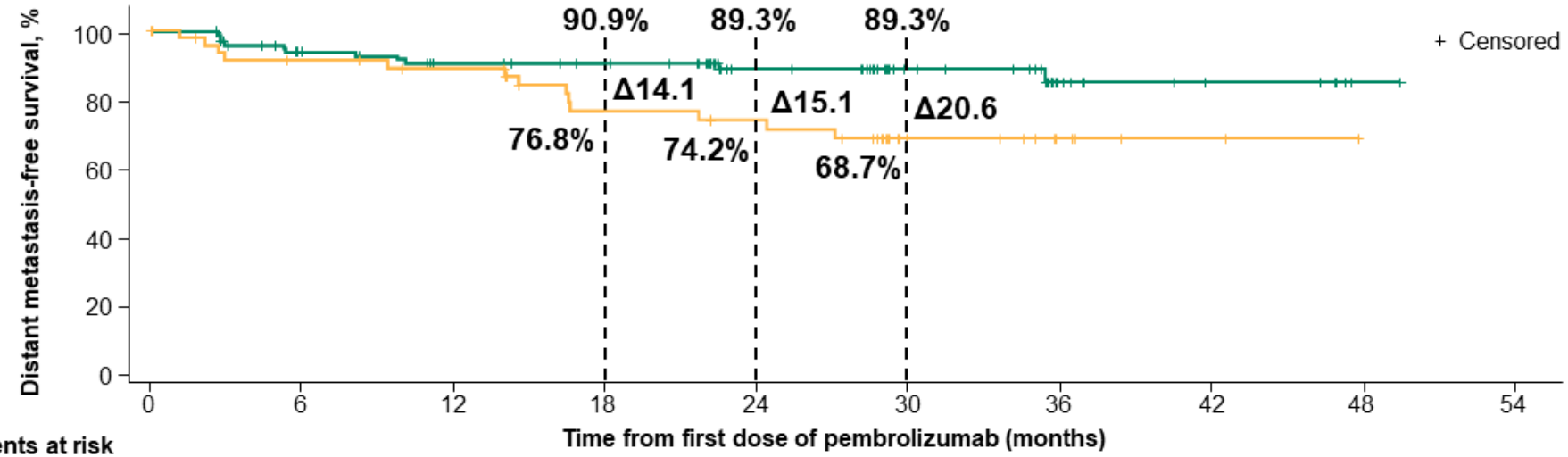
Sustained improvement of DMFS secondary endpoint



Patients at risk										
mRNA-4157 (V940) + pembrolizumab	107	89	82	78	52	30	12	6	1	0
Pembrolizumab	50	42	39	30	27	10	5	2	0	0

	Median (95% CI), months	Events, % (n/N)	Hazard ratio (95% CI)[a]
mRNA-4157 (V940) + pembrolizumab	NE	10.3 (11/107)	0.384 (0.172–0.858) *P* = 0.015[b]
Pembrolizumab	NE	26.0 (13/50)	

[a]The hazard ratio and 95% CI for mRNA-4157 (V940) plus pembrolizumab versus pembrolizumab were estimated using a Cox proportional hazards model with treatment group as a covariate, stratified by disease stage (stages IIIB or IIIC or IIID vs stage IV) used for randomization. The *P* value is based on a 2-sided log-rank test stratified by disease stage (stages IIIB or IIIC or IIID vs stage IV) used for randomization; [b]Formal hypothesis testing of DMFS was performed using November 2022 data cut. *P* value reported above used the November 2023 data cut; it's nominal and not for formal hypothesis testing.

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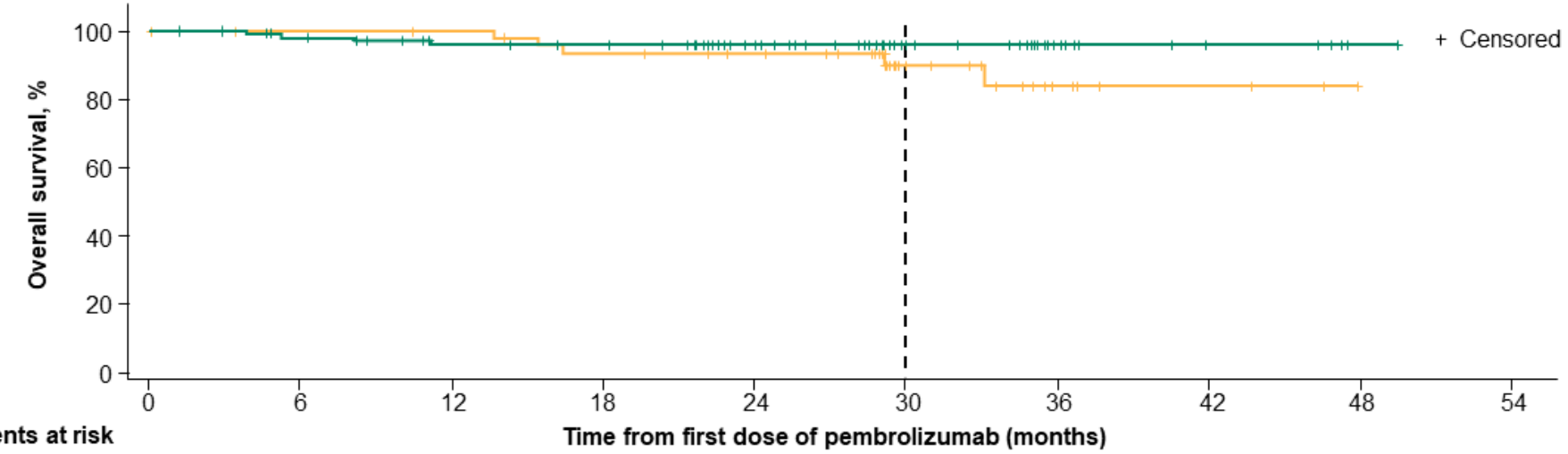
Overall survival shows encouraging trend with mRNA-4157 (V940) + pembrolizumab



Patients at risk										
mRNA-4157 (V940) + pembrolizumab	107	100	92	90	65	35	14	6	1	0
Pembrolizumab	50	48	47	43	40	18	7	3	0	0

	Median (95% CI), Months	Events, % (n/N)	Hazard ratio (95% CI)[a]
mRNA-4157 (V940) + pembrolizumab	NE	3.7 (4/107)	0.425 (0.114–1.584)
Pembrolizumab	NE	10.0 (5/50)	

[a]The hazard ratio and 95% CI for mRNA-4157 (V940) plus pembrolizumab versus pembrolizumab were estimated using a Cox proportional hazards model with treatment group as a covariate, stratified by disease stage (stages IIIB or IIIC or IIID vs stage IV) used for randomization.

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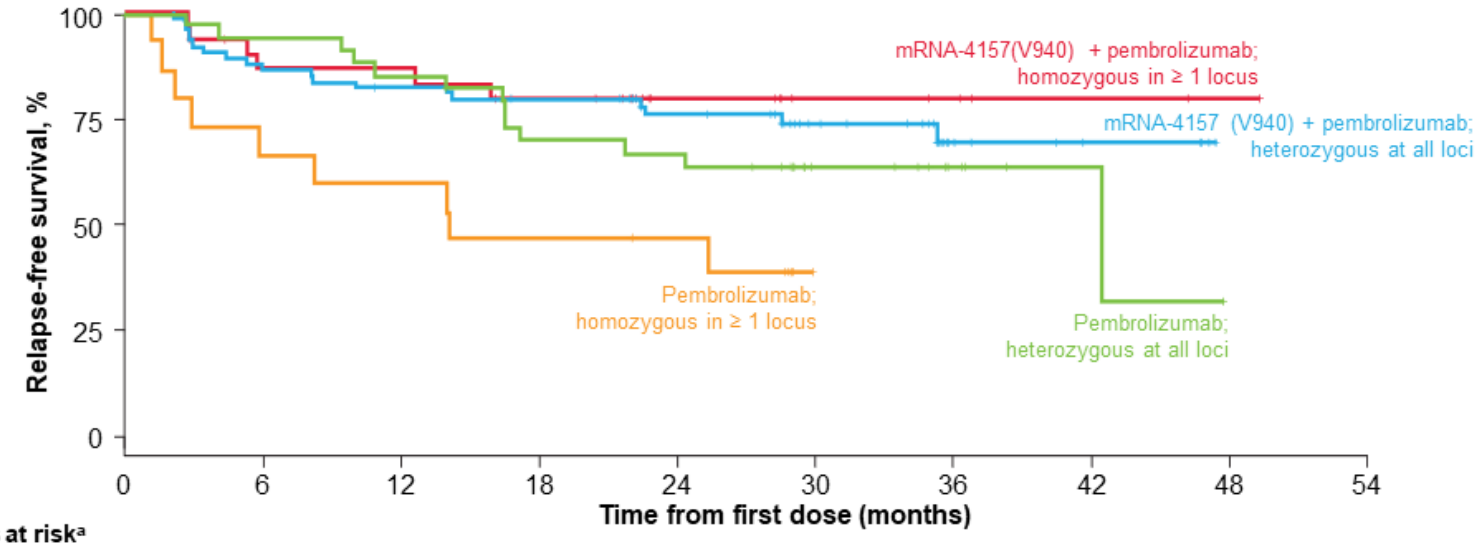
Biomarker analyses suggest mRNA-4157 (V940) + pembrolizumab may benefit a broad patient population

- HLA class I plays a key role in CD8 T cell immunosurveillance
- HLA diversity has been linked with differential immune responses to infection and autoimmune diseases
- No significant associations between individual HLA alleles and RFS were observed for mRNA-4157 + pembrolizumab



Patients at risk[a]

mRNA-4157 (V940) + pembrolizumab; heterozygous at all loci[b]	74	62	58	55	42	24	8	4	0	0
mRNA-4157(V940) + pembrolizumab; homozygous in ≥ 1 locus[c]	31	25	25	22	10	5	4	2	1	0
Pembrolizumab; heterozygous at all loci[b]	34	31	28	22	21	10	5	2	0	0
Pembrolizumab; homozygous in ≥ 1 locus[c]	15	10	9	7	6	0	0	0	0	0

The benefit of mRNA-4157 (V940) + pembrolizumab continued to be observed irrespective of PD-L1, TMB, and ctDNA status,[d] as presented previously

Note: In a large dataset, HLA diversity has not been shown as a determinant of response to pembrolizumab.[1]
[a]Analyses are based on subpopulation with HLA data (n = 154) and excluded 3 patients who did not receive treatment in either arm; [b]HLA heterozygous: heterozygous at all HLA-A/B/C loci; [c]HLA homozygous: homozygous at ≥ 1 locus of HLA-A, HLA-B, and HLA-C; [d]Supportive analysis RFS HR (95% CI) for mRNA-4157 + pembrolizumab versus pembrolizumab in TMB-high: 0.564 (0.253–1.258); TMB-non-high: 0.571 (0.245–1.331); PD-L1-positive: 0.471 (0.226–0.979); PD-L1-negative: 0.147 (0.034–0.630); and ctDNA-negative: 0.207 (0.091–0.470) subgroups; ctDNA-positive HR was not estimable. CD, cluster of differentiation; ctDNA, circulating tumor DNA; HLA, human leukocyte antigen; PD-L1, programmed death ligand 1; TMB, tumor mutational burden.

1. Chhibber A, et al. *Immunity* 2022;55:56-64.e4.

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3-year safety follow-up on safety demonstrates a manageable profile consistent with the primary analysis

	mRNA-4157 (V940) + pembrolizumab (n = 104)		Pembrolizumab (n = 50)	
Event, n (%)	Any grade	Grade ≥ 3	Any grade	Grade ≥ 3
Any AE	104 (**100%**)	36 (**34.6%**)	46 (**92.0%**)	18 (**36.0%**)
Any treatment-related AE	104 (**100%**)	26 (**25.0%**)	41 (**82.0%**)	10 (**20.0%**)
Serious AE[a]	15 (**14.4%**)		5 (**10.0%**)	
Immune-related AE[b]	39 (**37.5%**)	11 (**10.6%**)	18 (**36%**)	7 (**14.0%**)

mRNA-4157 (V940) + pembrolizumab (n = 104), n (%)	Grade 1	Grade 2	Grade 3	Grade 4/5	Total (n = 104)
Patients with mRNA-4157 (V940)–related AE[c]	**35 (33.7%)**	**51 (49.0%)**	**12 (11.5%)**	**0**	**98 (94.2%)**
Fatigue	40 (38.5%)	18 (17.3%)	5 (4.8%)	0	63 (60.6%)
Injection site pain	37 (35.6%)	22 (21.2%)	0	0	59 (56.7%)
Chills	48 (46.2%)	3 (2.9%)	0	0	51 (49.0%)
Pyrexia	34 (32.7%)	15 (14.4%)	1 (1.0%)	0	50 (48.1%)
Headache	20 (19.2%)	13 (12.5%)	0	0	33 (31.7%)
Injection site erythema	29 (27.9%)	4 (3.8%)	0	0	33 (31.7%)
Influenza-like illness	21 (20.2%)	10 (9.6%)	0	0	31 (29.8%)
Nausea	23 (22.1%)	3 (2.9%)	0	0	26 (25.0%)
Myalgia	16 (15.4%)	5 (4.8%)	1 (1.0%)	0	22 (21.2%)

Safety analyses were conducted in the safety population, which was defined as all randomly assigned patients who received ≥ 1 dose of treatment. Grading per National Cancer Institute Common Terminology Criteria for Adverse Events version 5.0. [a]Serious AEs were not evaluated by toxicity grade; [b]Based on established list of pembrolizumab immune-related AEs (CMQ Pembrolizumab AEOSI); [c]mRNA-4157 (V940)–related AEs included events attributed by the investigator to mRNA-4157 (V940) alone as well as events attributed to both mRNA-4157 (V940) and pembrolizumab. AE, adverse event; AEOSI, adverse event of special interest; CMQ, customized MedDRA queries.

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Conclusions

mRNA-4157 (V940) + pembrolizumab demonstrated a durable **clinically significant improvement in RFS & DMFS** compared with standard of care pembrolizumab in high-risk resected melanoma, with a **49% reduction in the risk of recurrence or death** and a **62% reduction of distant recurrence or death** with 3 years of follow-up

3-year exploratory endpoint showed an **encouraging trend in overall survival** with the combination versus pembrolizumab monotherapy

mRNA-4157 (V940) + pembrolizumab has a **manageable safety profile** without potentiation of immune-related AEs compared with pembrolizumab monotherapy

Translational analyses suggest mRNA-4157 (V940) + pembrolizumab may benefit a **broad patient** population **irrespective of the status of PD-L1, TMB, ctDNA, and HLA heterozygosity**

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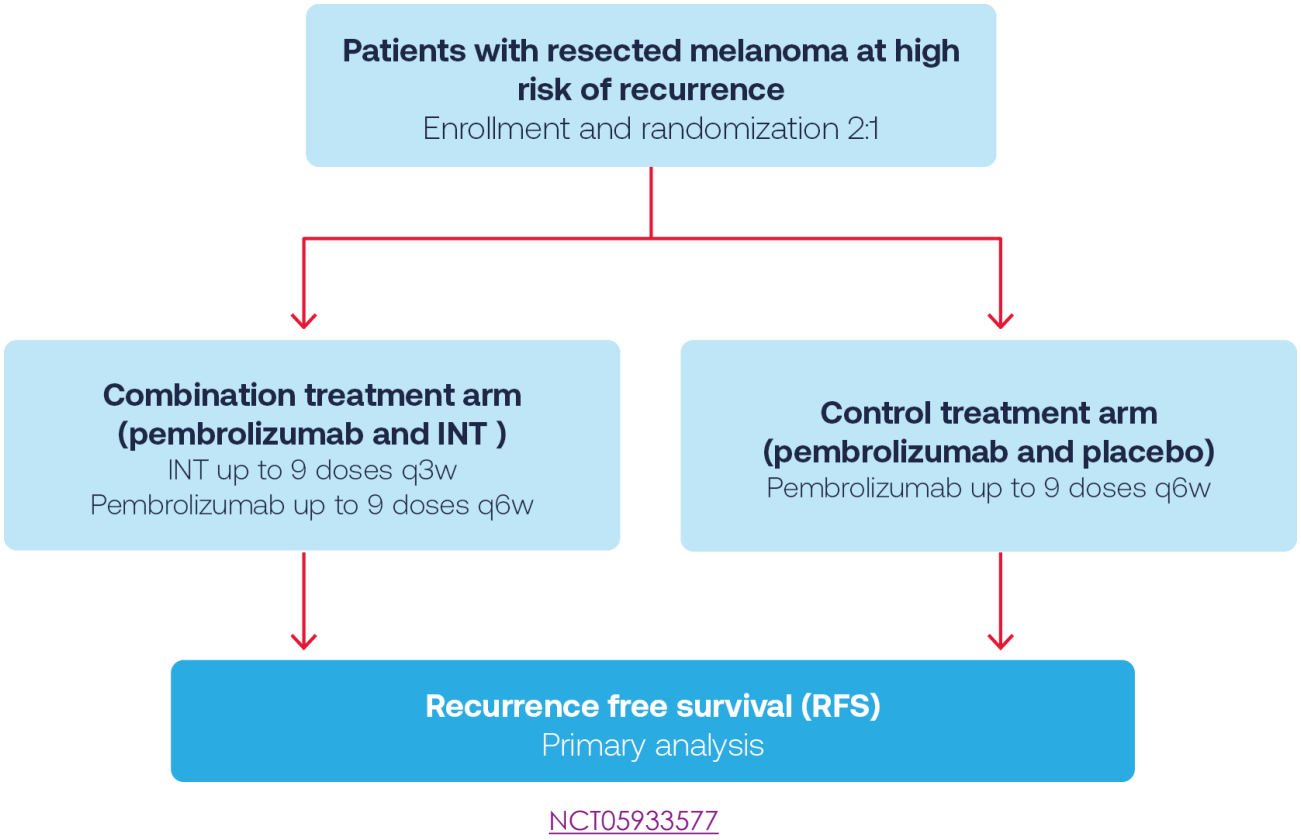
Adjuvant melanoma Phase 3 (mRNA-4157 / V940) trial design

Primary endpoint is recurrence free survival compared to pembrolizumab



Randomized, double-blind placebo controlled, INT + pembrolizumab (KEYTRUDA®) vs. placebo + pembrolizumab (2:1) (INTerpath-001)

Resected melanoma patients: stage IIB or IIC, III, IV

Primary endpoint: recurrence free survival (RFS)

Secondary endpoints: Distant Metastasis-Free Survival (DMFS), Overall-Survival (OS)

Number of participants: ~1,089

Phase 3 trial is substantially enrolled and has closed screening to new patients in many countries

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INT development program

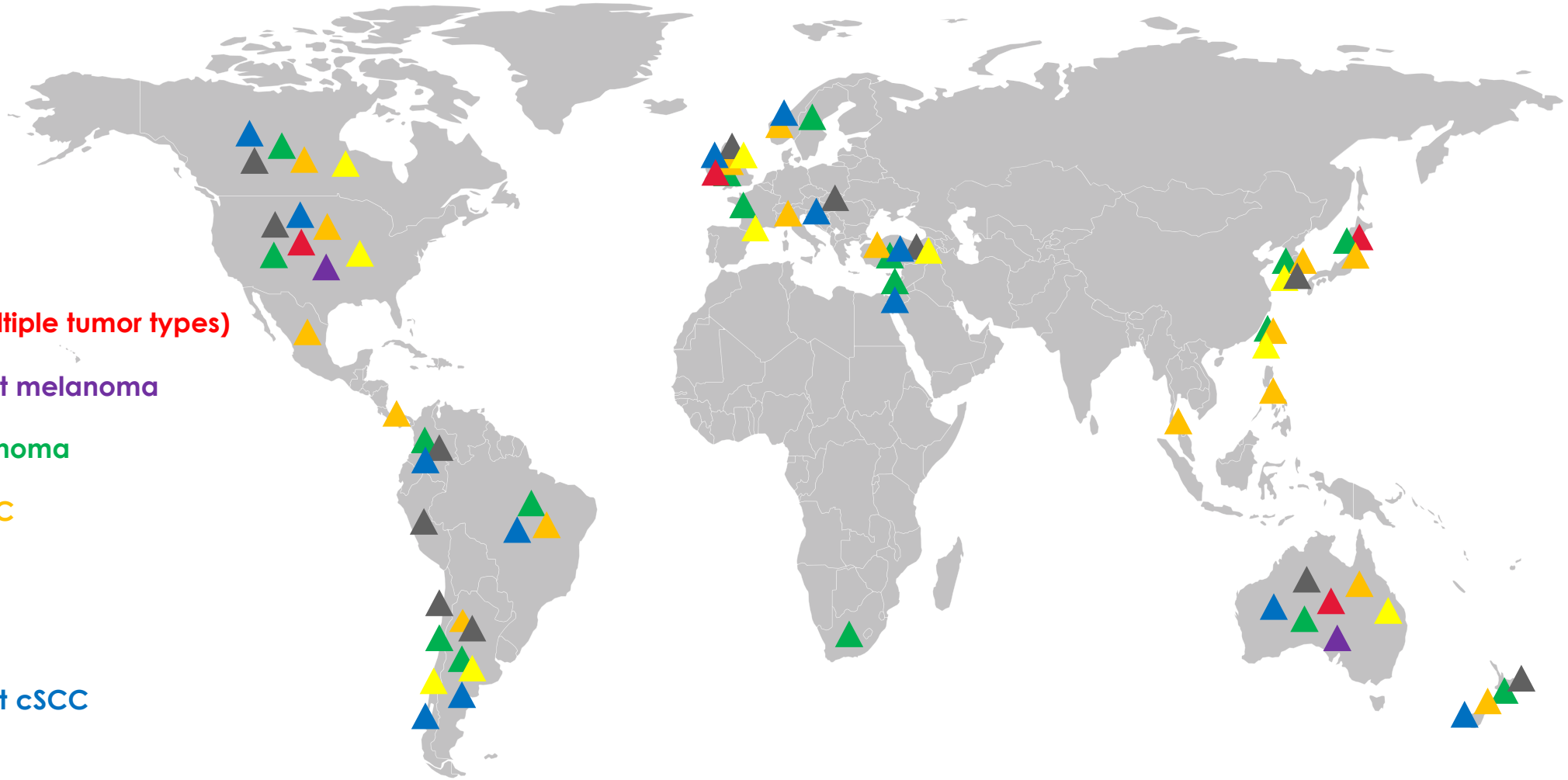
Phase 3 studies

- Adjuvant melanoma
- Adjuvant non-small cell lung cancer

Phase 2/3 and Phase 2 studies

- Randomized Phase 2/3 neoadjuvant/adjuvant cutaneous squamous cell carcinoma
- Randomized Phase 2 adjuvant high risk muscle invasive bladder cancer
- Randomized Phase 2 adjuvant renal cell carcinoma

Merck's and Moderna's global INT program has expanded to more than 45 countries



P101 – Phase 1 (multiple tumor types)

P201 – Ph2 adjuvant melanoma

Ph3 adjuvant melanoma

Ph3 adjuvant NSCLC

Ph2 adjuvant RCC

Ph2 adjuvant MIBC

Ph2/3 peri-adjuvant cSCC

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INT Summary

Clinical Results and Experience

- mRNA-4157 (V940) + pembrolizumab demonstrated a durable **clinically significant improvement in RFS & DMFS** at 3 years follow-up compared to standard of care pembrolizumab in high-risk resected melanoma:
  - 49% reduction (HR 0.51) in the risk of recurrence or death (RFS)
  - 62% reduction (HR 0.38) of distant recurrence or death (DMFS)
- 3-year exploratory endpoint showed **encouraging trend in overall survival (OS)**

Safety

- Showed a manageable safety profile without potentiation of immune-related AEs compared with pembrolizumab monotherapy

Next steps

- While discussions are ongoing, initial feedback from FDA has not been supportive of accelerated approval based on the current data. The Company and its partner Merck will continue engaging with regulators on the program, and remain focused on executing the Phase 3 trial
- Execute multiple late-stage studies across INT indications

HR = hazard ratio

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R&D portfolio overview

Stephen Hoge, M.D.
President

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Our R&D investments delivered many positive results in the past year

Two major approvals

COVID
mRNA-1273

spikevax™

RSV 60+
mRNA-1345

mRESVIA®
(Respiratory Syncytial Virus Vaccine)

Four positive Phase 3s

Next-gen COVID
mRNA-1283

Flu + COVID (50+)
mRNA-1083

RSV (18-59 HR)
mRNA-1345

Seasonal Flu
mRNA-1010

Proof of concept strengthened by ongoing durability

PA
mRNA-3927

MMA
mRNA-3705

INT: Adj. Melanoma
mRNA-4157

Positive early proof-of-concept data in six other programs

EBV
mRNA-1189

VZV
mRNA-1468

Norovirus
mRNA-1403

Data shared at Vaccines Day

Lyme
mRNA-1982

EBV
mRNA-1195

Checkpoint
mRNA-4359

New positive early-stage data

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Discontinued programs

Respiratory vaccines

Endemic HCoV
(mRNA-1287)
Preclinical program will not advance into Phase 1

RSV infants (seronegative, < 2 years)
(mRNA-1345)
We do not expect the program to advance beyond the ongoing Phase 1 based on emerging clinical data

Oncology therapeutics

KRAS antigen-specific therapy
(mRNA-5671)
No further development plans

Triplet (OX40L/IL-23/IL-36γ)
(mRNA-2752)
We have deprioritized further development based on available clinical data

Cardiovascular therapeutics

Relaxin
(mRNA-0184)
Program is wrapping up Phase 1

Our R&D strategy

2021-2023

Build a pipeline

Invest pandemic proceeds in diverse pipeline

2023-2026

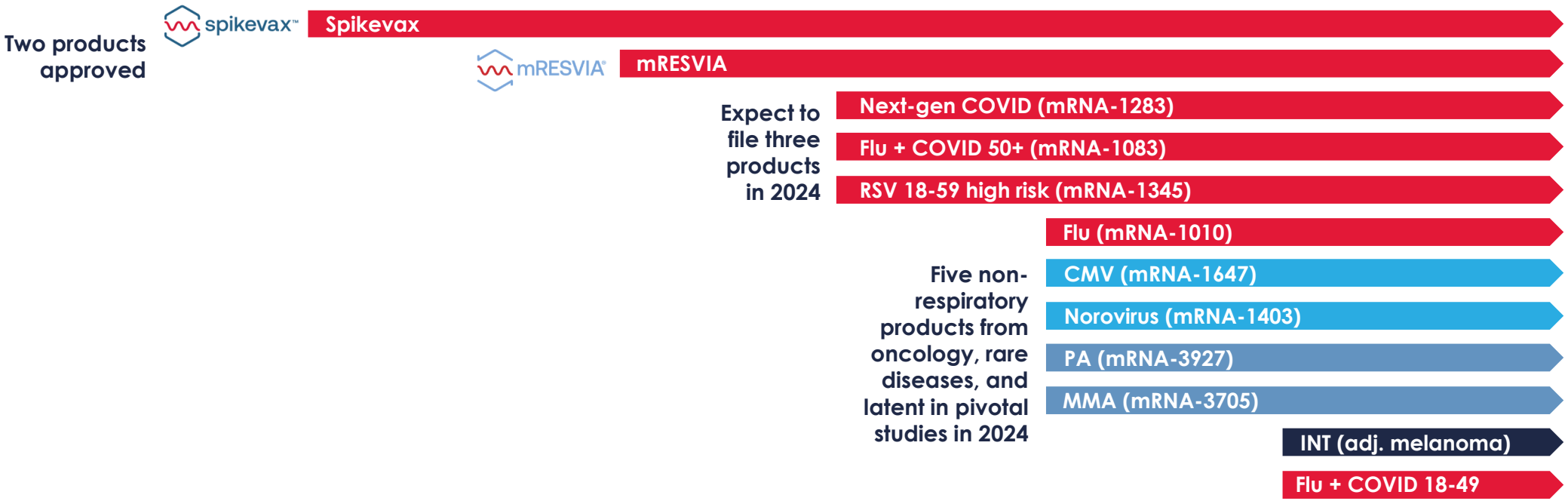
Deliver respiratory approvals

Build large portfolio of 5 commercial vaccines

2026-2028

Deliver non-respiratory approvals

Expand commercial portfolio into cancer, rare diseases, and latent



Financial review

Jamey Mock
Chief Financial Officer

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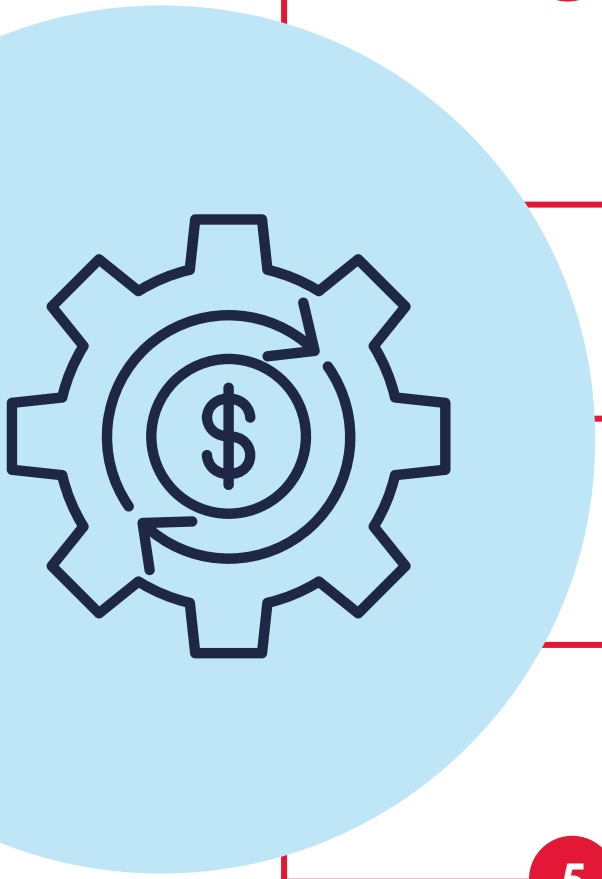
Revisiting Moderna operating principles



1. We expect our **commercial respiratory franchise to be profitable** in 2024
2. We plan to invest in our late-stage pipeline to **drive significant organic sales growth**
3. We will be **disciplined** and will **adjust our R&D and SG&A investment** based upon our sales performance
4. We expect to **break even on an operating cash cost basis with $6B in revenue** through product launches and disciplined investment. We currently expect we will achieve this in 2028
5. Our current balance sheet is **sufficient to fund** our plans **without raising equity**

Commercial Respiratory P&L (Spikevax and mRESVIA)

Currently marketed portfolio is cash flow positive

	2024 ($B)
Sales	**$3.0-3.5**
Cost of Sales	1.4
Gross Profit	1.6 – 2.1
SG&A	1.2
% Respiratory	60%
Respiratory SG&A (in-line)	0.7
Respiratory R&D (in-line)[1]	0.3
Adjusted Operating Margin[1]	**$0.6 – 1.1**

- Revenue to grow with new program launches
- COS & SG&A leverage with new program launches
- Commercial respiratory P&L is profitable

1. Excludes new development which includes age cohort expansion and new candidates

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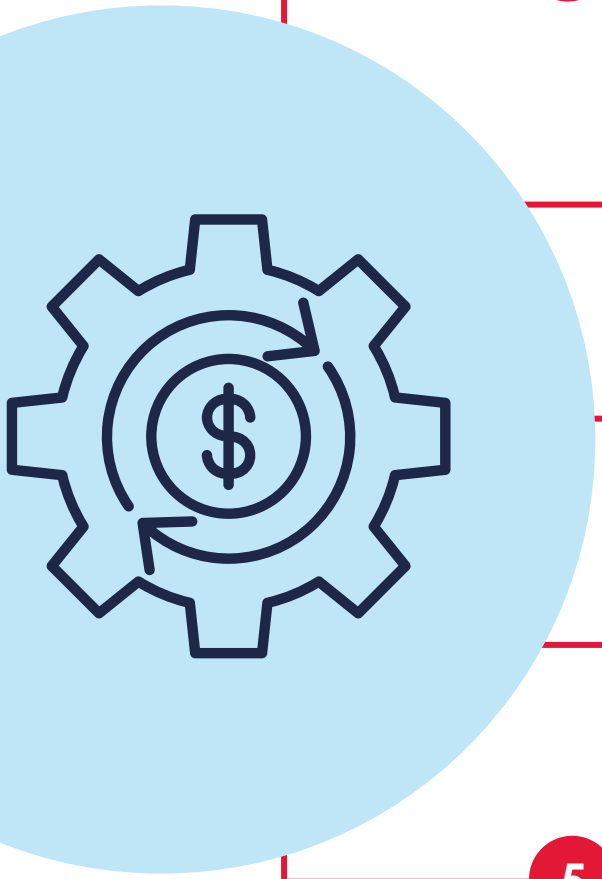
Revisiting Moderna operating principles



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2 Late-stage pipeline investment to drive sales growth

We have generated a diverse portfolio with 10 programs currently in late-stage development addressing large TAMs

		TAM	Product benefit	
Respiratory vaccines	Next-gen COVID mRNA-1283	~$8B	Strong efficacy, improved storage	Broad portfolio of marketed respiratory products strengthens competitive position
	Seasonal Flu mRNA-1010	~$7B	Potential for rapid strain update	
	RSV (18-59 HR) mRNA-1345	~$10B	Label expansion, PFS	
	Flu + COVID (50+) mRNA-1083	Potential to expand respiratory market	Potential to increase vaccination rates	
	Flu + COVID (18-49) mRNA-1083			
Latent + other virus vaccines	CMV mRNA-1647	~$2-5B	Unmet medical need	Limited-to-no competition
	Norovirus mRNA-1403	~$3-5B		
Rare Disease therapeutics/Other	PA mRNA-3927	~$500M	Unmet medical need	Limited-to-no competition
	MMA mRNA-3705			
Oncology therapeutics	INT: Adj. Melanoma mRNA-4157	Multi-$B	Unmet medical need	Strong commercial partner

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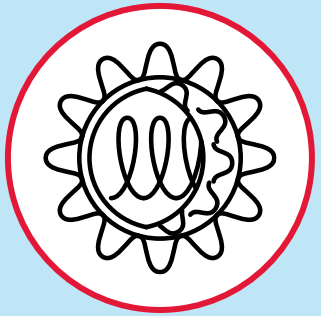
Norovirus meets our current prioritization criteria for our next pivotal investment



Norovirus

- Near-term launch potential
- Diversifies revenue base away from respiratory
- High-value opportunity
- Limited-to-no competition

Norovirus opportunity in the U.S.

Target population
155 million
people

Market segments
Older adults
Occupational risks
Health risks

Channels
Primarily administered through retail pharmacy channel, leveraging existing commercial infrastructure

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2 Late-stage pipeline investment to drive sales growth

Moderna's success developing medicines gives us confidence to invest in our pipeline

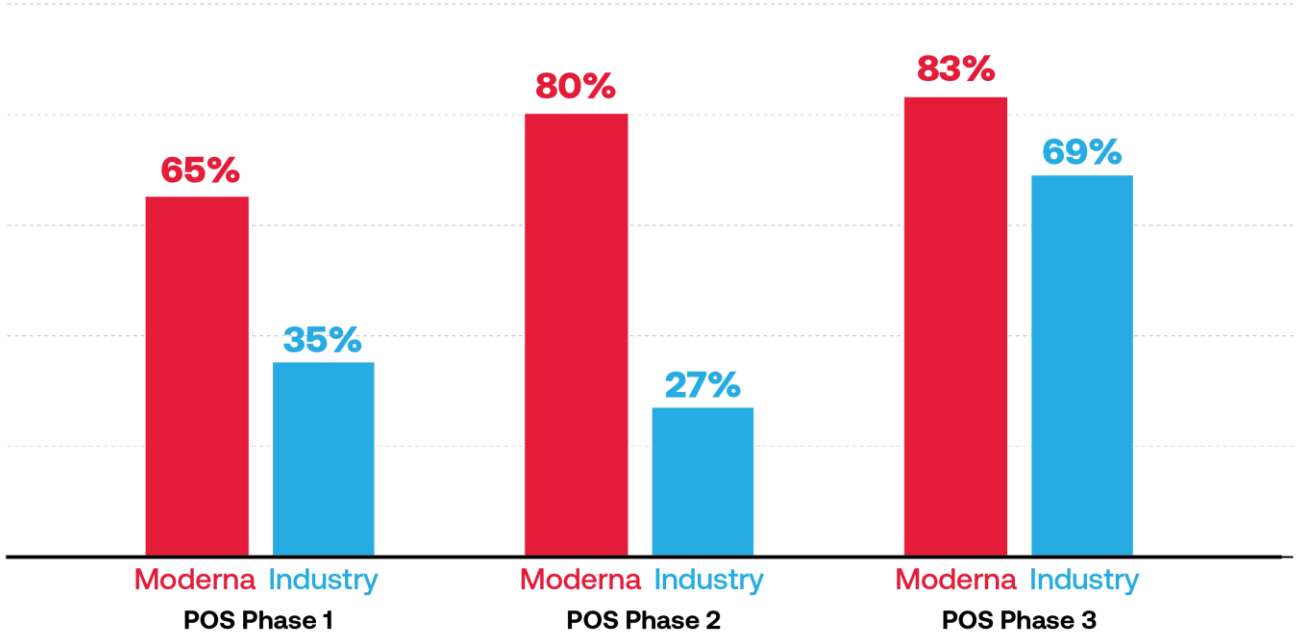
Recent highlights

Respiratory programs
4 positive Phase 3 readouts

Latent + other programs
4 programs with proof of concept

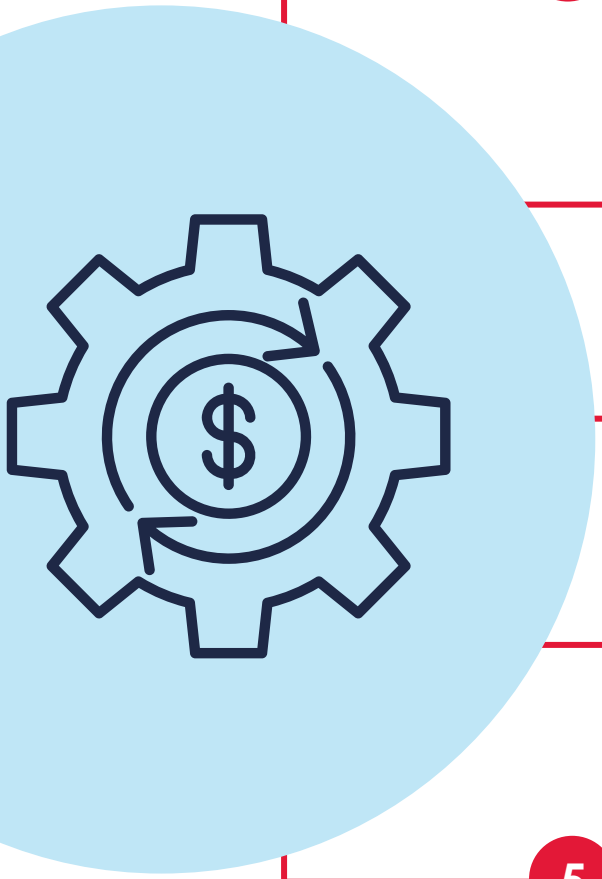
Rare disease and Oncology programs
Proof of concept strengthened by ongoing durability

Moderna's rate of success with our platform technology is higher than industry standard[1]



1. Statistics for Moderna based upon internal data and are based upon: 23 Phase 1 trials, 10 Phase 2 trials, and 6 Phase 3 trials. Only concluded trials for unique molecular entities are included in data; strain updates for a program are not counted separately. Early trials establishing platform technology not intended for commercialization are excluded from Phase 1 trial counts. Data reported as of September 12, 2024. Industry statistics derived from Wong et al., *Biostatistics* (2019) 20, 2 , pp 273-286.

Revisiting Moderna operating principles



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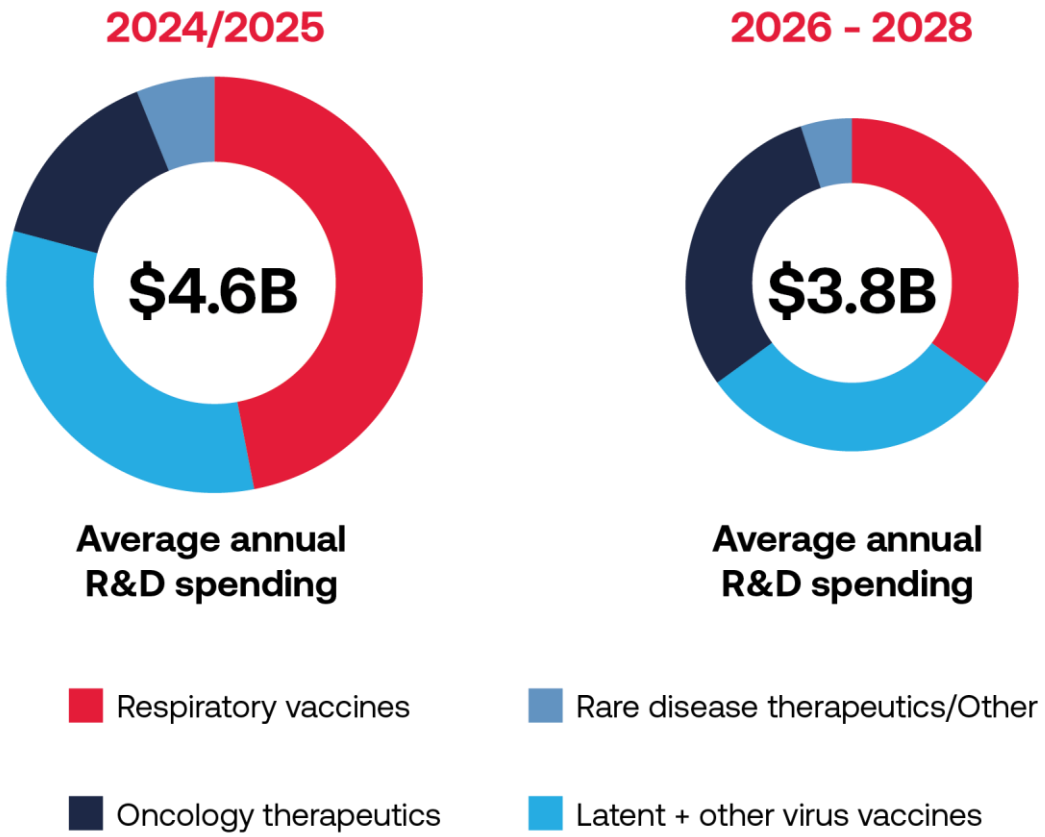
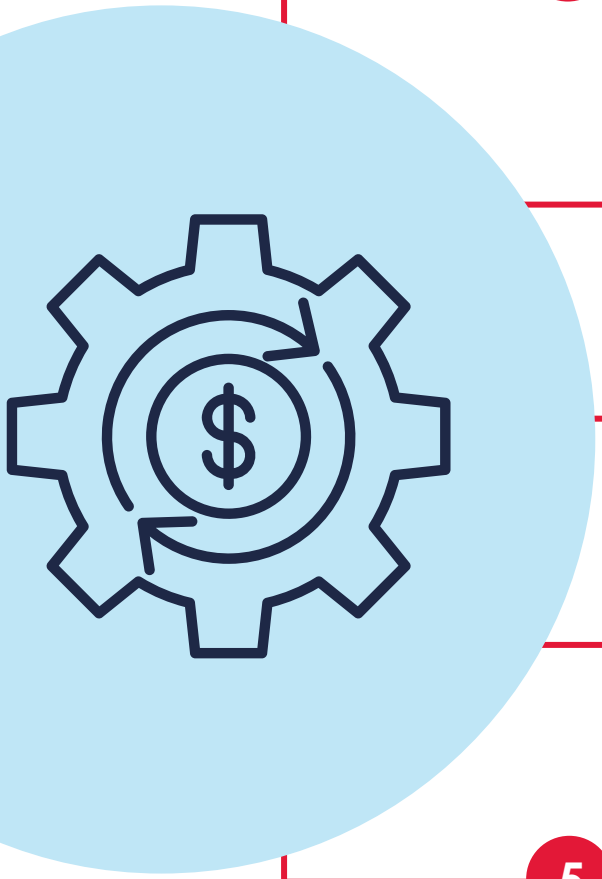
3 Disciplined investment

We are investing in our prioritized programs while lowering overall R&D expense



- Reducing 2025 - 2028 R&D investment from $20B to $16B
- Expect to complete majority of Respiratory investment by 2026
- Increasing R&D investments in Oncology
- Pacing Latent + Other and Rare Disease investments

Revisiting Moderna operating principles



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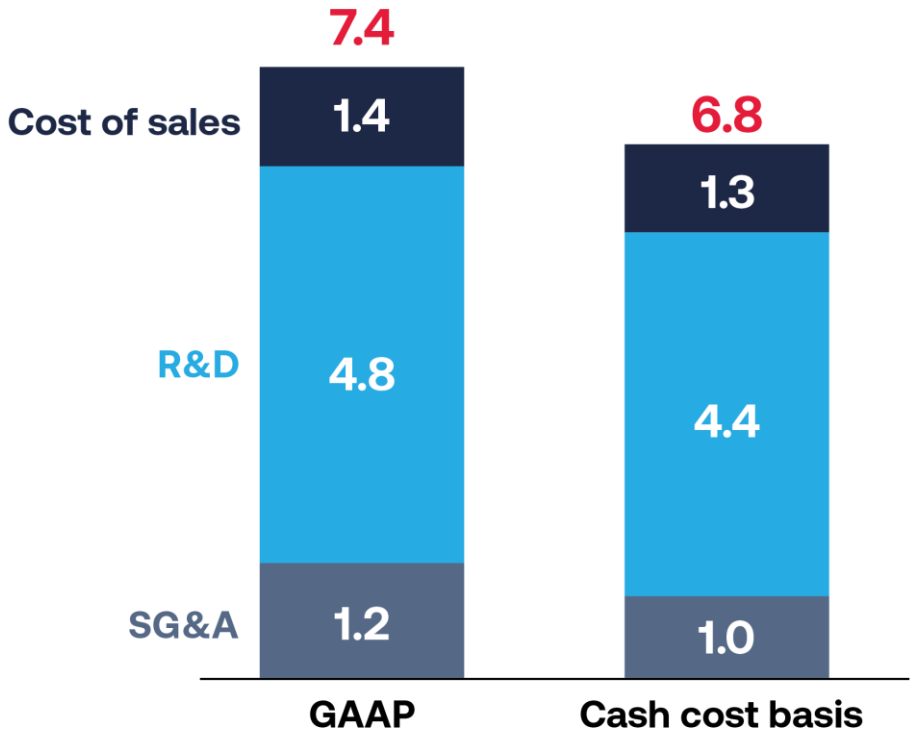
4 Break-even on a cash cost basis

On a cash cost basis, we expect to break even at ~$6B in revenue

Reconciliation of 2024E GAAP operating expenses[1]



Projected 2028 cash operating expenses

Assumes $6B in revenue

Consistent with our projected $3.6B-3.8B GAAP R&D expense from 2027 forward

1. Cash operating expenses excludes stock-based compensation, depreciation and amortization, which for 2024 are estimated to total ~$0.6B
Numbers may not add due to rounding

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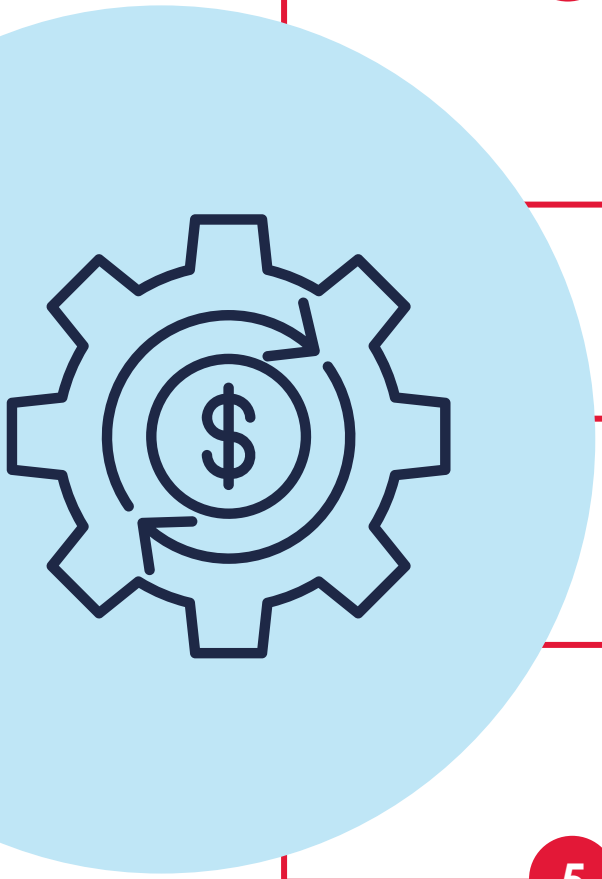
Revisiting Moderna operating principles



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5 Balance sheet sufficient to fund plan

2025 and 2026-2028: revising our financial framework

	Expectations for full year 2025	Expectations for full years 2026-2028
Revenue	$2.5 – 3.5 billion	25%+ CAGR (at mid-point of 2025 expected sales)
New product launch revenues	Meaningful revenue contribution for the next 10 products occurs in the year after approval[1]	
Cost of Sales	35 – 45%	Improving; 30% at $6B revenue
R&D	$4.2 – 4.5 billion	~$11.5 billion cumulatively from 2026 - 2028
SG&A	$1.0 – 1.2 billion	Flat G&A, growth in Selling with product launches
Tax	Negligible	Negligible
Capital expenditures	~$0.3 billion	Flat to down from 2025
Ending cash balance	~$6.0 billion	Sufficient capital to fund this strategy

1. Next-gen COVID, RSV (18-59 yo), Flu + COVID (50+ yo), Flu, CMV, Norovirus, PA, MMA, INT (melanoma), Flu + COVID (18-49 yo)

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Key financial takeaways

Portfolio prioritization and cost efficiency programs reduce annual R&D expense by ~$1.1B from $4.8B in 2024 to $3.6 – 3.8B in 2027

We assume revenue to be $2.5 – 3.5B in 2025 & then grow 25%+ per year[1] as we launch 10 products

Our cost of sales framework remains intact and we will continue to drive productivity

We plan to break even on a cash cost basis with $6B in revenue, which we currently expect to achieve in 2028

Our current balance sheet is sufficient to fund our plans without raising equity

We continue to be guided by our operating principles

1. Growth percentage from mid-point of expected 2025 sales range

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Looking forward

Stéphane Bancel
Chief Executive Officer

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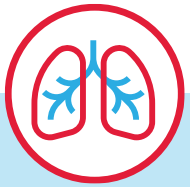
We have an exciting opportunity to deliver on our mission over the next 3 years



With approval of our positive Phase 3 programs, **we expect to have the broadest portfolio of respiratory vaccines**

With CMV and Norovirus, we have the potential to protect millions of people from diseases with no currently available vaccine

With our individualized neoantigen therapy (INT), **we expect to have a profound impact on cancer patients**

With our rare disease programs, MMA and PA, we could help many patient families and pave the way for more rare disease medicines

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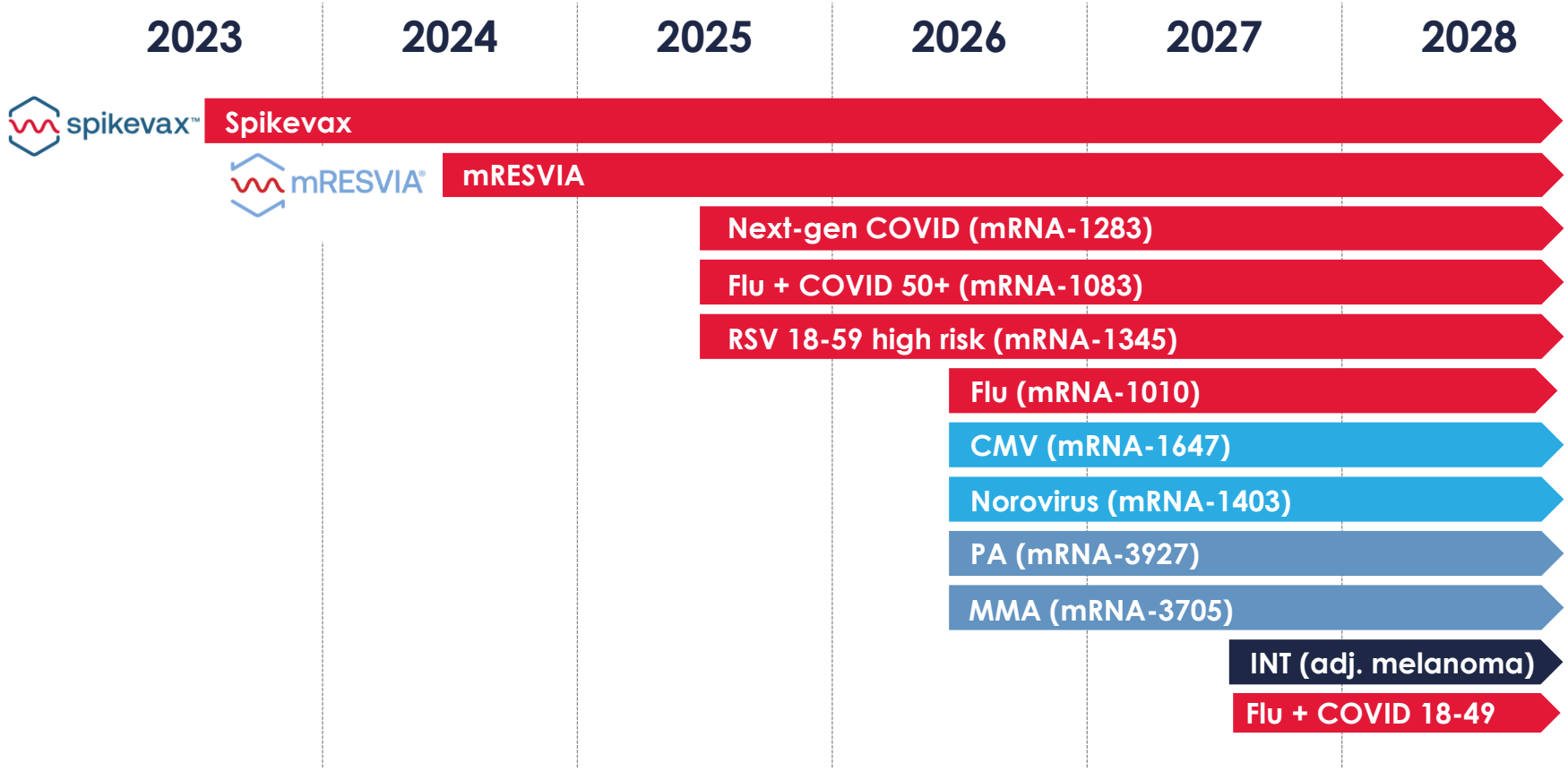
Multiple product approvals drive 25%+ revenue growth in 2026-2028



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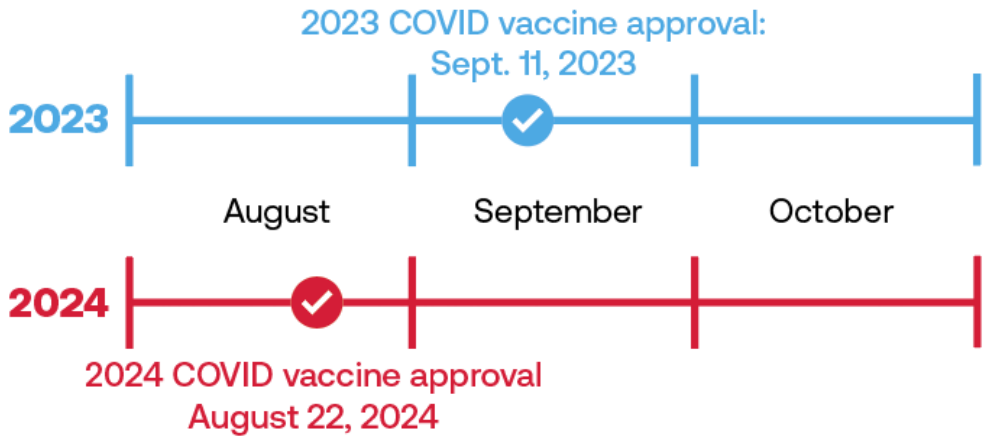
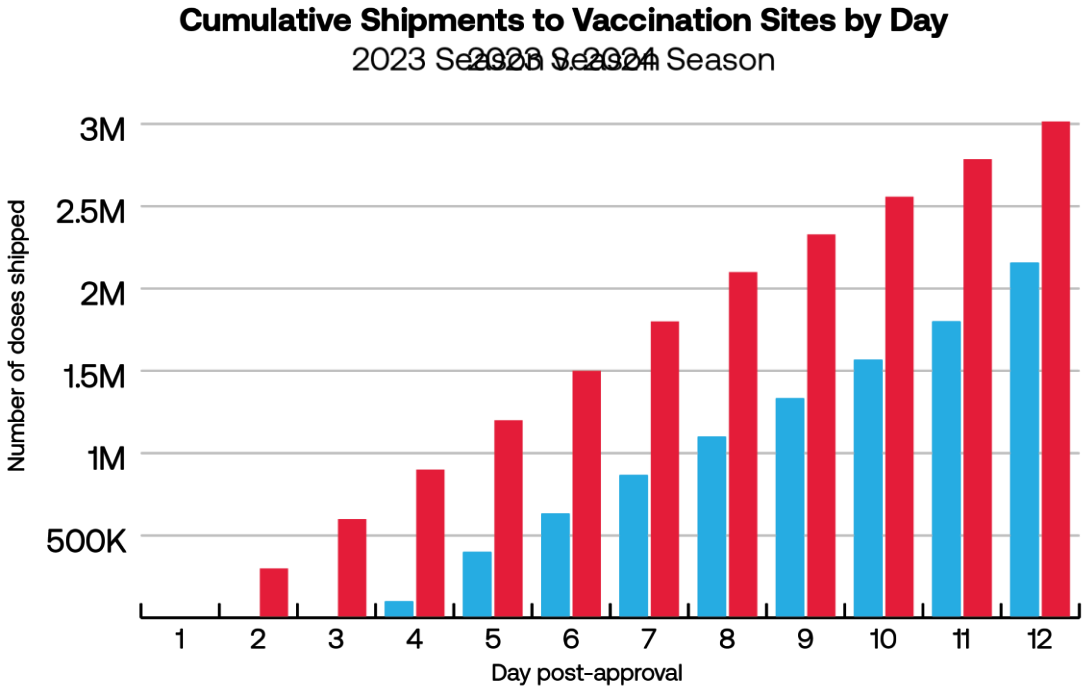
We were ready for an earlier COVID vaccine approval in the 2024/2025 season in the U.S.

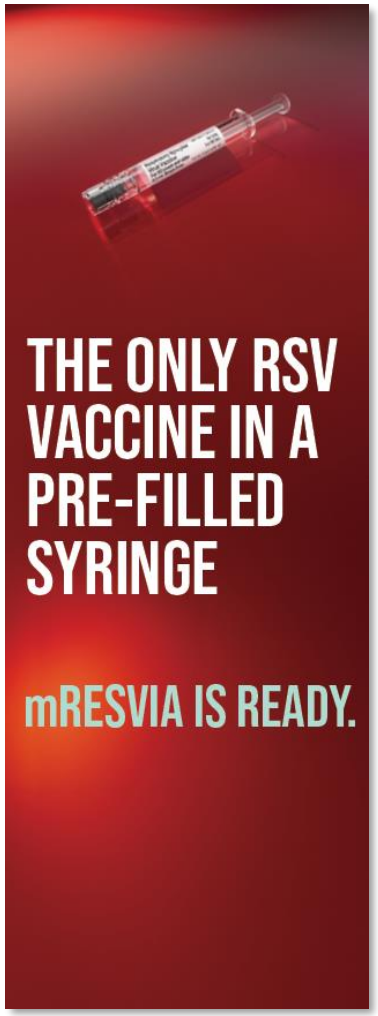
2024 COVID vaccine **approval was 19 days earlier than in 2023**



We have made significant progress in our U.S. commercial operations for the 2024-2025 season



RSV outlook



2024 mRESVIA uptake in the U.S. has been slower than expected

We expect higher market share in 2025 with expanded label (18-59 high-risk), and ability to compete for contracts earlier in the season

Recent European approval enables us to launch across several countries in 2025

Our 3 priorities to deliver on our vision

1. Drive use of Spikevax and mRESVIA vaccines
2. Focus on 10 product approvals over the next 3 years to drive sales growth
3. Deliver cost efficiency across the business and slow the pace of R&D investment, reducing it by $1.1B annually[1]

1. R&D expense of $4.8B in 2024E going to $3.6B-3.8B from 2027 forward

Our mission

Deliver the greatest possible impact to **people** through mRNA **medicines.**

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