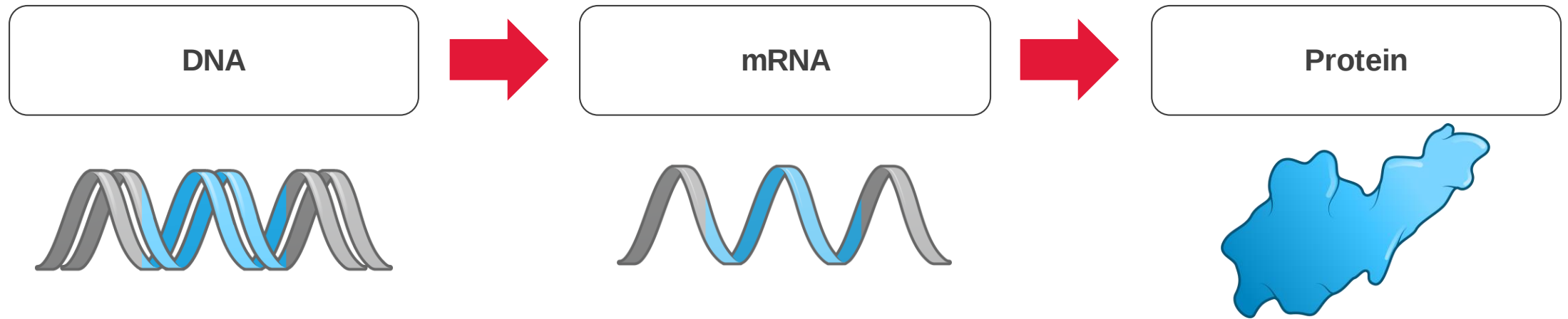




mRNA-1273 Vaccine Against COVID-19

Phase 1 Interim Analysis

July 15, 2020

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 regarding the Company's development of a potential vaccine against the novel coronavirus, the parameters of the Phase 1 and Phase 2 studies of mRNA-1273, the publication of study data for later cohorts in the Phase 1 study of mRNA-1273, the parameters and timing of the Phase 3 study of mRNA-1273, the potential filing of a biologics license application (BLA) for mRNA-1273, the Company's potential manufacturing capabilities and projected vaccine dose production, the publication of non-human primate challenge model data, and the publication of interim data from the Phase 2 study of mRNA-1273. 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: the fact that there has never been a commercial product utilizing mRNA technology approved for use; the fact that the rapid response technology in use by Moderna is still being developed and implemented; the fact that the safety and efficacy of mRNA-1273 has not yet been established; potential adverse impacts due to the global COVID-19 pandemic such as delays in regulatory review, manufacturing and clinical trials, supply chain interruptions, adverse effects on healthcare systems and disruption of the global economy; and those other risks and uncertainties described under the heading "Risk Factors" in Moderna's most recent Quarterly Report on Form 10-Q 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 hereof.

Phase 1 study of mRNA-1273 vaccine against COVID-19

Publication in The New England Journal of Medicine of interim results

- Interim analysis of original cohorts of Phase 1 study evaluated two-dose vaccination schedule of mRNA-1273 across three dose levels (25, 100, 250 µg) in 45 healthy adults ages 18-55 years
 - **Neutralizing antibody titers were observed in 100% of evaluated participants**
 - In the live SARS-CoV-2 (PRNT₈₀) assay, **the Day 43 geometric mean titer levels at the Phase 3 selected dose of 100 µg were 4.1-fold above those seen in reference convalescent sera (n=3)**
 - In the pseudovirus neutralization assay (ID₅₀), **the Day 57 geometric mean titers at the 100 µg dose were 2.1-fold higher than those seen in convalescent sera (n=38)**
 - Vaccination with mRNA-1273 elicited Th1-biased CD4 T cell responses
 - mRNA-1273 was generally safe and well-tolerated
- Results reaffirm and expand upon positive interim data announced on May 18th
 - Data support selection of 100 µg dose level for 30,000 participant Phase 3 study expected to begin on July 27th

Moderna's vaccine franchise

Safety



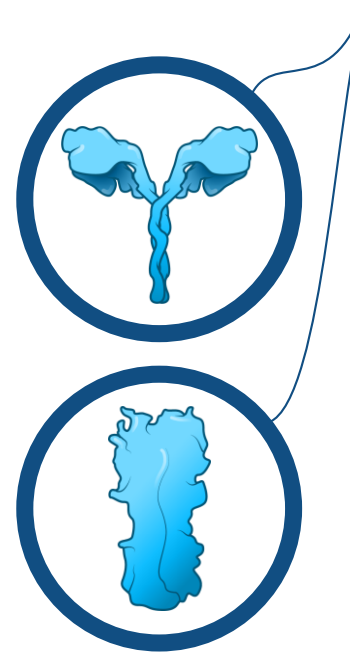
>1,900

Healthy volunteers
enrolled in

12 Phase 1 & Phase 2
vaccine trials

(dose levels up to 400µg);
emerging safety and
tolerability profile consistent
with marketed adjuvanted
vaccines¹

Immunogenicity



In clinical trials, we have observed
an ability to elicit neutralizing
antibodies against all

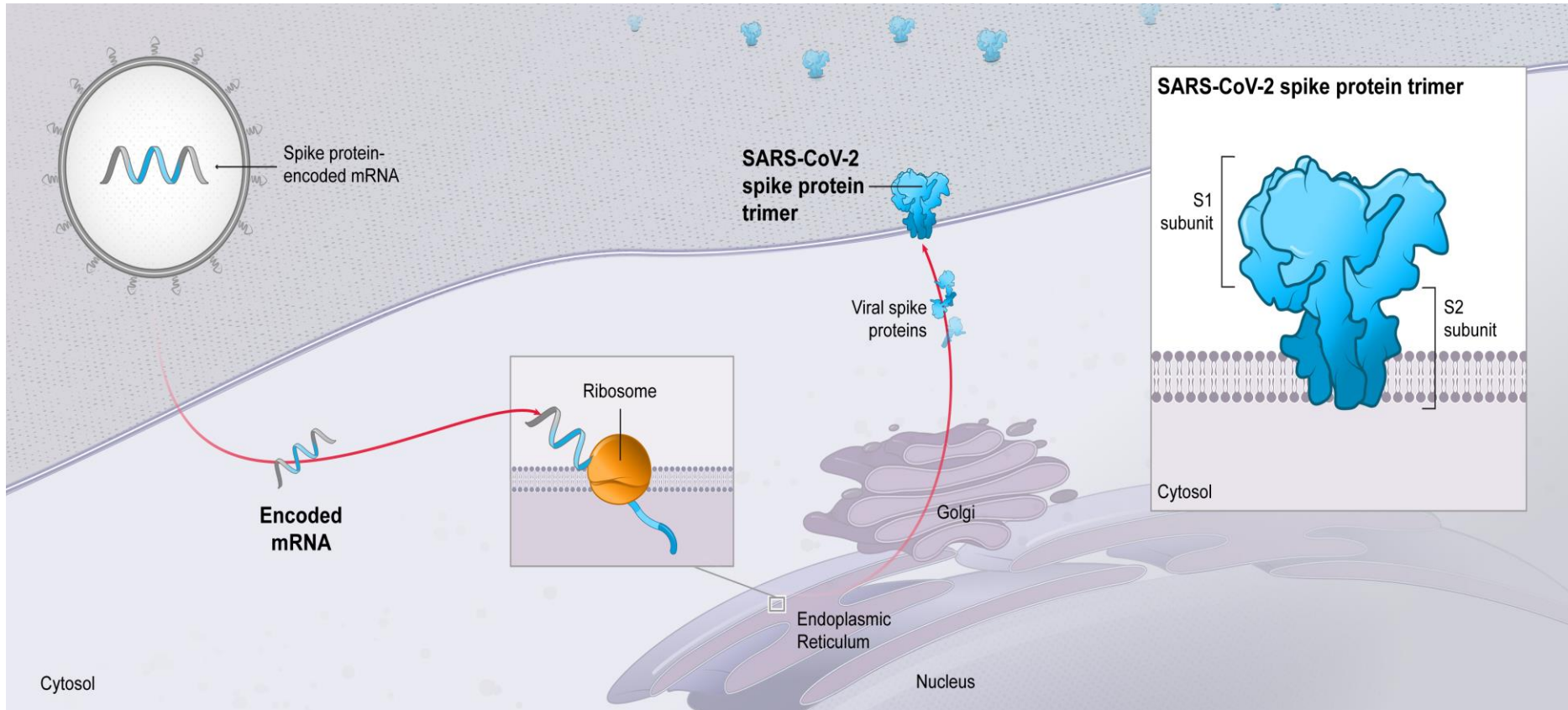
9 viruses for which we have
had clinical trial readouts

Neutralizing antibody responses seen across the platform

Virus mRNA program		Clinical safety & tolerability	Immunogenicity at sufficient levels to warrant further study	Neutralizing antibody/seroconversion achieved
H10N8 mRNA-1440		✓	✓	100% of participants induced HAI titers ≥ 1:40 at the 100 µg dose
H7N9 mRNA-1851		✓	✓	96.3% of participants induced HAI titers ≥ 1:40 at the 25 µg dose
Chikungunya mRNA-1388		✓	✓	100% of participants seroconversion at the 100 µg dose
RSV ¹ mRNA-1777		✓	✓	Observed humoral immune response as measured by neutralizing antibody titers against RSV A
Zika ² mRNA-1893		✓	✓	Seronegative: 100% seroconversion at the 30 µg dose Seropositive: 75% achieve a 4-fold boost at the 30 µg dose level
hMPV/PIV3 mRNA-1653		✓	✓	hMPV/PIV3 (pre-exposed individuals): Neutralization titers achieved ~6x baseline and ~3x baseline at the 25 µg dose, respectively
CMV mRNA-1647		✓	✓	Seronegative: ~10x baseline in epithelial cells, ~1.3x baseline in fibroblast cells at the 90 µg dose Seropositive: ~22x boost in epithelial cell, ~6x boost in fibroblast cells at the 90 µg dose
SARS-CoV-2 mRNA-1273		✓	✓	Neutralizing antibody titers were observed in 100% of evaluated participants

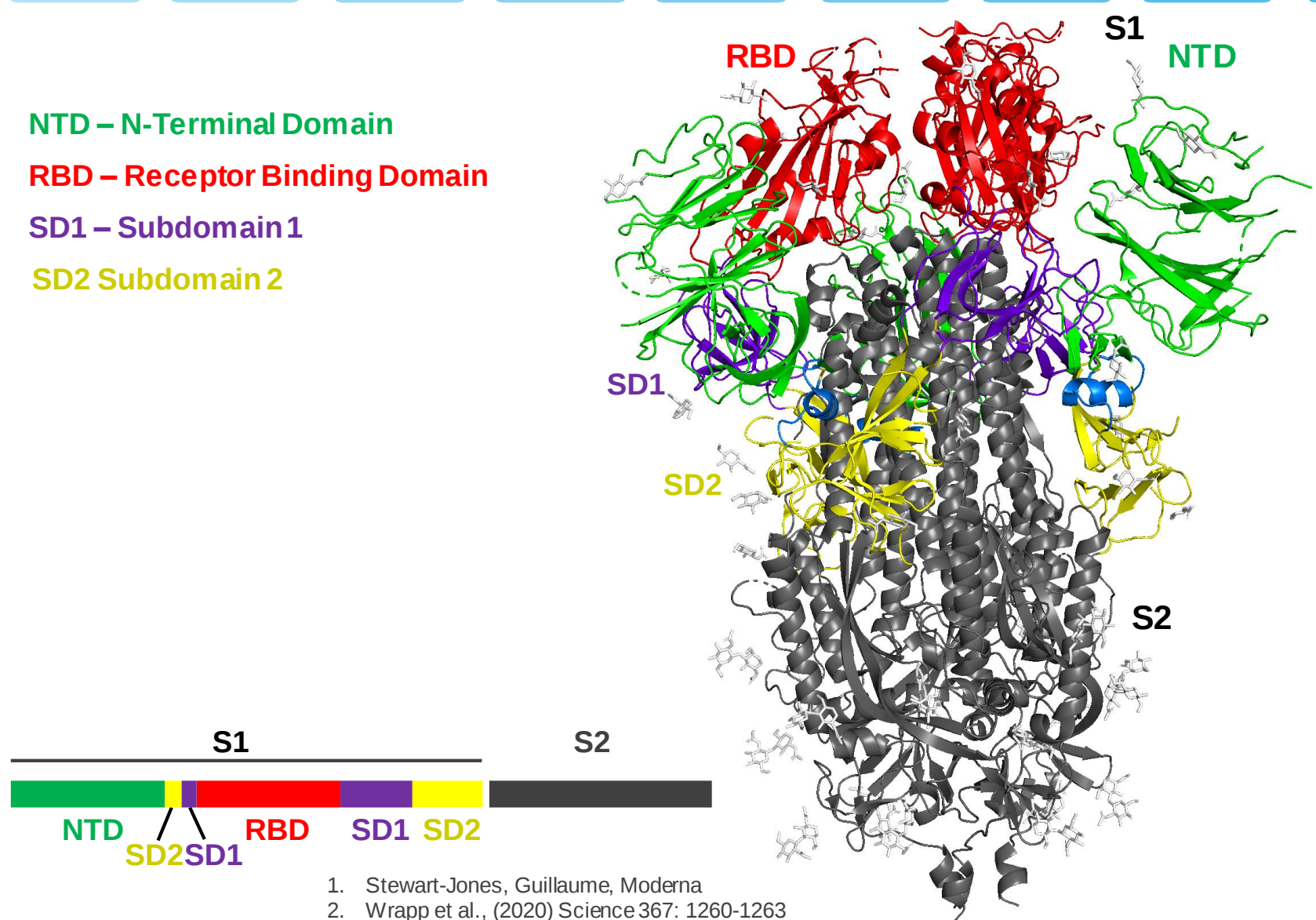
SARS-CoV-2 vaccine (mRNA-1273)

Encodes for the full spike *S* protein



Cryo-EM Structure of SARS-CoV-2 S-2P^{1,2}

- NTD – N-Terminal Domain
- RBD – Receptor Binding Domain
- SD1 – Subdomain 1
- SD2 Subdomain 2



1. Stewart-Jones, Guillaume, Moderna
2. Wrapp et al., (2020) Science 367: 1260-1263

Phase 1 trial design

Led by the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health (NIH)

Key objective:

- To assess the safety, reactogenicity and immunogenicity of mRNA-1273

Study design: Phase 1, open-label dose ranging clinical trial in males and non-pregnant females, 18 to 55 years of age

- Forty-five subjects were enrolled into one of three cohorts (25, 100 and 250 µg)
- Subjects received an intramuscular (IM) injection (0.5 milliliter [mL]) of mRNA-1273 on Days 1 and 29 in the deltoid muscle and will be followed through 12 months post second vaccination (Day 394)

Primary endpoint:

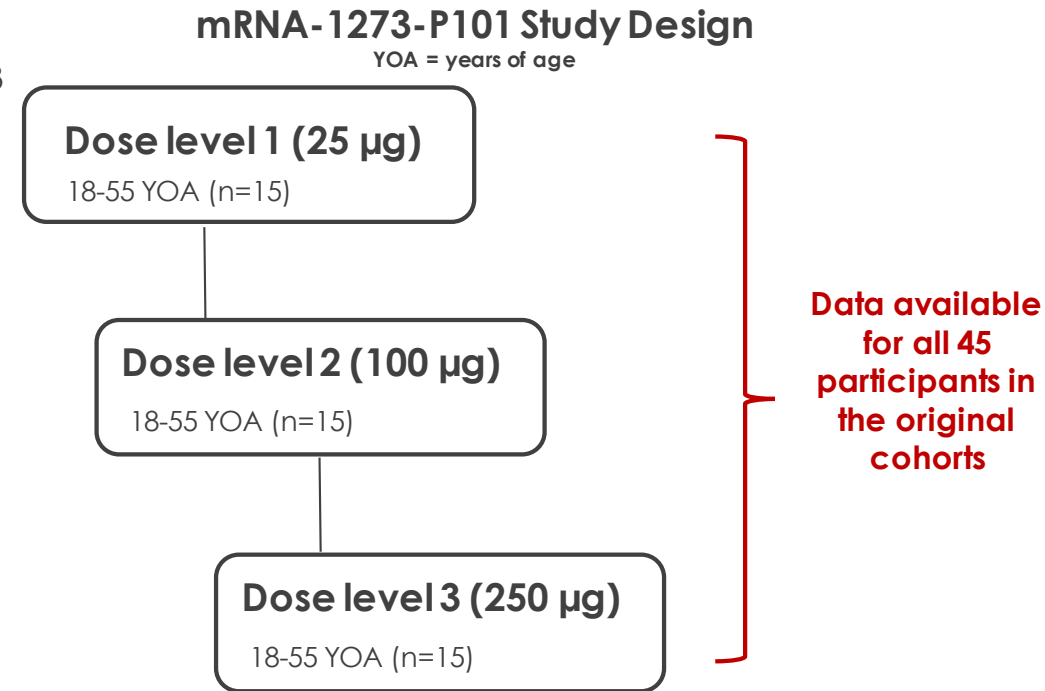
- Safety and reactogenicity of a 2-dose vaccination schedule of mRNA-1273, given 28 days apart, across 3 dosages in healthy adults

Secondary endpoint:

- Evaluate the immunogenicity as measured by IgG ELISA to the SARS-CoV-2 S protein following a 2-dose vaccination schedule of mRNA-1273 at Day 57

Trial progress/details:

- NIAID-led Phase 1 study of mRNA-1273 of original 3 dose cohorts (25 µg, 100 µg and 250 µg) Day 57 data available
- The additional seven cohorts: a 50 µg cohort in adults 18-55 (n=15), three cohorts of older adults (n=30, ages 56-70, 25 µg, 50 µg, and 100 µg) and three cohorts of elderly adults (n=30, ages 71 and above, 25 µg, 50 µg, and 100 µg) have completed enrollment and these data are expected to be published separately



Solicited local adverse events were nearly all mild or moderate

Symptom	Vaccination	Dose group	N	Maximum Severity		
				% Mild	% Moderate	% Severe
Any Local Symptom	1	25 µg	15	66.7	-	-
		100 µg	15	73.3	13.3	6.7
		250 µg	15	60.0	33.3	6.7
	2	25 µg	13	69.2	7.7	-
		100 µg	15	66.7	26.7	6.7
		250 µg	14	50.0	42.9	7.1
Size of Erythema/Redness	1	25 µg	15	-	-	-
		100 µg	15	-	6.7	6.7
		250 µg	15	-	-	6.7
	2	25 µg	13	-	-	-
		100 µg	15	6.7	-	6.7
		250 µg	14	-	14.3	7.1
Size of Induration/Swelling	1	25 µg	15	-	-	-
		100 µg	15	13.3	-	-
		250 µg	15	6.7	6.7	6.7
	2	25 µg	13	-	-	-
		100 µg	15	-	6.7	-
		250 µg	14	7.1	14.3	-
Pain	1	25 µg	15	66.7	-	-
		100 µg	15	80.0	13.3	-
		250 µg	15	60.0	40.0	-
	2	25 µg	13	69.2	7.7	-
		100 µg	15	73.3	26.7	-
		250 µg	14	71.4	28.6	-

- There were no serious adverse events and no pre-specified study halting rules were met
- All participants reported mild to moderate injection site pain

1. One participant in the 25 µg dose group was withdrawn due to an unsolicited adverse event of transient urticaria judged to be related to the first vaccination

Systemic adverse events were generally transient and mild to moderate in severity

Symptom	Vaccination	Dose group	N	Maximum Severity		
				% Mild	% Moderate	% Severe
Any Systemic Symptom	1	25 µg	15	20.0	13.3	-
		100 µg	15	53.3	13.3	-
		250 µg	15	26.7	26.7	-
	2	25 µg	13	30.8	23.1	-
		100 µg	15	20.0	80.0	-
		250 µg	14	14.3	64.3	21.4
Arthralgia	1	25 µg	15	-	-	-
		100 µg	15	6.7	6.7	-
		250 µg	15	6.7	-	-
	2	25 µg	13	-	15.4	-
		100 µg	15	6.7	6.7	-
		250 µg	14	35.7	21.4	-
Fatigue	1	25 µg	15	13.3	13.3	-
		100 µg	15	20.0	6.7	-
		250 µg	15	20.0	13.3	-
	2	25 µg	13	30.8	7.7	-
		100 µg	15	40.0	40.0	-
		250 µg	14	14.3	42.9	14.3
Fever	1	25 µg	15	-	-	-
		100 µg	15	-	-	-
		250 µg	15	-	-	-
	2	25 µg	13	-	-	-
		100 µg	15	33.3	6.7	-
		250 µg	14	35.7	14.3	7.1

Symptom	Vaccination	Dose group	N	Maximum Severity		
				% Mild	% Moderate	% Severe
Chills	1	25 µg	15	-	-	-
		100 µg	15	6.7	-	-
		250 µg	15	13.3	-	-
	2	25 µg	13	7.7	-	-
		100 µg	15	53.3	26.7	-
		250 µg	14	28.6	35.7	21.4
Headache	1	25 µg	15	20.0	-	-
		100 µg	15	26.7	-	-
		250 µg	15	26.7	20.0	-
	2	25 µg	13	15.4	7.7	-
		100 µg	15	33.3	26.7	-
		250 µg	14	64.3	28.6	7.1
Myalgia	1	25 µg	15	6.7	-	-
		100 µg	15	6.7	-	-
		250 µg	15	26.7	-	-
	2	25 µg	13	15.4	7.7	-
		100 µg	15	13.3	40.0	-
		250 µg	14	35.7	50.0	7.1
Nausea	1	25 µg	15	-	6.7	-
		100 µg	15	-	-	-
		250 µg	15	6.7	-	-
	2	25 µg	13	-	-	-
		100 µg	15	40.0	6.7	-
		250 µg	14	7.1	14.3	7.1

- The most notable adverse events (AEs) were seen at the 250 µg dose level, with three of those 14 participants (21%) reporting one or more severe events
- Solicited systemic adverse events were more common after the second vaccination
- Evaluation of safety clinical laboratory values grade 2 or higher and unsolicited adverse events revealed no patterns of concern

Geometric mean titers of binding antibodies exceeded convalescent sera

Binding Antibodies Geometric Mean Titers (GMTs) to S-2P

geometric mean response (95% CI)

Convalescent Sera (N=38) = 142,140 (81,543 – 247,768)

	25 µg	100 µg	250 µg
Day 1	116 (72 – 187)	131 (65 – 266)	178 (81 – 392)
Day 15*	32,261 (18,723 – 55,587)	86,291 (56,403 – 132,016)	163,449 (102,155 – 261,520)
Day 29	40,227 (29,094 – 55,621)	109,209 (79,050 – 150,874)	213,526 (128,832 – 353,896)
Day 36	391,018 (267,402 – 571,780)	781,399 (606,247 – 1,007,156)	1,261,975 (973,972 – 1,635,140)
Day 43	379,764 (281,597 – 512,152)	811,119 (656,336 – 1,002,404)	994,629 (806,189 – 1,227,115)
Day 57	299,751 (206,071 – 436,020)	782,719 (619,310 – 989,244)	1,192,154 (924,878 – 1,536,669)

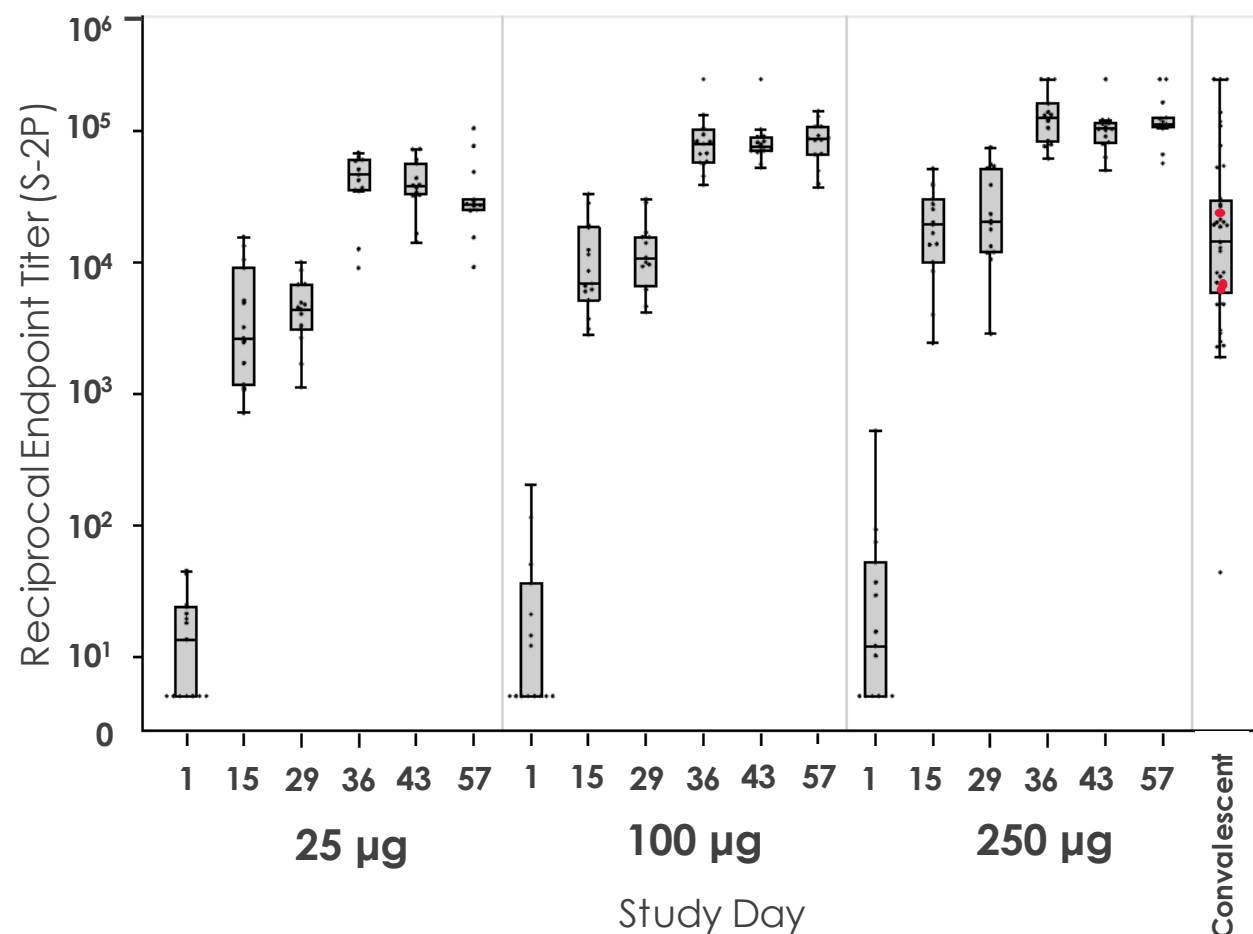
* All participants seroconverted at Day 15

Seroconversion by ELISA was defined as a 4-fold or greater rise in endpoint dilution titer compared to pre-dose 1

- mRNA-1273 induced binding antibodies to the full length SARS-CoV-2 spike protein in a time and dose dependent fashion
- All participants seroconverted by Day 15
- After two vaccinations, at Day 57, geometric mean titers exceeded those seen in convalescent sera obtained from 38 individuals with confirmed COVID-19 diagnosis

Subject n at each timepoint			
	25 µg	100 µg	250 µg
Day 1	15	15	15
Day 15	15	15	15
Day 29	15	15	14
Day 36	13	15	14
Day 43	13	14	14
Day 57	13	14	13

Binding antibody titers exceeded convalescent sera



Red data points in convalescent group indicate specimens that were also tested in PsVNA and PRNT assays

- After the first vaccination, binding antibody levels in the 100 and 250 µg dose cohorts were comparable to the median convalescent sera
- After two vaccinations, the median antibody titers for all doses were above the median convalescent sera

Boxes and horizontal bars denote interquartile range (IQR) and median reciprocal endpoint titer (S-2P), respectively. Whisker endpoints are equal to the maximum and minimum values below or above the median $\pm 1.5 \times$ IQR. The convalescent sera panel includes specimens from 41 individuals; red dots indicate the 3 specimens that were cross-tested in PRNT assay. The other 38 specimens were used to calculate summary statistics for the box plot in the convalescent panel.

Geometric mean titers of neutralizing antibodies measured by the Plaque Reduction Neutralization Test were above those seen in convalescent sera

Live virus neutralization assay PRNT ₈₀ geometric mean results <i>geometric mean response (95% CI)</i> Convalescent Sera (N=3) = 158.3		
	25 µg	100 µg
Day 1*	4	4
Day 43	339.7 (184.0 – 627.1)	654.3 (460.1 – 930.5)
GMT/convalescent sera (Day 43)	2.1	4.1

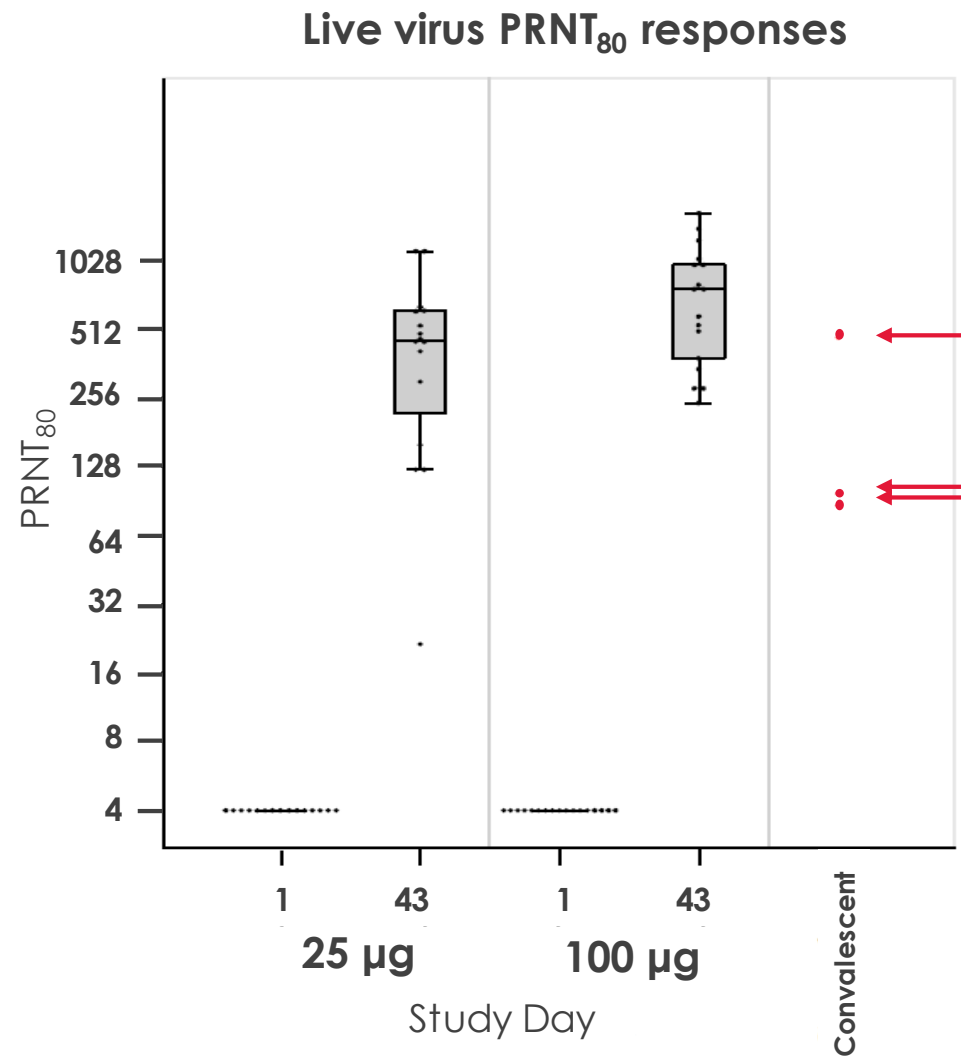
- Geometric mean neutralizing antibody titers in both dose cohorts were above those seen in convalescent sera (N=3)
- At the Phase 3 selected dose of 100 µg, the geometric mean titer levels were 4.1-fold above those seen in reference convalescent sera from three individuals

Subject n at each timepoint		
	25 µg	100 µg
Day 1	15	15
Day 43	13	14

* All Day 1 specimens exhibited less than 80% inhibitory activity at the lowest dilution tested, 1:8, and so were assigned a titer of 4

Due to the time-intensive nature of PRNT, results for the Day 1 and Day 43 timepoints were available only for the 25 µg and 100 µg dose groups.

Neutralizing antibody levels in Plaque Reduction Neutralization Test against live SARS-CoV-2 virus were at or above convalescent sera values



- Convalescent sera group N=3
- At the 25 and 100 µg dose, neutralizing antibody titers were at or above convalescent sera values

Boxes and horizontal bars denote interquartile range (IQR) and median PRNT₈₀, respectively. Whisker endpoints are equal to the maximum and minimum values below or above the median +/- 1.5 x IQR. The three convalescent sera specimens were also cross-tested in ELISA and PsVNA assays.
Note: due to the time-intensive nature of the PRNT assay, for this publication, PRNT results were available only for the 25 µg and 100 µg dose groups.

Geometric mean titers of pseudovirus neutralization for 100 µg dose were above those of convalescent sera

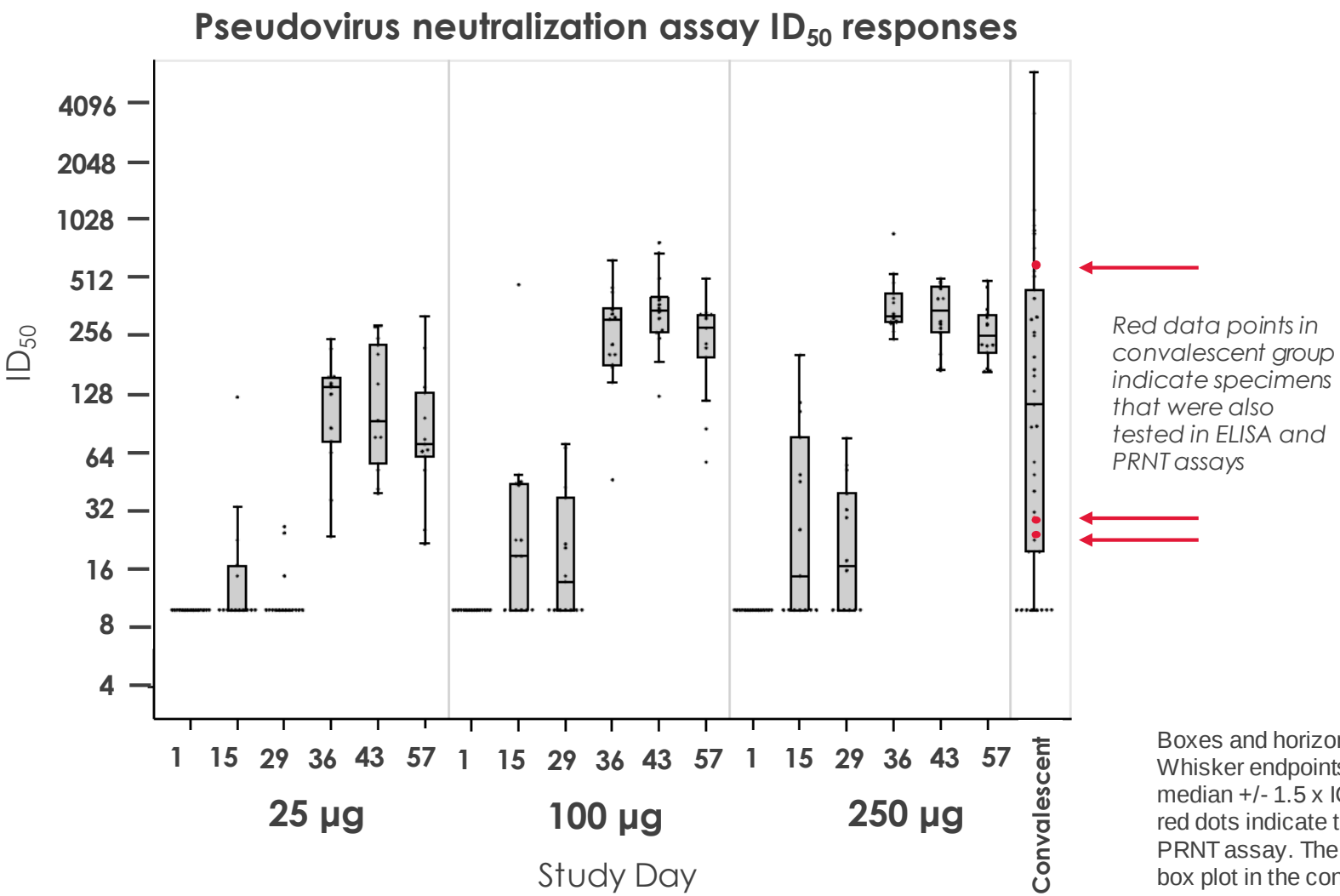
Pseudovirus neutralization assay ID ₅₀ geometric mean results			
<i>geometric mean response (95% CI)</i>			
Convalescent Sera (N=38) = 109.2 (59.6 – 199.9)			
	25 µg	100 µg	250 µg
Day 1	10	10	10
Day 15*	14.5 (9.8 – 21.4)	23.7 (13.3 – 42.3)	26.1 (14.1 – 48.3)
Day 29	11.7 (9.7 – 14.1)	18.2 (12.1 – 27.4)	20.7 (13.3 – 32.3)
Day 36	105.8 (69.8 – 160.4)	256.3 (182.0 – 361.1)	373.5 (308.6 – 452.2)
Day 43	112.3 (71.2 – 177.1)	343.8 (261.2 – 452.7)	332.2 (266.3 – 414.5)
Day 57	80.7 (51.0 – 127.6)	231.8 (163.2 – 329.3)	270.2 (221.0 – 330.3)
GMT/convalescent sera (Day 57)	0.7	2.1	2.5

- After the second vaccination, PsVNA neutralizing antibody titers were detected in all participants in all dose cohorts.
- **The Day 57 geometric mean titers at the 100 µg dose were 2.1-fold higher than those seen in convalescent sera (n=38)**

	Subject n at each timepoint		
	25 µg	100 µg	250 µg
Day 1	15	15	15
Day 15	15	15	15
Day 29	15	15	14
Day 36	13	15	14
Day 43	13	14	14
Day 57	13	14	14

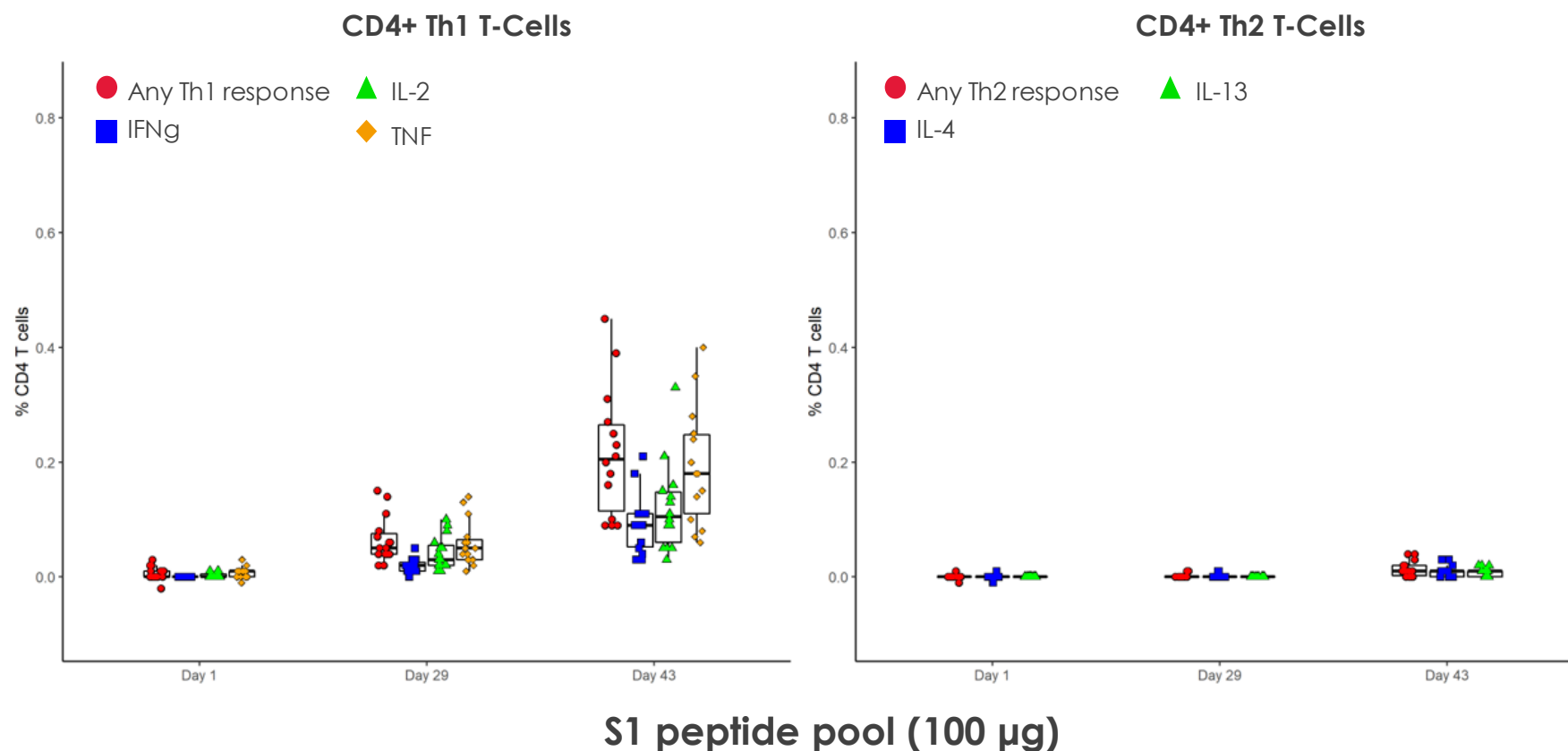
* All participants seroconverted at Day 15
 Samples that do not neutralize at the 50% level are expressed as <20 and plotted at half that dilution, i.e., 10

Distribution of antibody titers in pseudovirus neutralization assay shows titers elicited by 100 µg and 250 µg comparable to top half of convalescent sera



Boxes and horizontal bars denote interquartile range (IQR) and median ID₅₀, respectively. Whisker endpoints are equal to the maximum and minimum values below or above the median +/- 1.5 x IQR. The convalescent sera panel included specimens from 41 people; red dots indicate the three convalescent sera specimens that were also cross-tested in the PRNT assay. The other 38 specimens were used to calculate summary statistics for the box plot in the convalescent panel.

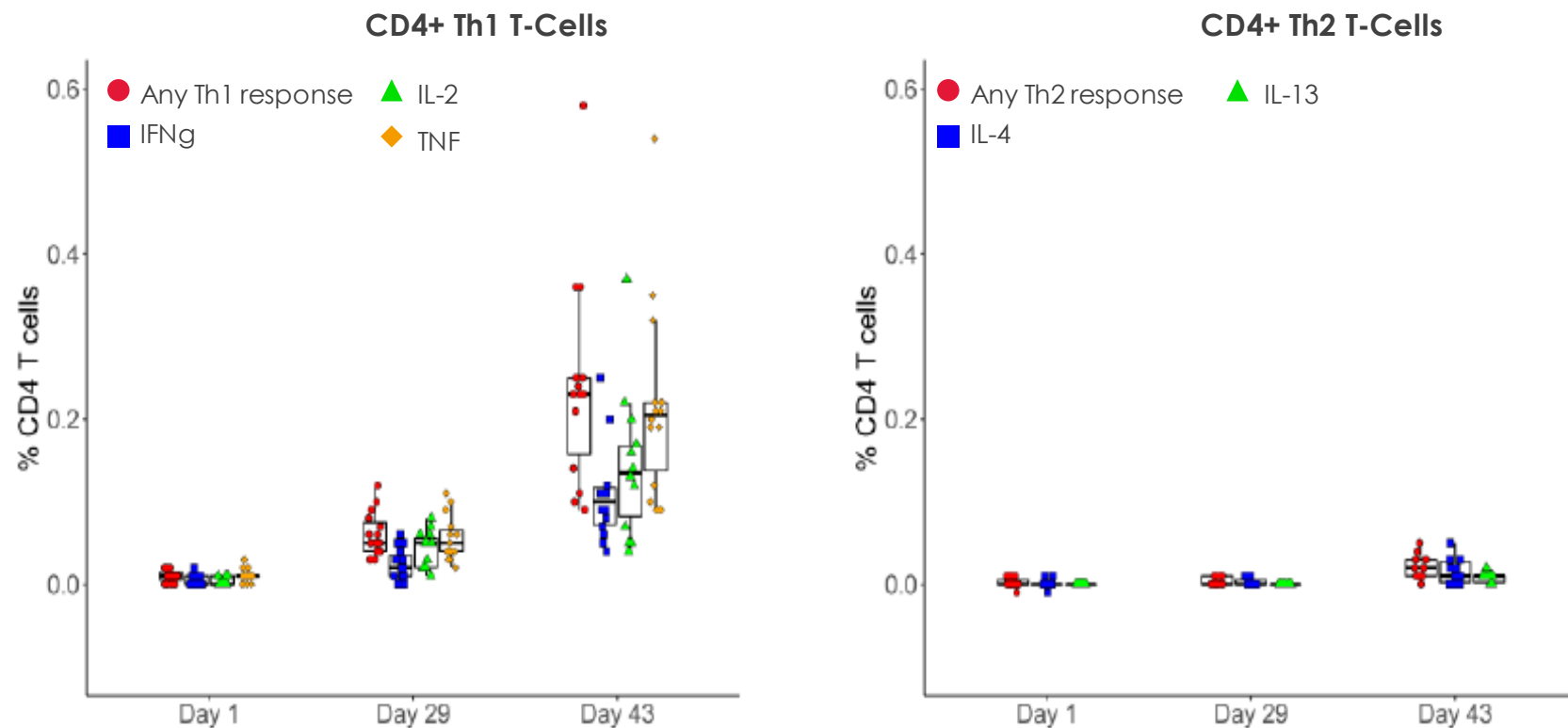
Th-1 CD4+ T-cell responses are observed in trial participants: S1 peptide pool



- **Vaccination with 100 μ g mRNA-1273 led a Th1-biased CD4+ T-cell response**
- Increase in the percentage of CD4+ T-cell expressing IFN γ , IL-2 and TNF-a particularly evident after second dose
- CD4+ T cells did not express Th2 cytokines
- S1 and S2 peptide pools produced similar results

Frequencies of CD4 T cells producing the indicated cytokines from 100 μ g dose following stimulation with SARS-CoV-2 S1 peptide pool. For Th1 responses (left) red circles indicate any combination of IFN- γ , IL-2 and TNF, blue squares indicate IFN- γ , green triangles indicate IL-2, and orange diamonds indicate TNF. For Th2 cytokine responses (right), red circles indicate any combination of IL-4 and IL-13, blue squares indicate IL-4, and green triangles indicate IL-13.

Th-1 CD4+ T-cell responses are observed in trial participants: S2 peptide pool



S2 peptide pool (100 µg)

- **Vaccination with 100 µg mRNA-1273 led a Th1-biased CD4+ T-cell response**
- Increase in the percentage of CD4+ T-cell expressing IFN γ , IL-2 and TNF- α particularly evident after second dose
- CD4+ T cells did not express Th2 cytokines
- S1 and S2 peptide pools produced similar results

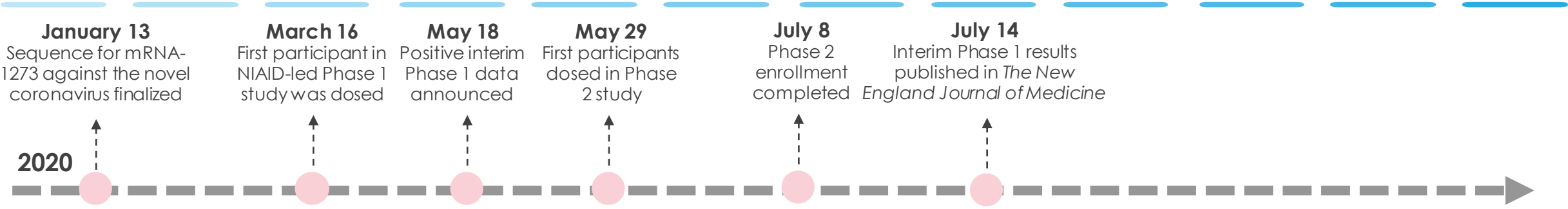
Frequencies of CD4 T cells producing the indicated cytokines from 100 µg dose following stimulation with SARS-CoV-2 S1 peptide pool. For Th1 responses (left) red circles indicate any combination of IFN- γ , IL-2 and TNF, blue squares indicate IFN- γ , green triangles indicate IL-2, and orange diamonds indicate TNF. For Th2 cytokine responses (right), red circles indicate any combination of IL-4 and IL-13, blue squares indicate IL-4, and green triangles indicate IL-13.

SARS-CoV-2 vaccine (mRNA-1273)

Conclusions

- mRNA-1273 was generally well tolerated with no serious adverse events reported through Day 57
- mRNA-1273 induced robust binding antibody titers in a time and dose dependent fashion and with a geometric mean titer above those seen in convalescent sera
- Neutralizing antibody titers were observed in 100% of evaluated participants
- After two doses at the 100 µg dose cohort, mRNA-1273 elicited robust neutralizing titers with a geometric mean above those seen in convalescent sera, as measured by two assays
- Vaccination with mRNA-1273 elicited Th1 biased T cell responses
- Data from the Phase 1 interim analysis supports selection of 100 µg as the optimal dose level for Phase 3

mRNA-1273 vaccine against COVID-19 clinical development plan



Phase 1 (March)



Phase 2 (May)



Phase 3 (expected to begin July 27th)

Accelerated strategy

- Phase 2 study planning started after **early Phase 1 safety data** became available
- Phase 3 **expected to begin July 27th**; Phase 3 protocol has been reviewed by the FDA and is aligned to recent FDA guidance on clinical trial design for COVID-19 vaccine studies

Late stage development for mRNA-1273 vaccine against COVID-19

Ongoing Phase 2 Study

- Placebo-controlled, dose-confirmation study evaluating the safety, reactogenicity and immunogenicity of two vaccinations of mRNA-1273 given 28 days apart
- Each participant is receiving placebo, a 50 µg or a 100 µg dose at both vaccinations
- 600 healthy participants; two cohorts of adults ages 18-55 years (n=300) and older adults ages 55 years and above (n=300)
- Enrollment is complete

Late stage development for mRNA-1273 vaccine against COVID-19

Planned Phase 3 Study

- Randomized, 1:1 placebo-controlled trial is expected to include ~30,000 participants enrolled in the U.S. Based on the results of the Phase 1 study, **the 100 µg dose level was chosen as the optimal dose level** to maximize the immune response while minimizing adverse reactions
- **The primary efficacy analysis will be an event-driven analysis based on the number of participants with symptomatic COVID-19 disease**
 - The target vaccine efficacy against COVID-19 for powering assumptions is 60% (95% confidence interval to exclude a lower bound >30%)
 - Data will be reviewed on an ongoing basis by an independent safety monitoring committee led by NIH
 - The trial is expected to have two interim analyses (approximately 53 and 106 events), prior to a final event-driven analysis at approximately 151 events
- **Primary endpoint of prevention of symptomatic COVID-19 disease defined as:**
 - The participant must have experienced at least TWO of the following systemic symptoms: Fever ($\geq 38^{\circ}\text{C}$), chills, myalgia, headache, sore throat, new olfactory and taste disorder(s), OR
 - The participant must have experienced at least ONE of the following respiratory signs/symptoms: cough, shortness of breath or difficulty breathing, OR clinical or radiographical evidence of pneumonia; AND
 - The participant must have at least one NP swab, nasal swab, or saliva sample (or respiratory sample, if hospitalized) positive for SARS-CoV-2 by RT-PCR
- **Key secondary endpoints include prevention of severe COVID-19 disease (as defined by the need for hospitalization) and prevention of infection by SARS-CoV-2**
- mRNA-1273 received FDA Fast Track Designation and the team is preparing for a rolling submission for the BLA

Phase 3 trial recruitment strategy

The Phase 3 study has been named the COVE study; the ClinicalTrials.gov identifier is NCT04470427

NIAID and Moderna efforts to enable diversity of enrollment in the Phase 3 trial

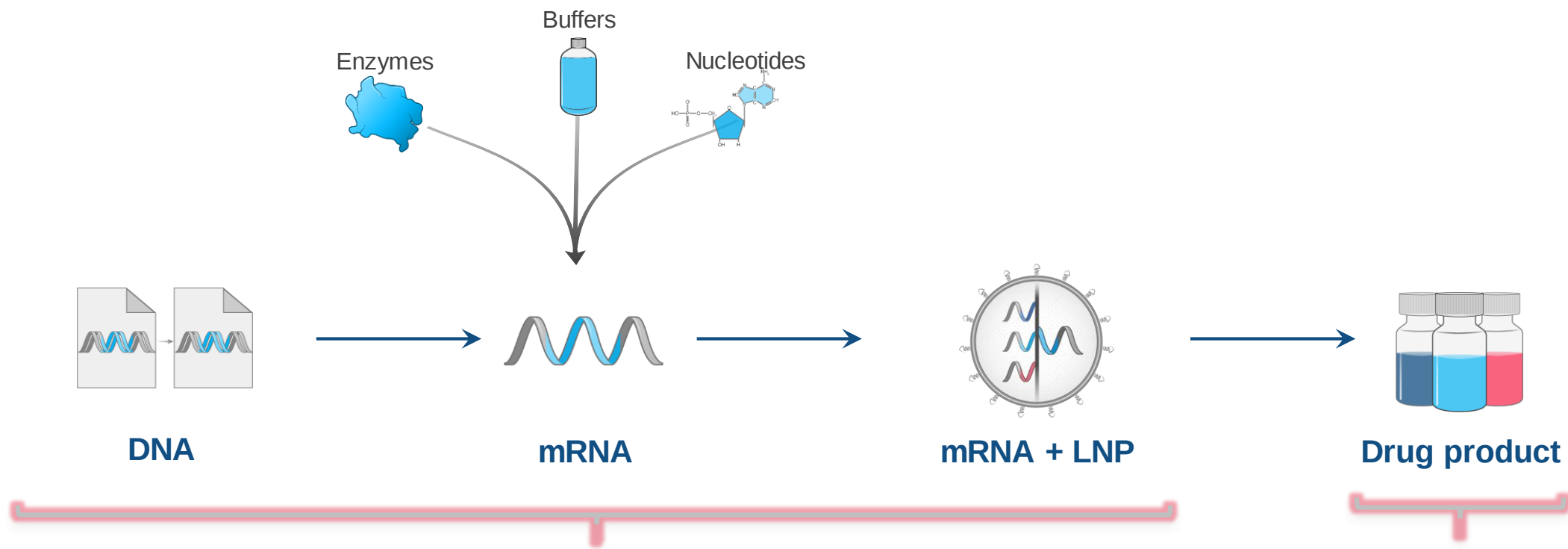
- Working closely with Operation Warp Speed (OWS) and the NIH, including NIAID's COVID-19 Prevention Trials Network (COVPN), to conduct the Phase 3 COVE study
- With the hope to achieve a shared goal that the participants in the COVE study are representative of the communities at highest risk for COVID-19 and of our diverse society
- Registration for the COVE study is expected to be available at study centers across the country beginning on July 21st with study initiation on July 27th



- Epidemiology informed site selection to inform recruitment of diversified sub-populations
- Diversification of enrollment with emphasis on at-risk populations (e.g., demographics, occupation)
- Specific recruitment plans developed by each site, tailored for the site's specific populations

Moderna manufacturing collaborations

Manufacturing scale up to supply 500 million to 1 billion doses per year



United States

Outside United States

Moderna Technology Center + Lonza (New Hampshire)

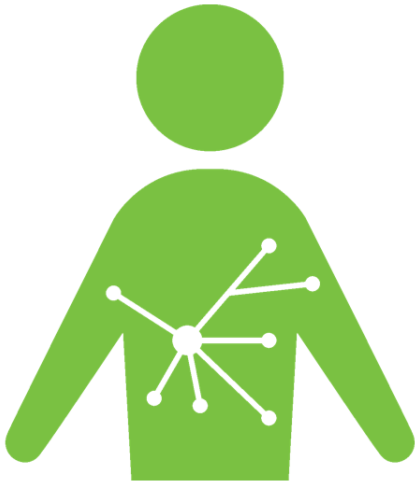
Lonza (Switzerland)

Catalent (Indiana)

ROVI (Spain)

Next steps for mRNA-1273 vaccine against COVID-19

- Nonhuman primate (NHP) challenge model publication
- Start of Phase 3 trial
- Phase 1 interim data for 55-70 and 71+ age groups
- Phase 2 interim data
- Phase 3 interim analysis
- BLA filing upon evidence of Phase 3 safety and efficacy¹



Our mission

To deliver on the promise of mRNA science to create a new generation of transformative medicines for patients.