Vaccines and Related Biological Products Advisory Committee December 17, 2020 Meeting Presentation - Emergency Use Authorization (EUA) Application for mRNA-1273

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Emergency Use Authorization (EUA) Application for mRNA-1273

ModernaTX, Inc.

Vaccines and Related Biological Products Advisory Committee

December 17, 2020

Introduction

Tal Zaks, MD PhD

Chief Medical Officer

ModernaTX, Inc.

Seeking EUA Due to Urgent Need for Vaccine Against SARS-COV-2

- Significant morbidity and mortality
  - > 15 million cases and ~300,000 deaths in US[1]
- Unprecedented COVID-19 hardships
  - Direct medical and economic impact
  - Emotional and functional impact
- Moderna has focused on rapid, thorough response to pandemic
  - Close collaboration with NIH on clinical development
  - Transparent sharing of data

1. https://covid.cdc.gov/covid-data-tracker/#cases_casesper100klast7days

mRNA-1273 is Based on Well-Understood mRNA Biology

- mRNA is the blueprint for all protein synthesis
- Uses cell biology to activate immune system
- Inherent safety features
  - Does not self-replicate
  - Does not enter nucleus or integrate into DNA
  - Manufacturing process is cell free and contains no human or animal products, preservatives, or adjuvants

Clinical Experience with mRNA Infectious Disease Vaccines Since 2015

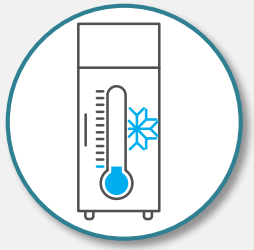
- 12 Phase 1 and Phase 2 clinical trials
  - 8 viruses prior to SARS-CoV-2
- > 1,700 healthy volunteers enrolled
- Routinely elicited neutralizing antibodies
- No significant safety concerns to date

mRNA-1273 Shipping, Storage and Administration

Shipping
-20°C (-40°C to -15°C)

Able to ship a single carton (100 doses)

Local Storage Options
(up to the Date of Expiration)



Freezer
-20° C

Refrigerator
5°C
up to 30 days

Room Temperature
up to 12 hours

Local transportation under controlled condition at 5°C

Administration

Multiple-dose vial (10 doses)

Use within 6 hours after first entry

No dilution required

Study 301 Data Support Emergency Use Authorization

- Exceed FDA efficacy criteria for BLA
  - VE = 94.1% (89.3%, 96.8%), $p < 0.0001$
  - Consistency among subgroups
  - Very high efficacy maintained against severe disease
- Safety profile well characterized in > 15,000 vaccine recipients
  - Majority of solicited injection and systemic AEs reported as mild-to-moderate and resolve, occur ≤ 7 days of injection

Moderna Committed to Transparency and Gathering Longer Term Safety Data

- Study 301 will continue to provide safety and effectiveness data
- Will continue to transparently share data
- DSMB will continue to monitor safety
- Will continue to monitor duration of immunity and effectiveness

Moderna Committed to Collecting Additional Data in a Broader Range of Patients

- Pediatric studies ongoing
- National Cancer Institute collaboration
- Post-authorization active surveillance and safety study
- Global pregnancy registry under development
- Post-authorization effectiveness study

Moderna will continue to collaborate with NIH, FDA, CDC and other agencies

Agenda

Mechanism of Action	**Melissa Moore, PhD** Chief Scientific Officer, Platform Research ModernaTX, Inc.
Efficacy	**Jacqueline Miller, MD, FAAP** Senior Vice President, Therapeutic Area Head, Infectious Disease ModernaTX, Inc.
Safety	**David Martin, MD, MPH** Vice President, Pharmacovigilance ModernaTX, Inc.
Clinical Perspective	**Lindsey Robert Baden, MMSc, MD** Associate Professor, Brigham and Women's Hospital Associate Professor of Medicine, Harvard Medical School Director of Clinical Research

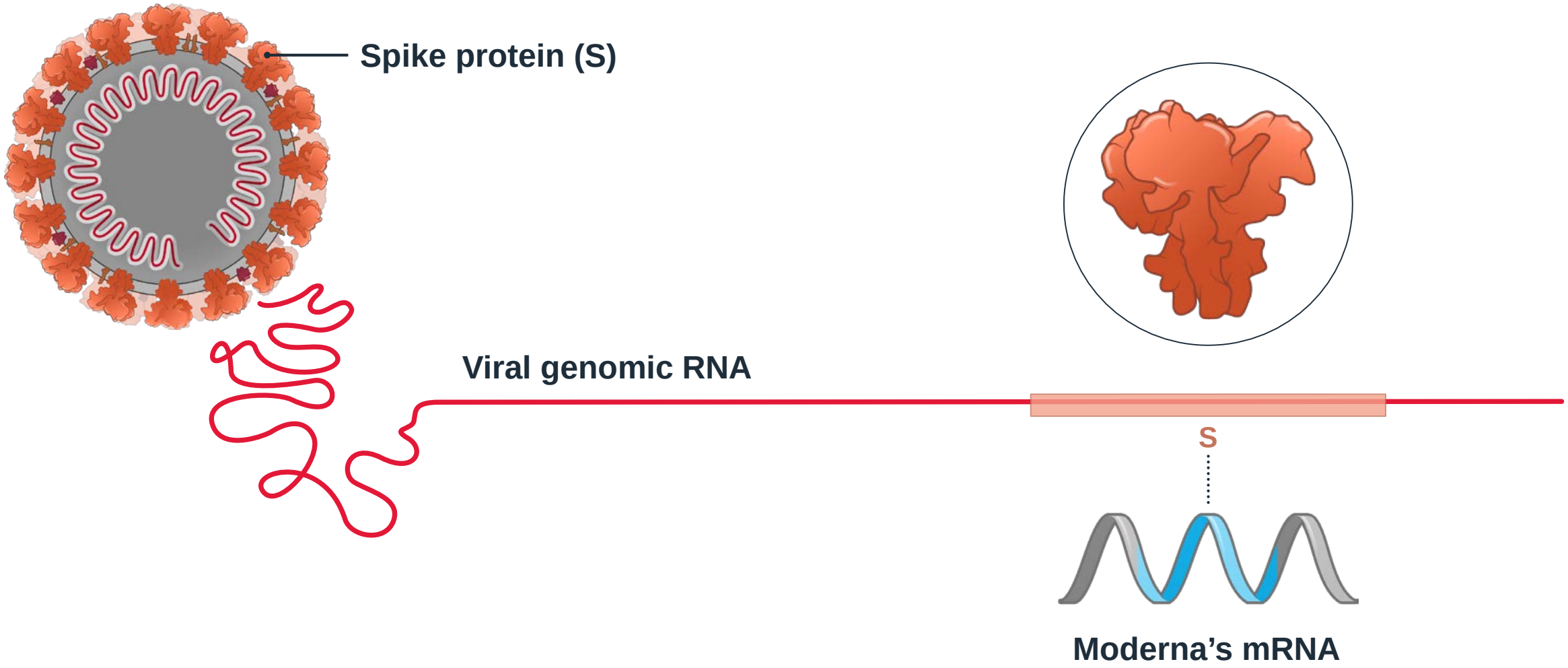
mRNA Platform and Mechanism of Action of mRNA-1273

Melissa J. Moore

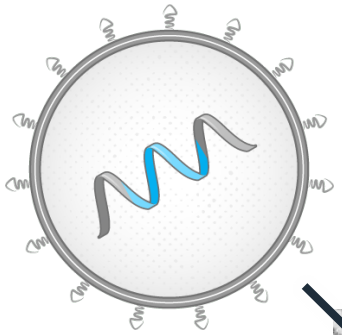
Chief Scientific Officer, Platform Research

ModernaTX, Inc.

Our Vaccine Contains an mRNA Encoding the SARS-CoV-2 Spike Protein

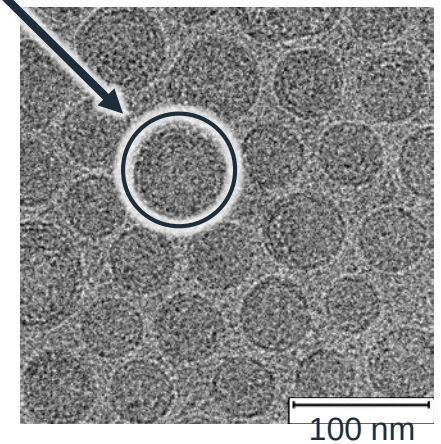


Our Manufacturing Process Utilizes No Ingredients of Human or Animal Origin

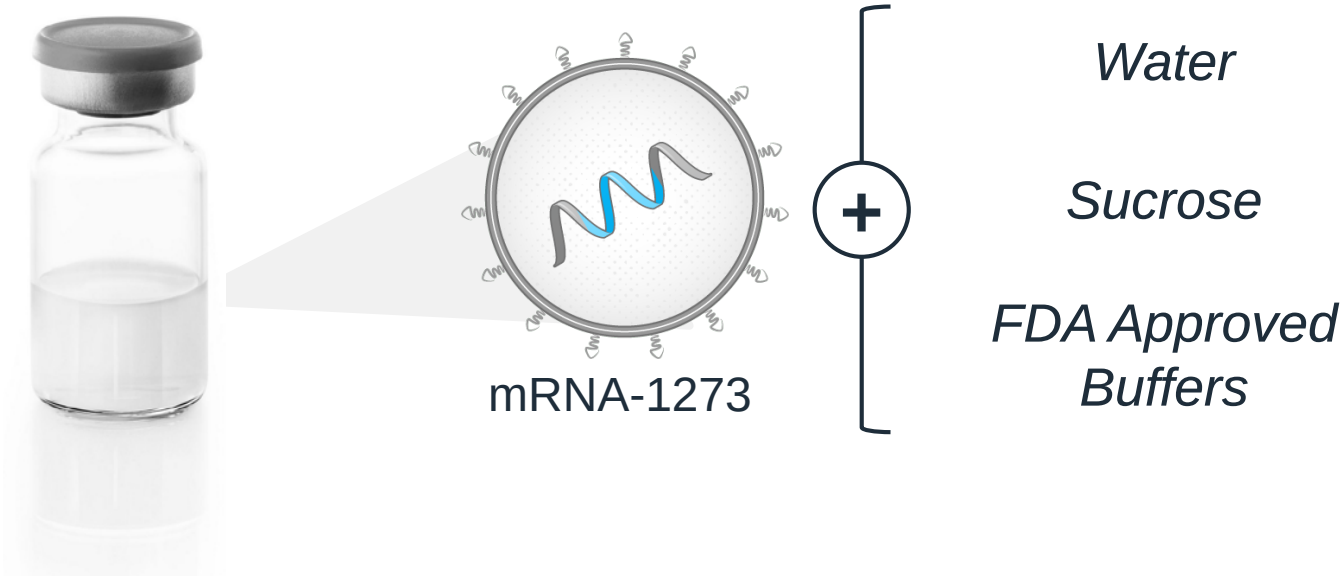


mRNA in Lipid Nanoparticle (LNP)

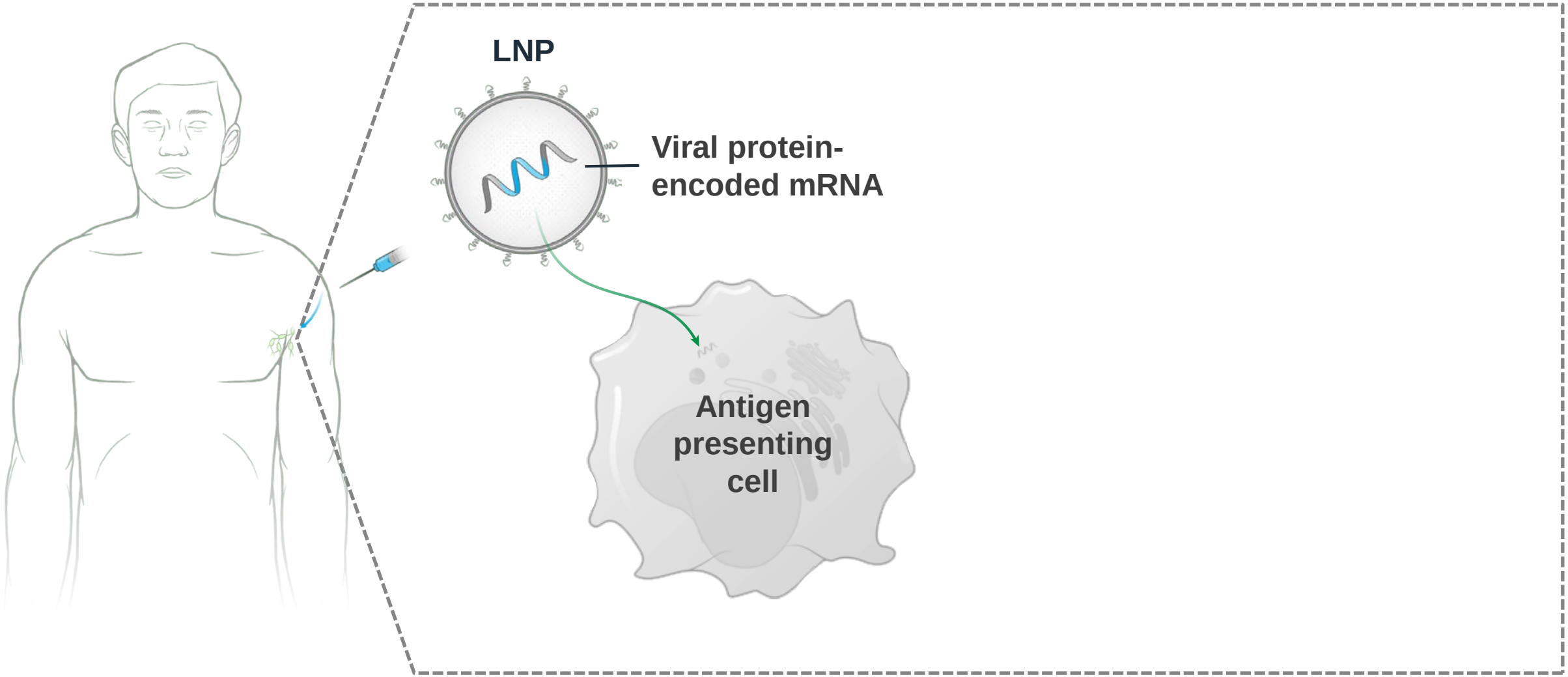
Electron micrograph of mRNA-1273

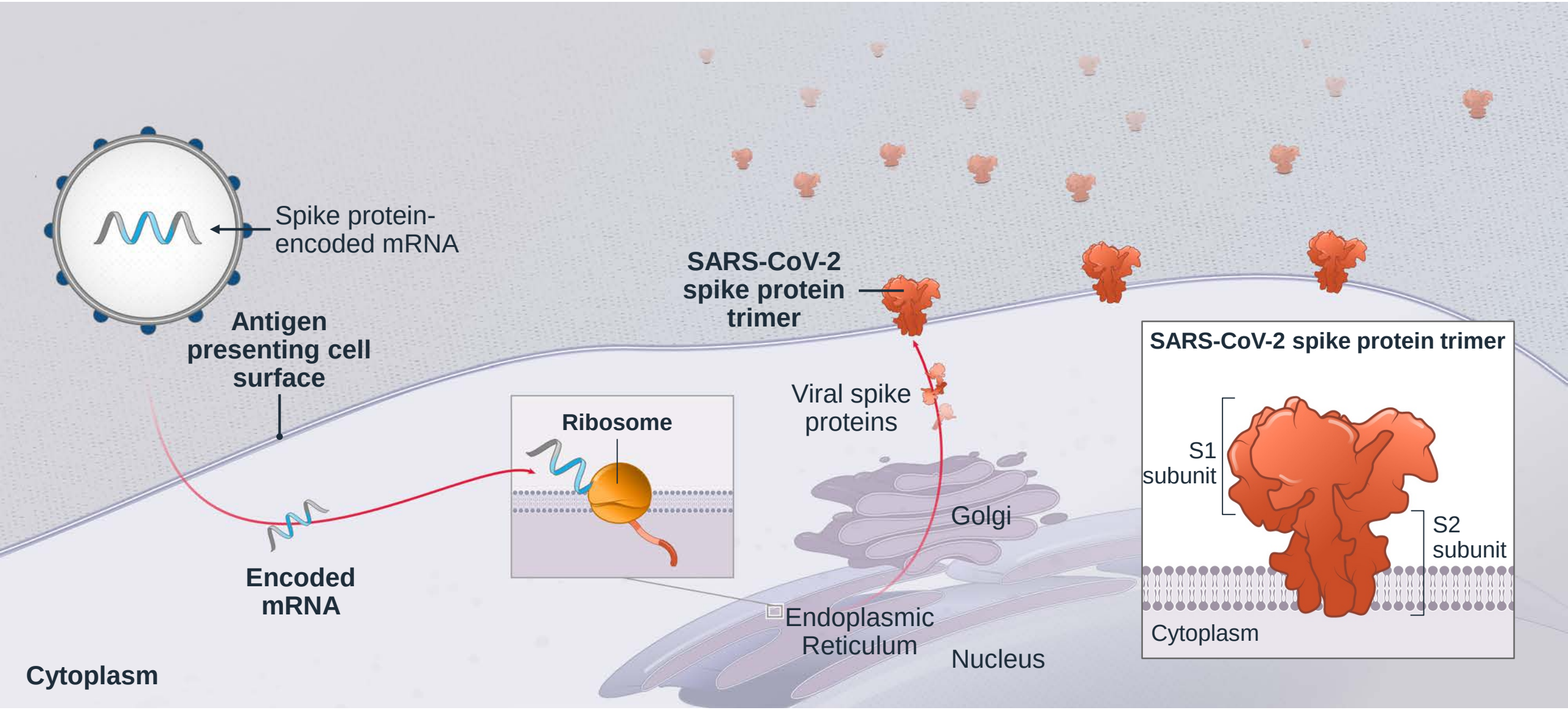


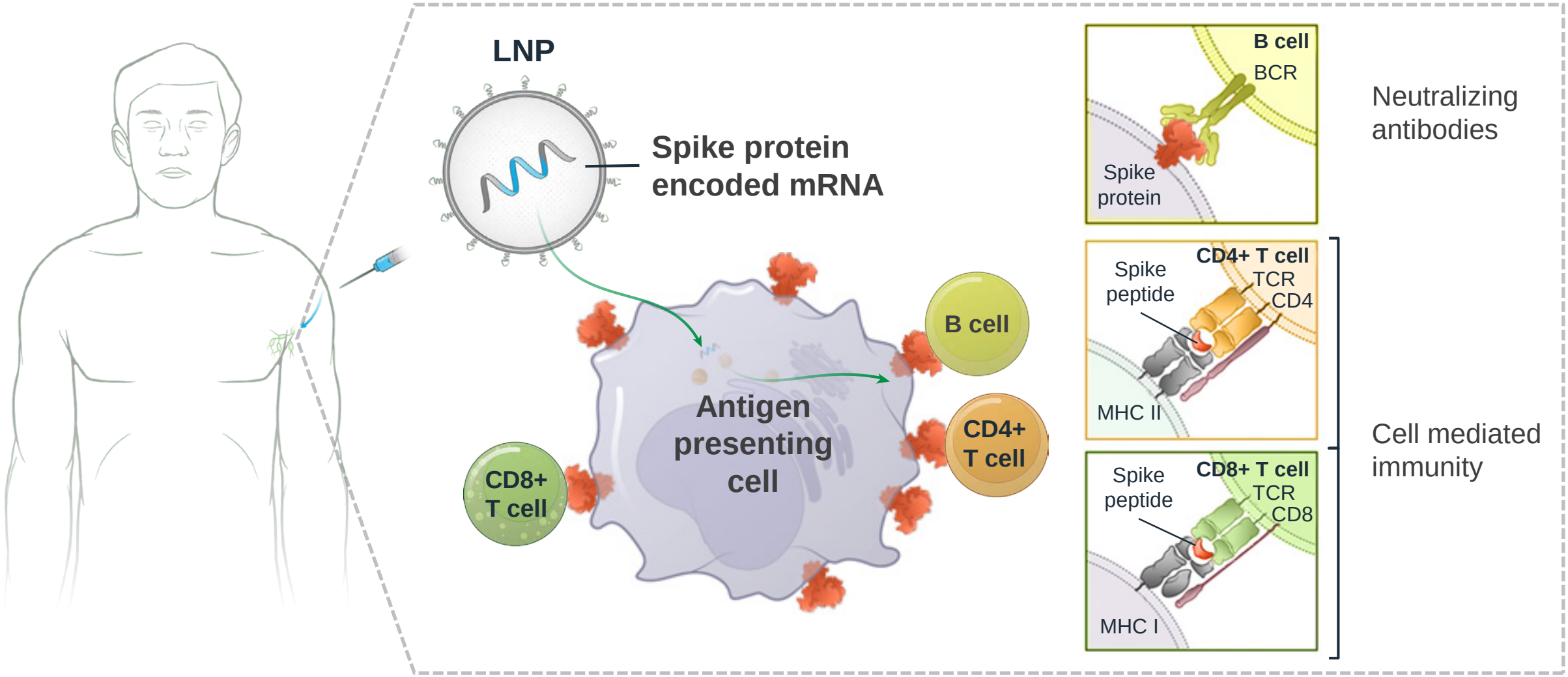
In the Vial



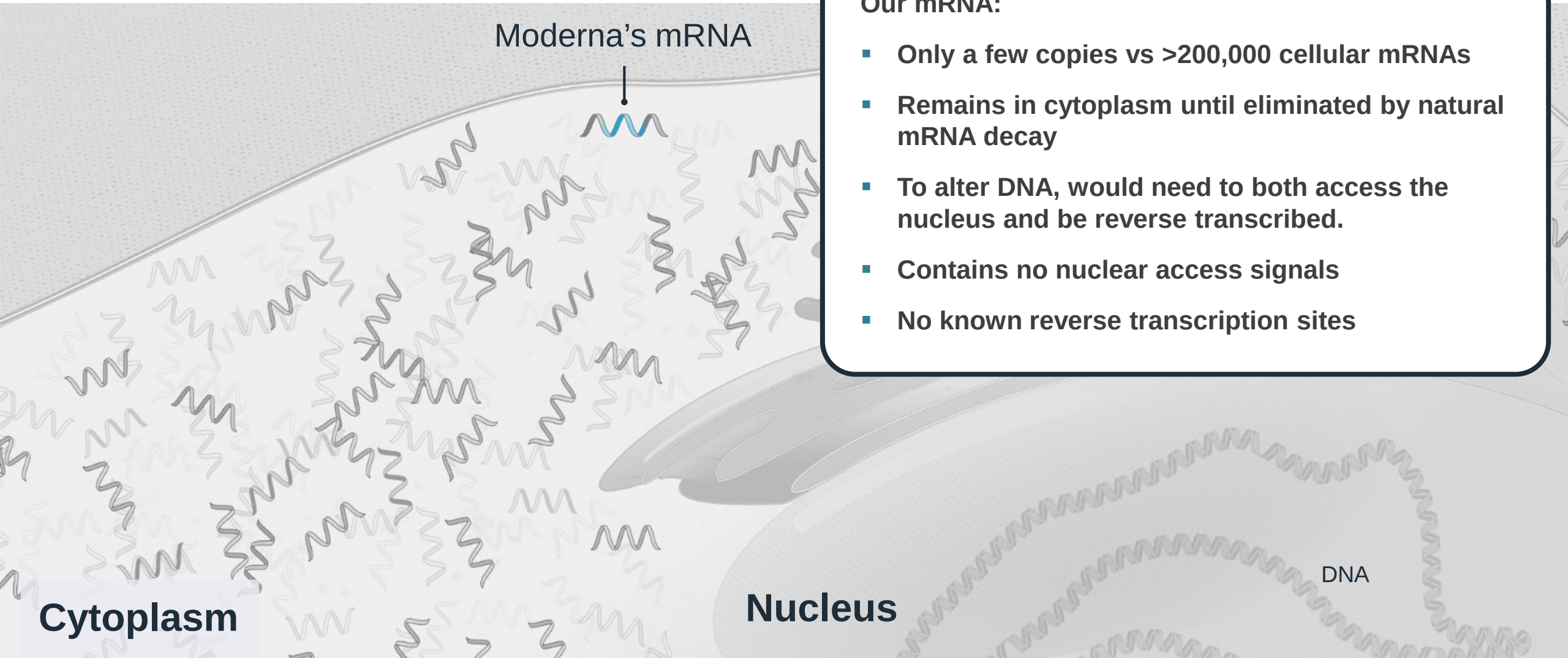
- **No preservatives**
- **No antibiotics**
- **No adjuvants**
- **All components rapidly cleared**


LNP
Viral protein-encoded mRNA
Antigen presenting cell


Spike protein-encoded mRNA
Antigen presenting cell surface
Encoded mRNA
Ribosome
SARS-CoV-2 spike protein trimer
Viral spike proteins
Golgi
Endoplasmic Reticulum
Nucleus
Cytoplasm
SARS-CoV-2 spike protein trimer
S1 subunit
S2 subunit
Cytoplasm

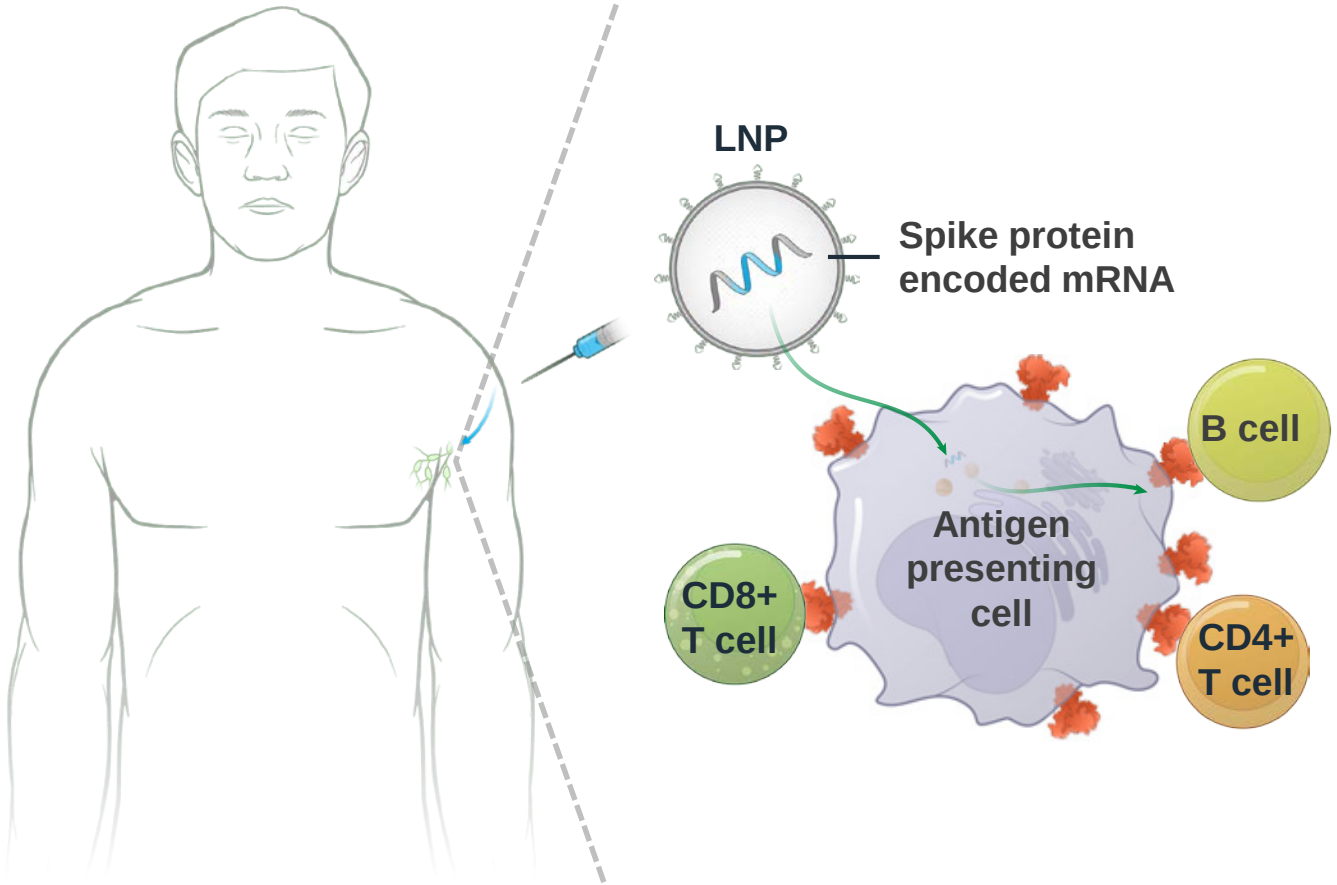

LNP
Spike protein encoded mRNA
Antigen presenting cell
B cell
CD4+ T cell
CD8+ T cell
B cell
BCR
Spike protein
CD4+ T cell
Spike peptide
TCR
CD4
MHC II
CD8+ T cell
Spike peptide
TCR
CD8
MHC I
Neutralizing antibodies
Cell mediated immunity

Our mRNA Vaccine Cannot Alter DNA



Our mRNA:

- **Only a few copies vs >200,000 cellular mRNAs**
- **Remains in cytoplasm until eliminated by natural mRNA decay**
- **To alter DNA, would need to both access the nucleus and be reverse transcribed.**
- **Contains no nuclear access signals**
- **No known reverse transcription sites**



Messenger RNA vaccine (mRNA-1273)

- Provides instruction directly to the immune system (Spike protein)
- Efficiently creates specific immune memory in a natural context (*in situ*)
- mRNA can neither interact with nor integrate into DNA

mRNA-1273 Efficacy

Jacqueline Miller, MD, FAAP

Senior Vice President, Therapeutic Area Head, Infectious Diseases

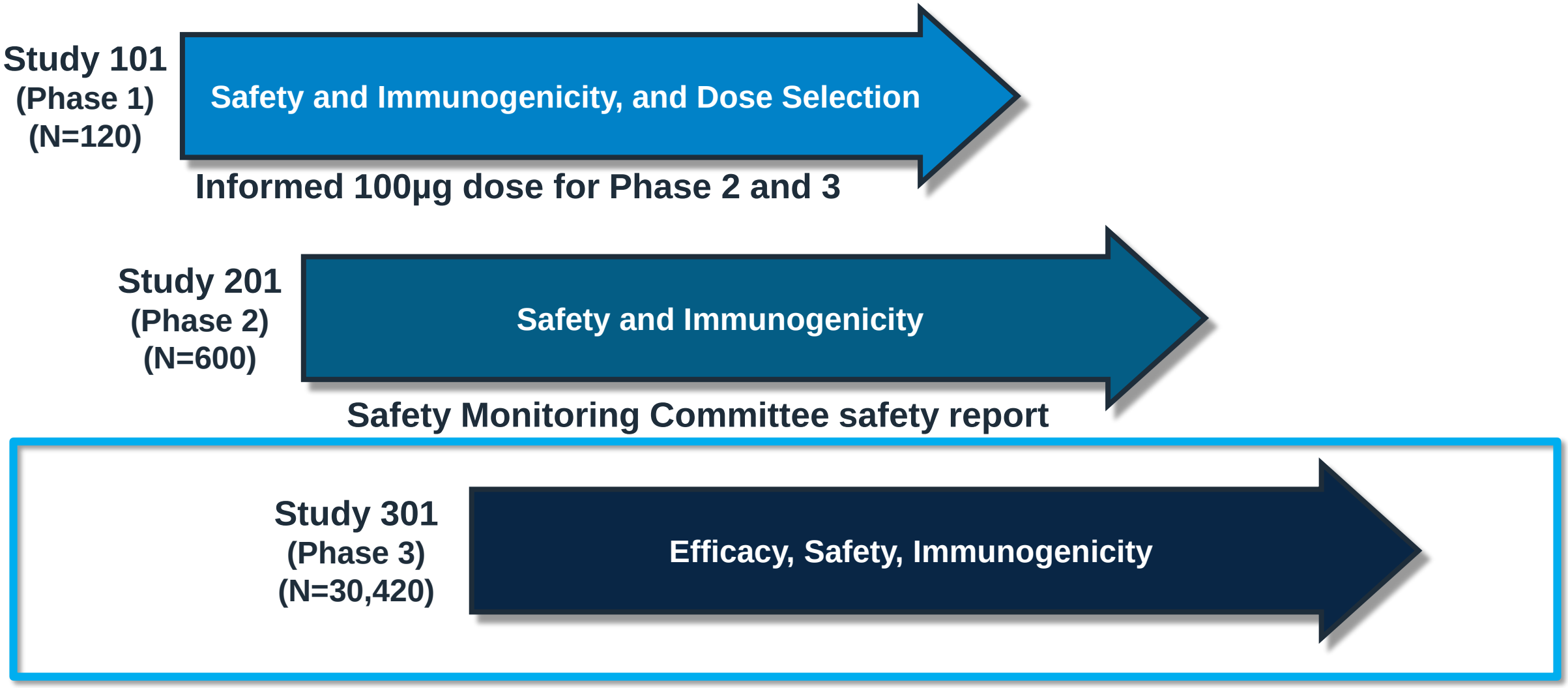
ModernaTX, Inc.

mRNA-1273 Non-clinical Results

- Immunogenic
  - Drives robust SARS-CoV-2 specific antibody and Th1-directed CD4+ and CD8+ T-cell responses
- Nonclinical animal challenge studies demonstrate
  - Full protection of mice, hamsters and non-human primates from SARS-CoV-2
  - Does not lead to vaccine-associated enhanced respiratory disease
- No safety concerns identified in developmental and reproductive toxicology study (DART)

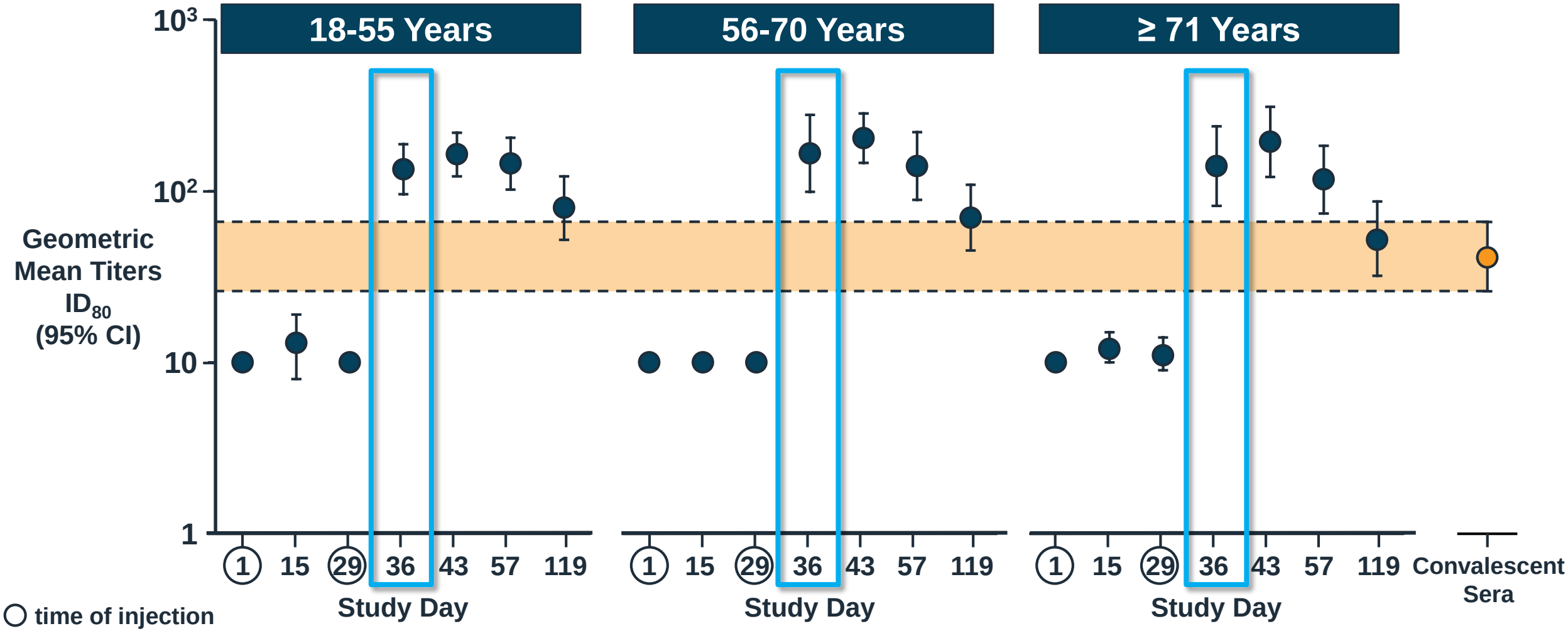
Studies were performed in young and aged mice, Golden Syrian Hamster, and rhesus macaque (NHP) animal models

mRNA-1273 Full Development Program Supports the 100-µg Dose

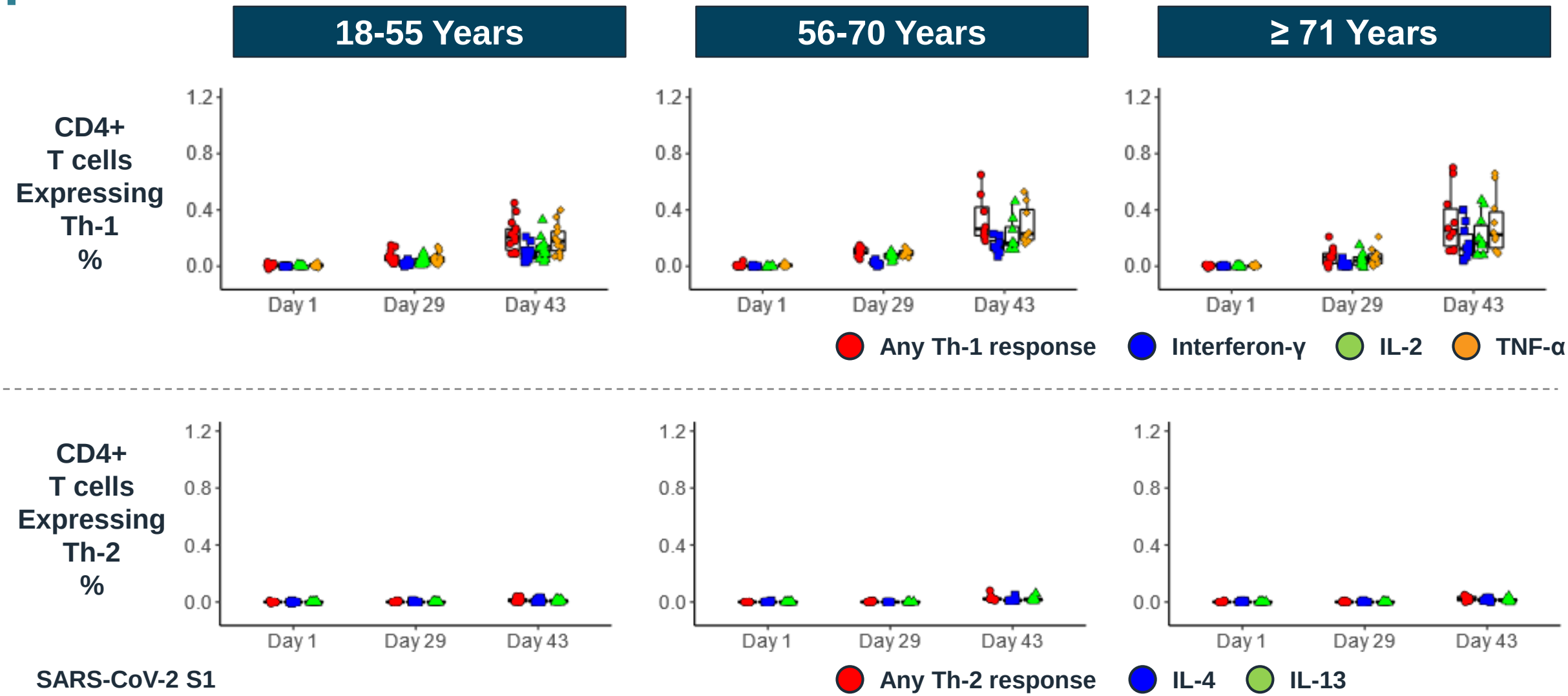


Study 101: mRNA-1273 **100 µg** Neutralizes SARS-CoV-2 Across All Age Groups

(Pseudovirus Neutralization Assay)

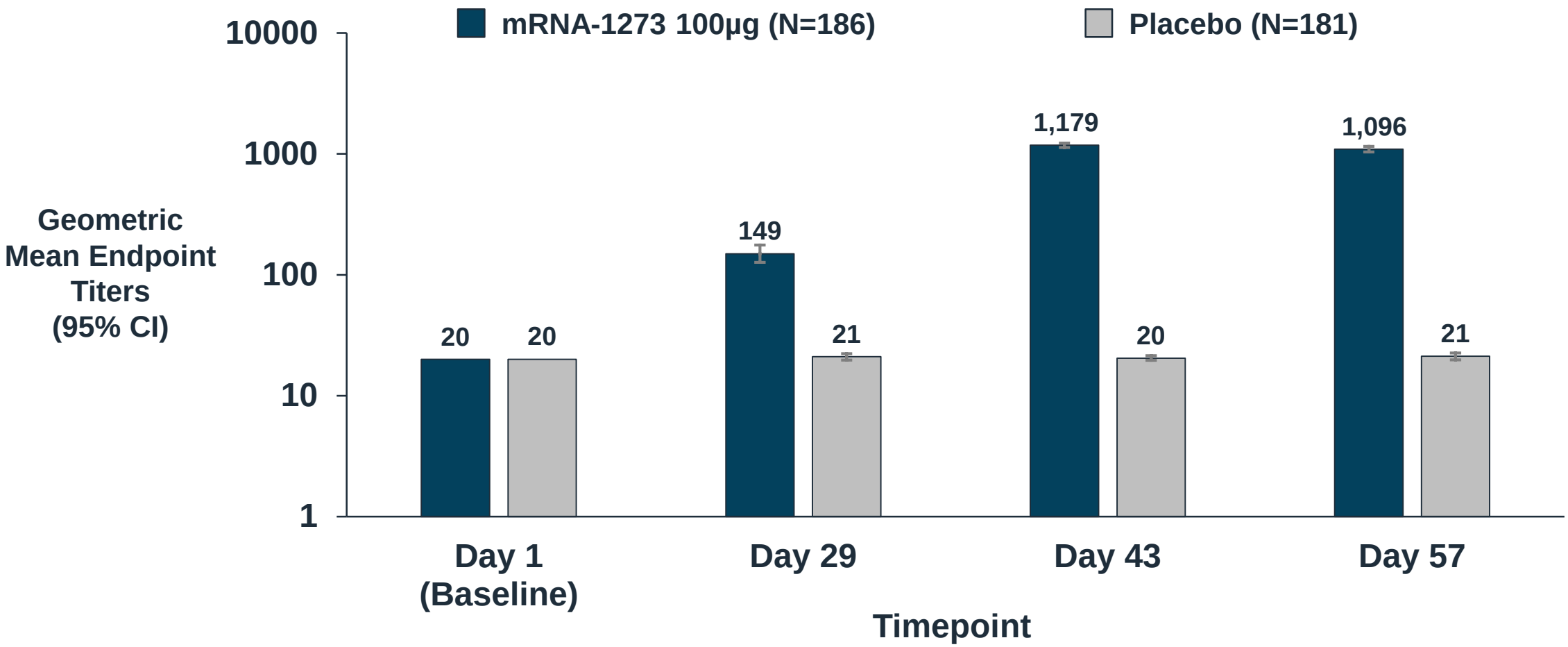


Study 101: mRNA-1273 Induces CD4+ T-Cell Response at 14 Days Post 2nd Dose



Study 201: mRNA-1273 Induces Neutralizing Antibodies to SARS-CoV-2

(Per Protocol Set, WT Virus Microneutralization Assay)

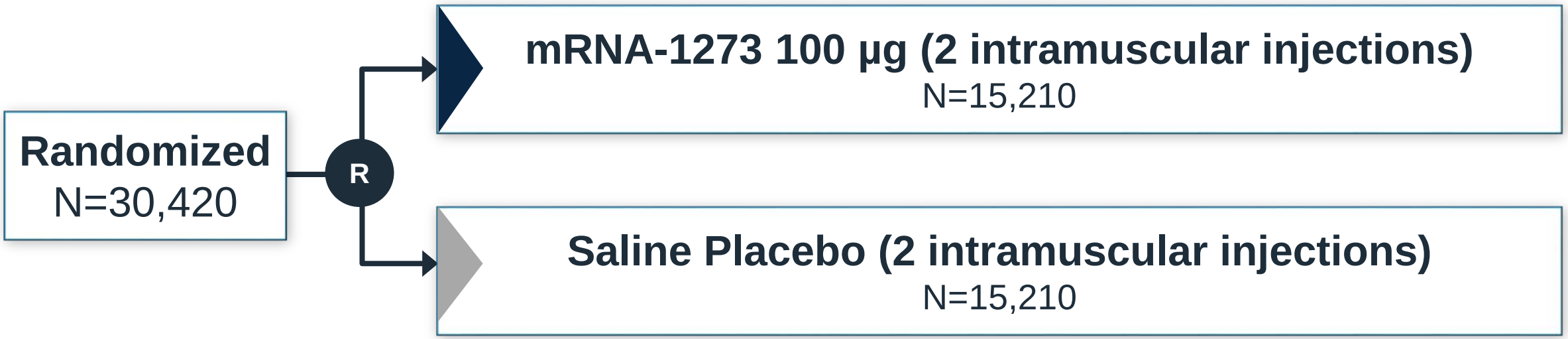


Summary of Studies 101 and 201 mRNA-1273 Immunogenicity Data

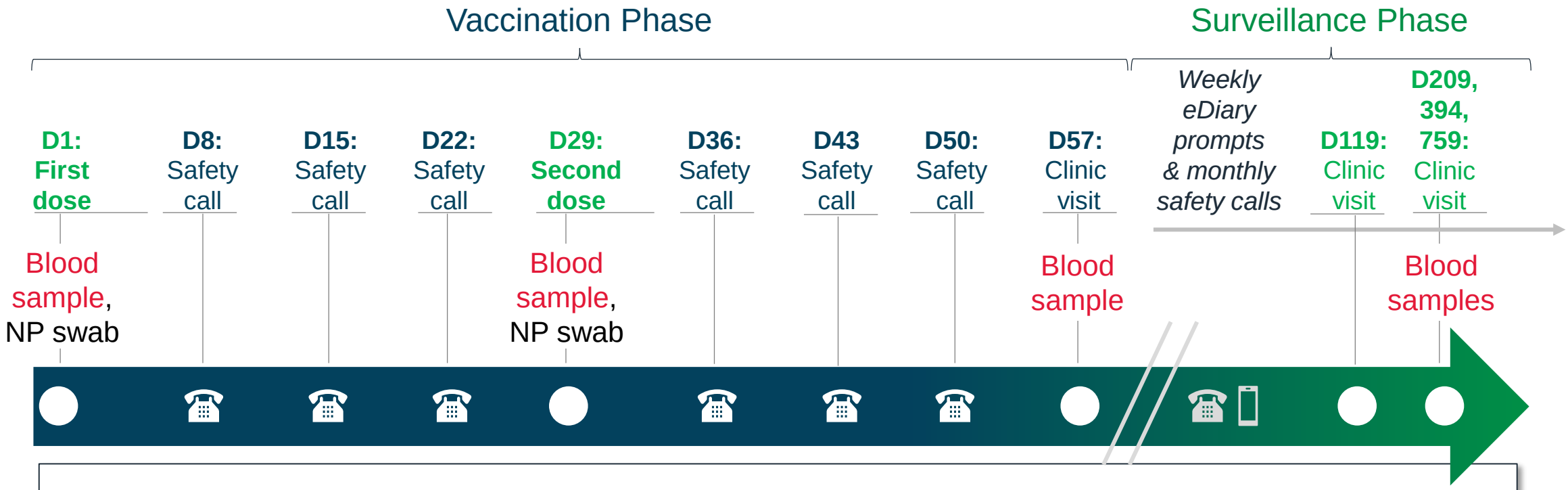
- Neutralizing antibody titers observed in all participants following 2nd dose
- GMTs across age strata numerically higher than in pool of convalescent sera
- Neutralizing antibodies persisted for at least 3 months after 2nd dose and remained numerically higher than convalescent sera
- Strong Th-1 dominant, CD4+ T-cell response observed
  - Consistent results with preclinical studies

Study 301

Study 301: Pivotal, Randomized, Placebo-Controlled Evaluation of Efficacy and Safety



Study 301: Scheduled Visits and Safety Calls



COVID-19 active surveillance throughout the study

Daily telemedicine visits for participants with COVID-19

eDiary captures solicited local and systemic adverse reactions in all participants

SAEs and MAAEs captured throughout the study

Study 301 Primary and Key Secondary Efficacy Objectives

- Primary Endpoint (Per Protocol Population)
  - Vaccine Efficacy (VE) to prevent COVID-19
  - Primary Hypothesis: Lower limit of 95% confidence interval > 30%
- Secondary Endpoints included VE to prevent:
  - Severe COVID-19
  - Death due to COVID-19
  - COVID-19 using CDC case definition
  - Symptomatic COVID-19 disease occurring after 1st dose
  - Asymptomatic SARS-CoV-2 infection

Study 301 Primary Objective: Case Definition of Symptomatic COVID-19 Disease

- Symptoms
  - ≥ 2 systemic: fever, chills, myalgia, headache, sore throat, new olfactory and taste disorder(s)

OR

  - ≥ 1 respiratory: cough, shortness of breath / difficulty breathing, clinical or radiographical evidence of pneumonia

AND

- Confirmed SARS-CoV-2 infection via RT-PCR

Primary analysis: adjudicated cases occurring ≥ 14 days after dose 2

Study 301 Key Secondary Objective: Case Definition of Severe COVID-19

- Confirmed COVID-19 as per the Primary Endpoint definition, plus any one of the following:
  - Clinical signs indicative of severe systemic illness, RR ≥ 30 per minute, HR ≥ 125 BPM, SpO_2 ≤ 93% on room air at sea level or PaO_2/FIO_2 < 300 mm Hg
  - Respiratory failure or ARDS, evidence of shock (SBP < 90 mm Hg, DBP < 60 mm Hg or requiring vasopressors)
  - Significant acute renal, hepatic or neurologic dysfunction
  - Admission to ICU or death

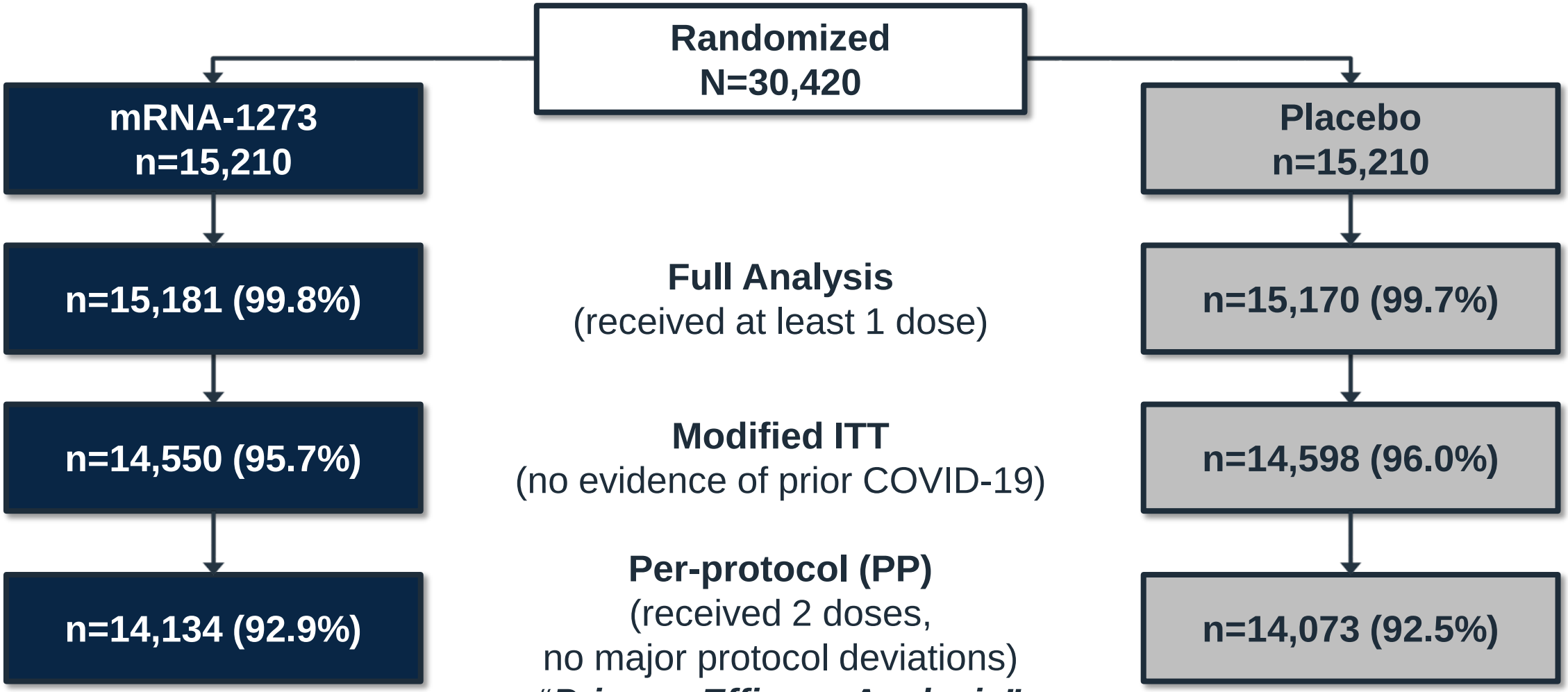
RR: respiratory rate; HR: heart rate; BPM: beats per minute; SpO_2: oxygen saturation; PaO_2/FIO_2: arterial oxygen partial pressure over fractional inspired oxygen; mm Hg: pressure measured by millimeters of mercury; ARDS: acute respiratory distress syndrome; SBP: systolic blood pressure; DBP: diastolic blood pressure; ICU: intensive care unit

Study 301 Includes an Independent DSMB and Efficacy Endpoint Adjudication Committee

- Independent Data and Safety Monitoring Board (DSMB) chartered by NIH
  - Continuous monitoring for:
    - Vaccine-associated enhanced respiratory disease
    - Any other safety signal
  - Evaluated interim efficacy analysis and alerted Moderna when criteria met
- Independent Efficacy Endpoint Adjudication Committee
  - Reviews potential COVID-19 cases, including laboratory results
  - Determines if case definition for efficacy endpoints were met
  - Confirms case was ≥14-days post 2nd dose

Study 301: Disposition of Participants

Randomization Set



Study 301: Representation of Participants with Risk Factors

Full Analysis Set

	mRNA-1273 N=15,181		Placebo N=15,170		
	n	%	n	%	
Age and health risk for severe COVID-19					
≥ 18 to < 65 without comorbid conditions	8,888	**59%**	8,886	**59%**	
≥ 18 to < 65 with comorbid conditions	2,530	**17%**	2,535	**17%**	
≥ 65 with and without comorbid conditions	3,749	**25%**	3,749	**25%**	
		42%			**42%**

Comorbid conditions included chronic lung disease or moderate to severe asthma, significant cardiac disease, severe obesity, diabetes, liver disease, stable HIV infection

Study 301: Representative of US Demography

Full Analysis Set

	mRNA-1273 N=15,181		Placebo N=15,170	
	n	%	n	%
Sex, male	7,923	**52%**	8,062	**53%**
Age, years				
Mean (SD)	**51 (15.5)**		**51 (15.6)**	
Age group				
≥ 18 to < 65	11,413	**75%**	11,418	**75%**
≥ 65	3,768	**25%**	3,752	**25%**
Breakdown of ≥ 65 age group				
≥ 65 to < 70	1,905	**51%**	1,817	**48%**
≥ 70 to < 75	1,205	**32%**	1,194	**32%**
≥ 75 to < 80	467	**12%**	507	**14%**
≥ 80	191	**5%**	234	**6%**

Study 301: Representative of US Demography

Full Analysis Set

	mRNA-1273 N=15,181		Placebo N=15,170	
	n	%	n	%
Race				
White	12,029	**79%**	11,995	**79%**
Black or African American	1,563	**10%**	1,527	**10%**
Asian	651	**4%**	731	**5%**
Multiracial	315	**2%**	321	**2%**
American Indian or Alaska Native	112	**< 1%**	121	**< 1%**
Native Hawaiian or Other Pacific Islander	35	**< 1%**	32	**< 1%**
Other, Not reported, Unknown	476	**3%**	443	**3%**
Ethnicity				
Hispanic or Latino	3,121	**21%**	3,114	**21%**

Study 301: 23% of Participants Reported ≥ 1 Pre-Existing Medical Risk Factor

Full Analysis Set

Medical Risk Factor	mRNA-1273 N=15,181		Placebo N=15,170	
	n	%	n	%
Diabetes	1,435	9%	1,440	9%
Severe obesity (BMI > 40 kg/m^2)	1,025	7%	1,021	7%
Chronic lung disease	710	5%	744	5%
Significant cardiac disease	752	5%	744	5%
Liver disease	100	< 1%	96	< 1%
HIV	92	< 1%	87	< 1%

Study 301: Participants with Occupational Risk Factors Under Consideration for Priority Vaccination

Full Analysis Set — Primary Efficacy Analysis

	mRNA-1273 N=15,181		Placebo N=15,170	
	n	%	n	%
Healthcare workers	3,790	**25%**	3,831	**25%**
Educators and students	1,543	**10%**	1,552	**10%**
Pastoral, social, or public health workers	533	**4%**	503	**3%**
Transportation and delivery services	482	**3%**	473	**3%**
Personal care and in-home services	469	**3%**	469	**3%**
Manufacturing and production operations	425	**3%**	421	**3%**
Emergency response	302	**2%**	297	**2%**
Warehouse shipping and fulfillment centers	191	**1%**	175	**1%**
Border protection and military personnel	69	**0.5%**	68	**0.4%**

Overview of Confirmed Symptomatic and Severe Cases by Subgroup

Per Protocol

Subgroup	N	# of Confirmed COVID-19 Cases	
		Confirmed Symptomatic	Severe
Overall	28,207	196	30
Age and risk			
≥ 18 and < 65 without comorbidities	16,799	126	6
≥ 18 and < 65 with comorbidities	4,273	37	14
≥ 65 with or without comorbidities	7,135	33	10
Participants with comorbidities (all ages)			
Yes	6,373	47	20
No	21,834	149	10
Race and Ethnicity			
Non-Hispanic White	17,939	154	24
Communities of Color	10,220	42	6

Study 301: Primary Efficacy Objective Met, VE Against Confirmed, Symptomatic COVID-19 Cases is > 94%

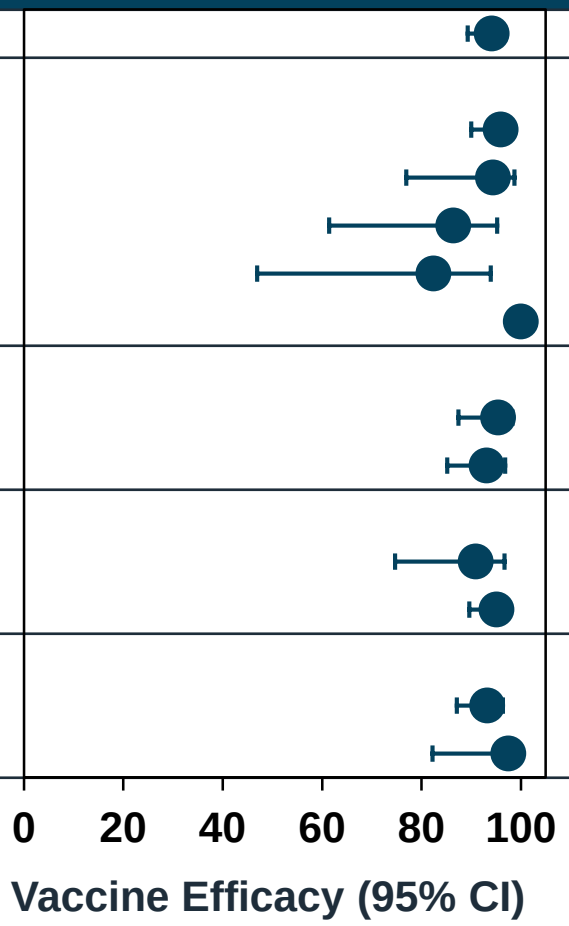
Per Protocol

Confirmed, Symptomatic COVID-19 Cases	Interim Analysis		**Primary Efficacy Analysis**	
	mRNA-1273 N=13,934	Placebo N=13,883	**mRNA-1273 N=14,134**	**Placebo N=14,073**
Number of cases, n (%)	5 (< 0.1%)	90 (0.6%)	**11 (< 0.1%)**	**185 (1.3%)**
Vaccine efficacy based on hazard ratio (95% CI)	94.5% (86.5%, 97.8%)		**94.1% (89.3%, 96.8%)**	
p-value	< 0.0001		**< 0.0001**	
Incidence rate per 1000 person-years	1.8	33.4	**3.3**	**56.5**

Study 301: Subgroup Analyses of Efficacy are Consistent with Primary Analysis

Per Protocol — Primary Efficacy Analysis

Subgroup	# Events / N mRNA-1273 N=14,134	# Events / N Placebo N=14,073	Vaccine Efficacy (95% CI)
Overall	**11 / 14,134**	**185 / 14,073**	**94.1%** (89.3%, 96.8%)
Age and risk			
≥ 18 and < 65 without comorbidities	**5 / 8,396**	**121 / 8,403**	**95.9%** (90.0%, 98.3%)
≥ 18 and < 65 with comorbidities	**2 / 2,155**	**35 / 2,118**	**94.4%** (76.9%, 98.7%)
≥ 65 with or without comorbidities	**4 / 3,583**	**29 / 3,552**	**86.4%** (61.4%, 95.2%)
≥ 65 and < 70 with or without comorbidities	**4 / 2,953**	**22 / 2,864**	**82.4%** (46.9%, 93.9%)
≥ 70 with or without comorbidities	**0 / 630**	**7 / 688**	**100%** (NE, 100)
Sex			
Male	**4 / 7,366**	**87 / 7,462**	**95.4%** (87.4%, 98.3%)
Female	**7 / 6,768**	**98 / 6,611**	**93.1%** (85.2%, 96.8%)
Participants with comorbidities (all ages)			
Yes	**4 / 3,206**	**43 / 3,167**	**90.9%** (74.7%, 96.7%)
No	**7 / 10,928**	**142 / 10,906**	**95.1%** (89.6%, 97.7%)
Race and Ethnicity			
Non-Hispanic White	**10 / 9,023**	**144 / 8,916**	**93.2%** (87.1%, 96.4%)
Communities of Color	**1 / 5,088**	**41 / 5,132**	**97.5%** (82.2%, 99.7%)



NE: not estimable

Study 301 Secondary Efficacy Endpoint: Cases of Confirmed Severe COVID-19

Per Protocol

Confirmed, Severe COVID-19 Cases	Interim Analysis		Primary Efficacy Analysis	
	mRNA-1273 N=13,934	Placebo N=13,883	**mRNA-1273 N=14,134**	**Placebo N=14,073**
Number of cases, n (%)	0 (0%)	11 (< 0.1%)	**0 (0%)**	**30 (0.2%)**
Vaccine efficacy based on hazard ratio (95% CI)	100% (NE, 100%)		**100%** (NE, 100%)	
Incidence rate per 1000 person-years	0	4.1	**0**	**9.1**

- **One participant death due to COVID-19 in the placebo group**
- **Given the high efficacy against severe disease, no evidence for vaccine-associated enhanced disease was observed**

One potential case of severe disease was reported in the mRNA-1273 group after data cut-off for the primary efficacy analysis, this case has yet to be adjudicated.

NE: not estimable

Study 301 Secondary Efficacy Endpoint: VE According to CDC Case Definition[1]

Per Protocol

CDC Case Definition[1]	Interim Analysis		Primary Efficacy Analysis	
	mRNA-1273 N=13,934	Placebo N=13,883	**mRNA-1273 N=14,134**	**Placebo N=14,073**
Number of cases, n (%)	6 (< 0.1%)	121 (0.9%)	**11 (< 0.1%)**	**221 (1.6%)**
Vaccine efficacy based on hazard ratio (95% CI)	95.1% (88.9%, 97.8%)		**95.1% (91.1%, 97.3%)**	
Incidence rate per 1000 person-years	2.2	44.9	**3.3**	**67.6**

[1] One clinical symptom from an expanded list and a nasopharyngeal swab positive for SARS-CoV-2 virus

Study 301 Secondary Endpoint: Symptomatic COVID-**19 Cases ≥ 14 Days After 1st** Dose

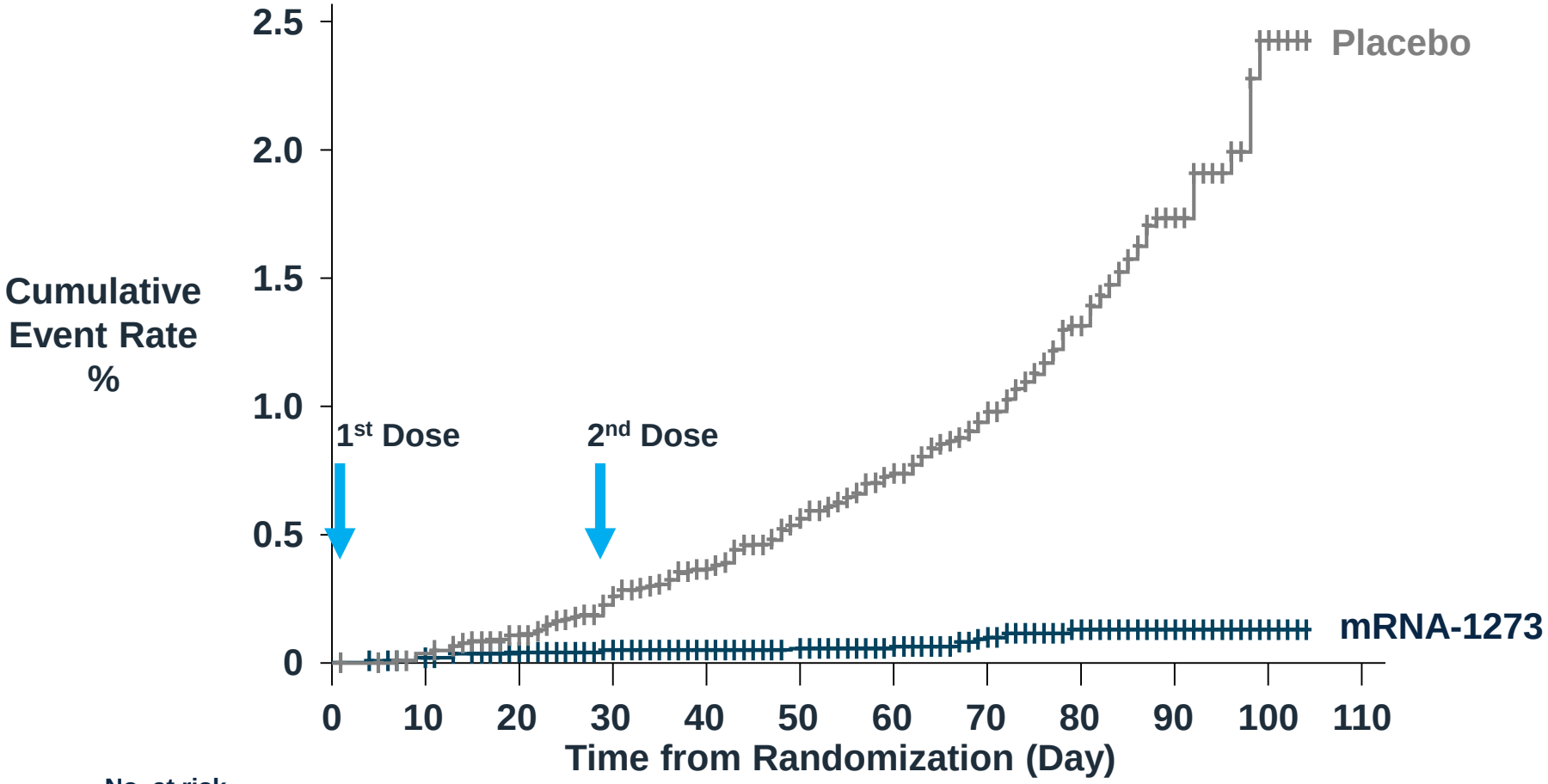
Per Protocol

Symptomatic COVID-19 Cases 14 Days After 1st Dose	Interim Analysis		**Primary Efficacy Analysis**	
	mRNA-1273 N=13,934	Placebo N=13,883	**mRNA-1273 N=14,134**	**Placebo N=14,073**
Number of cases, n (%)	6 (< 0.1%)	128 (0.9%)	**11 (< 0.1%)**	**225 (1.6%)**
Vaccine efficacy based on hazard ratio (95% CI)	95.4% (89.5%, 98.0%)		**95.2% (91.2%, 97.4%)**	
Incidence rate per 1000 person-years	2.2	47.5	**3.3**	**68.8**

- **Not all cases occurring before day-14 post 2nd dose have been adjudicated**
- **> 96% compliance with 2nd dose**

Kaplan-Meier Estimates of Time to First Occurrence of COVID-19 Starting After Randomization

mITT – Interim Analysis



No. at risk												
mRNA-1273	14312	14306	13964	13490	12981	12284	10742	8327	5705	2621	583	0
Placebo	14370	14363	14000	13515	12972	12225	10657	8283	5663	2594	586	0

Study 301: Summary of COVID-19 Cases Within 6 Weeks After Randomization Based on CDC Case Definition[1]

mITT Population – Interim Analysis

	mRNA-1273 N=14,550	Placebo N=14,598
	n	n
From randomization to 14 days post 1st dose	5	11
From 14 days post 1st dose to 2nd dose	3	34
From 2nd dose to 14 days post 2nd dose	0	17
Total	8	62

[1] One clinical symptom from an expanded list and a nasopharyngeal swab positive for SARS-CoV-2 virus

Study 301: Summary of Asymptomatic SARS-CoV-2 Infections as Measured by Scheduled NP Swabs Prior to 2nd Dose

Per Protocol – Primary Efficacy Analysis

RT-PCR NP Swab Results	mRNA-1273 N=14,134		Placebo N=14,073	
	n	%	N	%
No documented COVID-19 symptoms between 1st dose and 2nd dose	14	0.1%	38	0.3%

Data suggestive of efficacy for prevention of asymptomatic infection

Conclusions: mRNA-1273 Efficacy Data

- 94.1% mRNA-1273 efficacy demonstrated in primary analysis on 196 cases
  - Consistent with 94.5% observed in interim analysis on 95 cases
- Primary efficacy hypothesis was met
  - Lower limit of 95% CI was 89.3%, exceeding pre-specified 30% margin
- Reduced severe COVID-19 disease
  - 0 vs 30 cases in mRNA-1273 and placebo groups, respectively
- Other secondary, sensitivity and subgroup analyses support primary efficacy analysis results
- mRNA-1273 offers potential to address the public health crisis of COVID-19

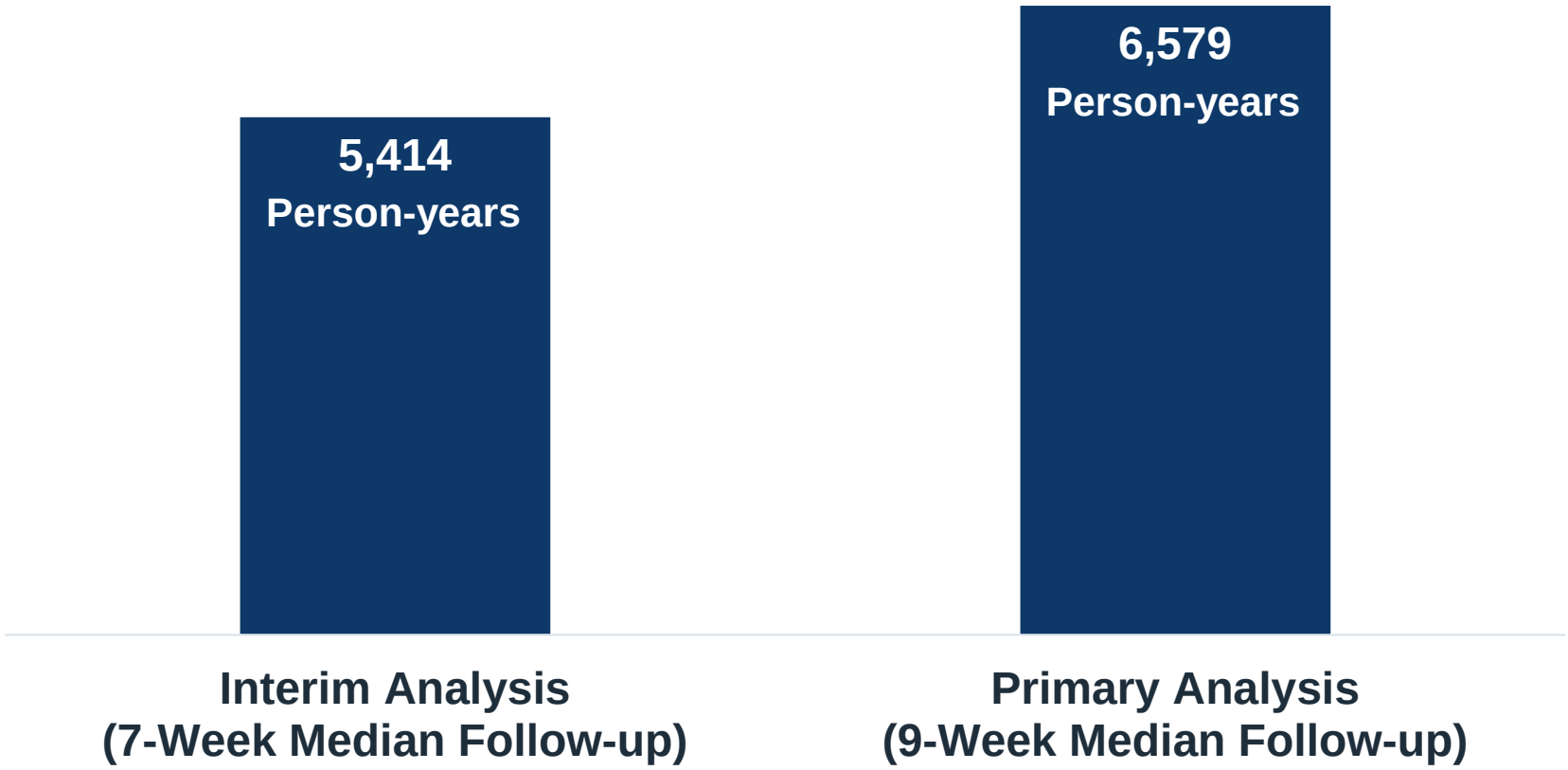
Study 301: mRNA-1273 100 µg Safety 9-Week Median Follow-up

David Martin, MD, MPH

Vice President, Pharmacovigilance

ModernaTX, Inc.

Study 301: Primary Analysis Timepoint With 9-Week Median Follow-up



Study 301: 9-Week Median Exposure Following 2nd Dose

Safety Set, 9-Week Median Follow-up

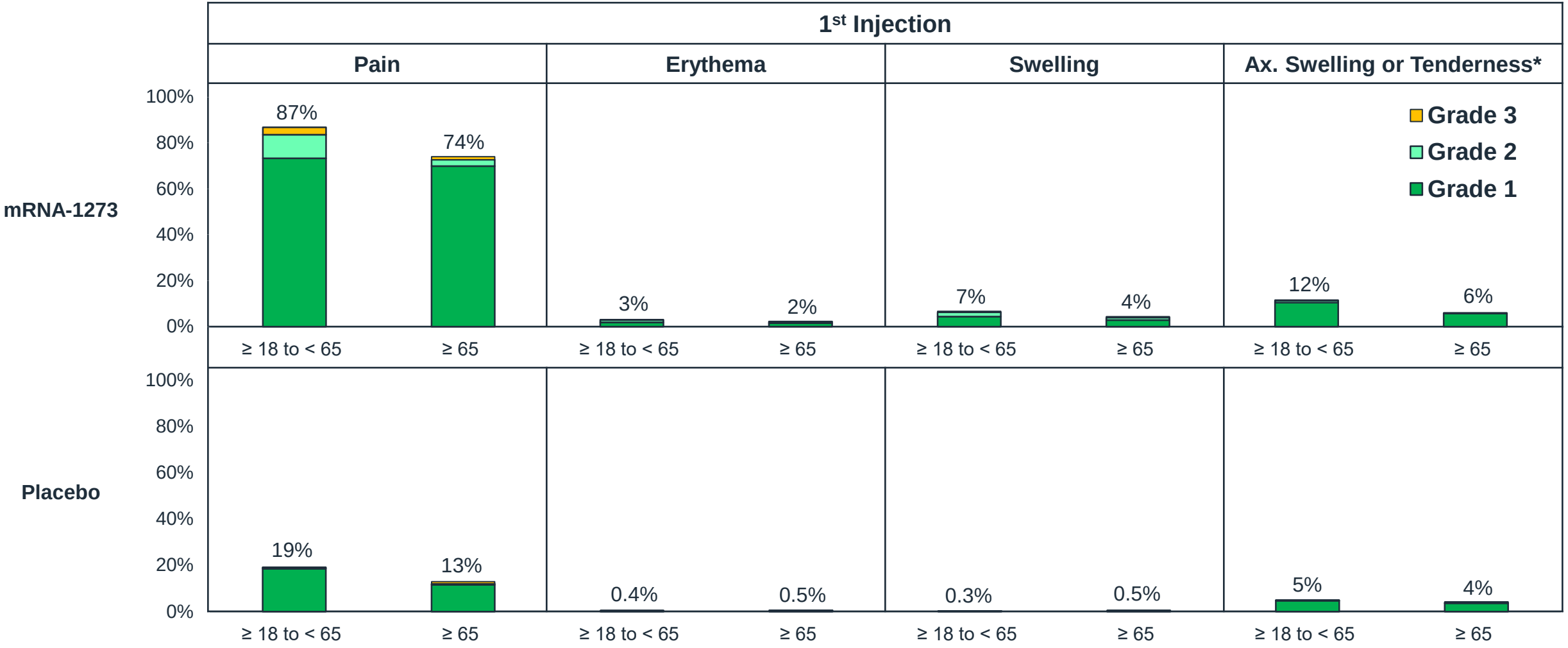
Number of Participants	mRNA-1273 N=15,185		Placebo N=15,166	
	n	%	n	%
Received 1st dose	15,185	**100%**	15,166	**100%**
Received 2nd dose	14,715	**97%**	14,613	**96%**
Completed ≥ 28 days since 2nd dose	13,386	**88%**	13,297	**88%**
Completed ≥ 56 days since 2nd dose	9,406	**62%**	9,299	**61%**

Solicited Adverse Reactions

Study 301 Safety Set (N=30,351)

Study 301: Most Solicited Local Adverse Reactions Were Mild-to-Moderate (1st Injection)

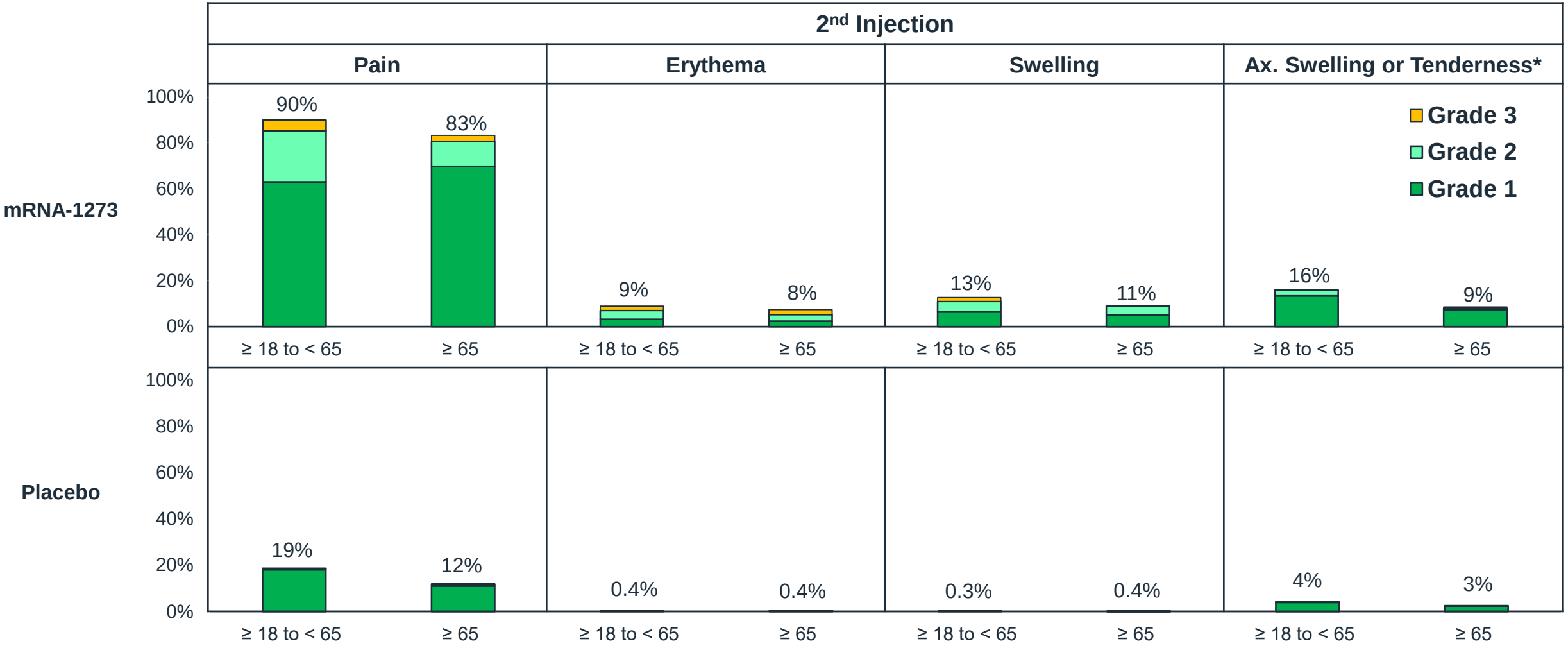
Safety Set, 9-Week Median Follow-up



Note: Includes reports within 7 days of either injection. *Localized axillary swelling or tenderness ipsilateral to the vaccination arm.

Study 301: Most Solicited Local Adverse Reactions Were Mild-to-Moderate (2nd Injection)

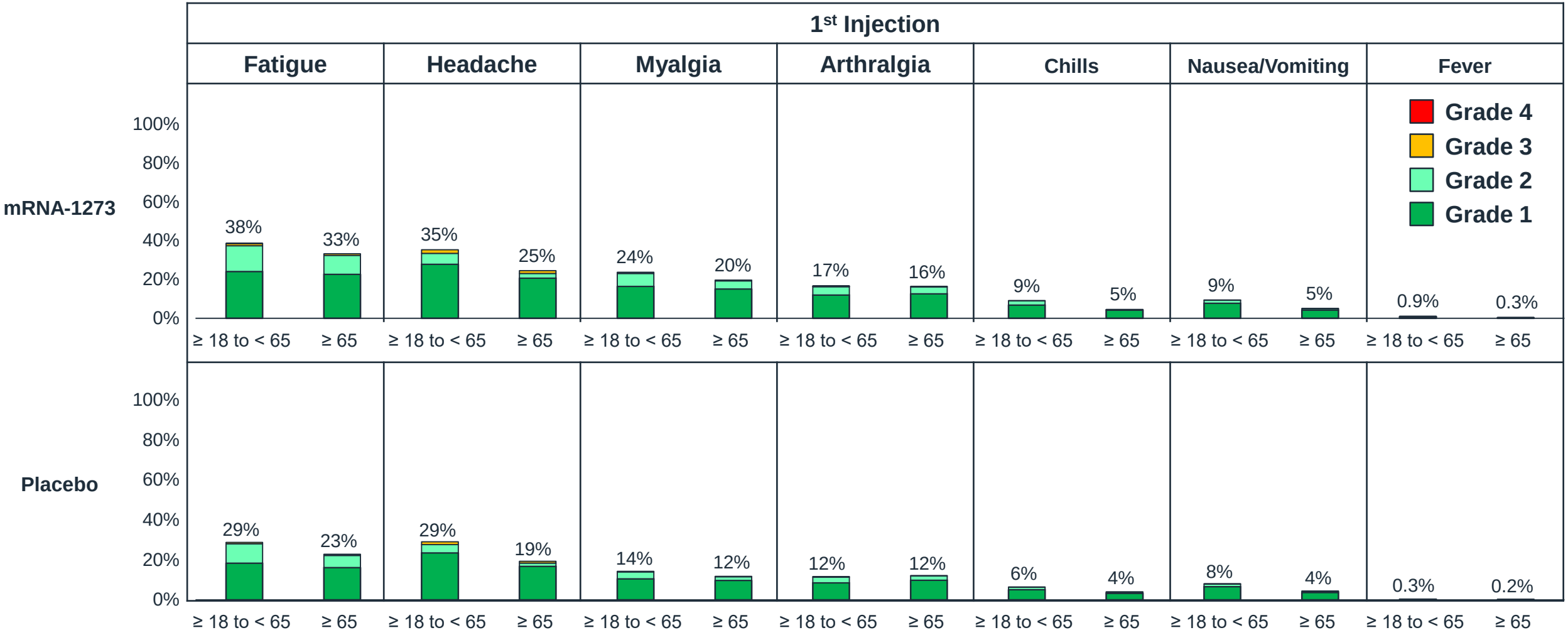
Safety Set, 9-Week Median Follow-up



Note: Includes reports within 7 days of either injection. *Localized axillary swelling or tenderness ipsilateral to the vaccination arm.

Study 301: Most Solicited Systemic Adverse Reactions Were Mild-to-Moderate (1st Injection)

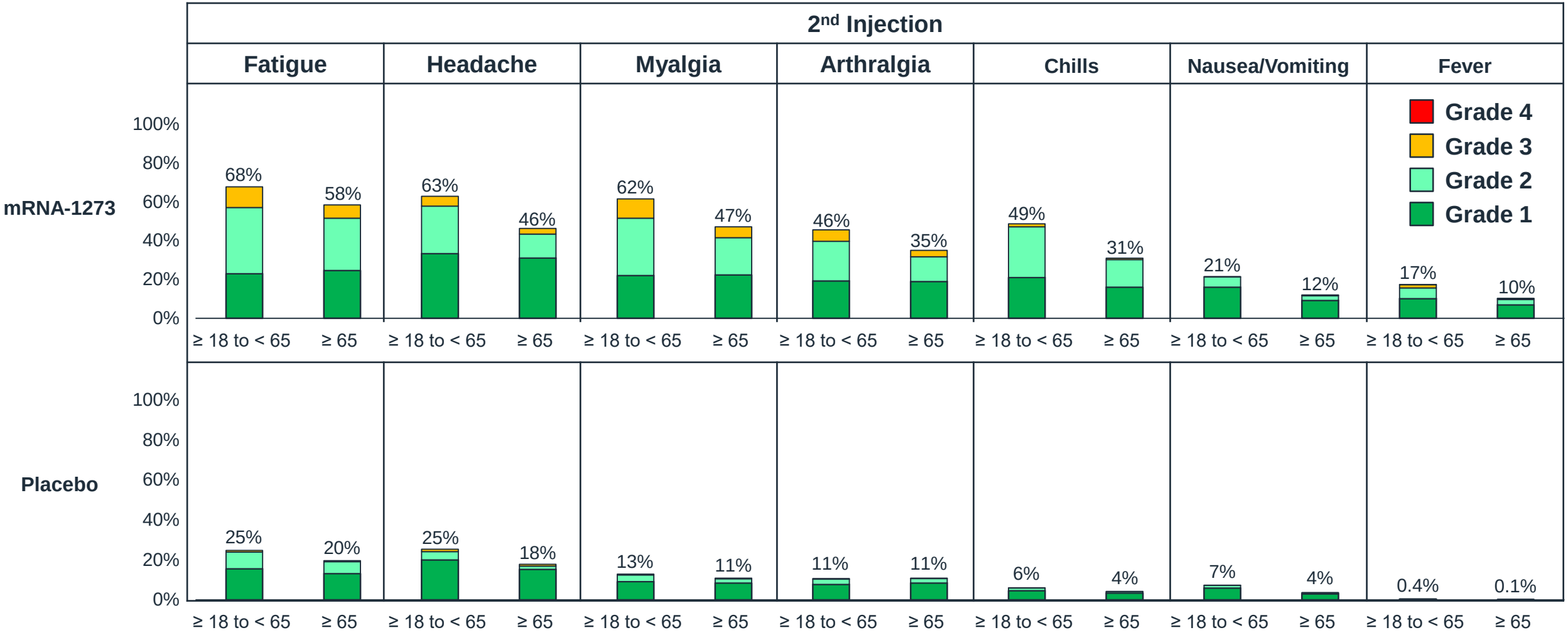
Safety Set, 9-Week Median Follow-up



Note: Solicited Systemic ARs include reports within 7 days of either injection

Study 301: Most Solicited Systemic Adverse Reactions Were Mild-to-Moderate (2nd Injection)

Safety Set, 9-Week Median Follow-up



Note: Solicited Systemic ARs include reports within 7 days of either injection

Unsolicited Adverse Events

Study 301 Safety Set (N=30,351)

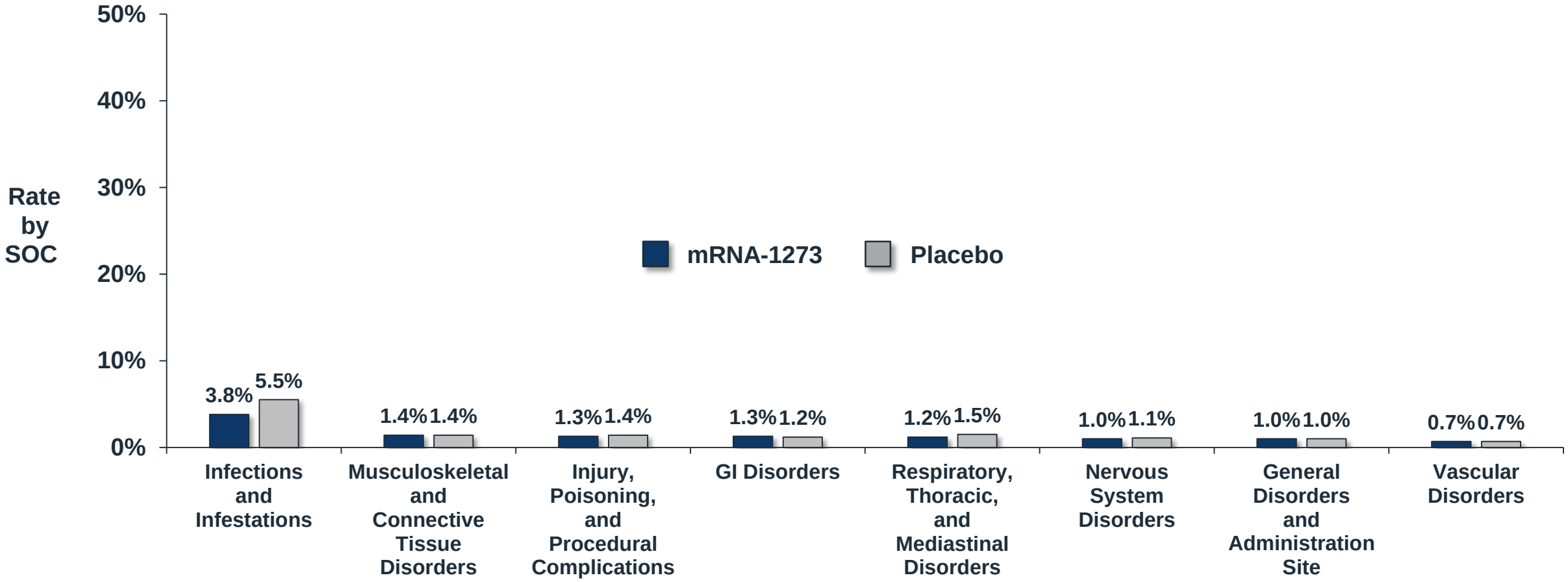
Study 301: Summary of Unsolicited AEs

Safety Set, 9-Week Median Follow-up

Unsolicited Adverse Events	mRNA-1273 N=15,185		Placebo N=15,166	
	n	%	n	%
Any Adverse Event	4,058	**27%**	3,888	**26%**
Any Medically-Attended Adverse Event (MAAE)	1,745	**11%**	1,958	**13%**
Any Serious Adverse Event (SAE)	147	**1%**	153	**1%**
Any death (reported through December 3, 2020)	6	**< 0.1%**	7	**< 0.1%**

Study 301: Rates of Medically-Attended AEs Were Comparable Between Groups

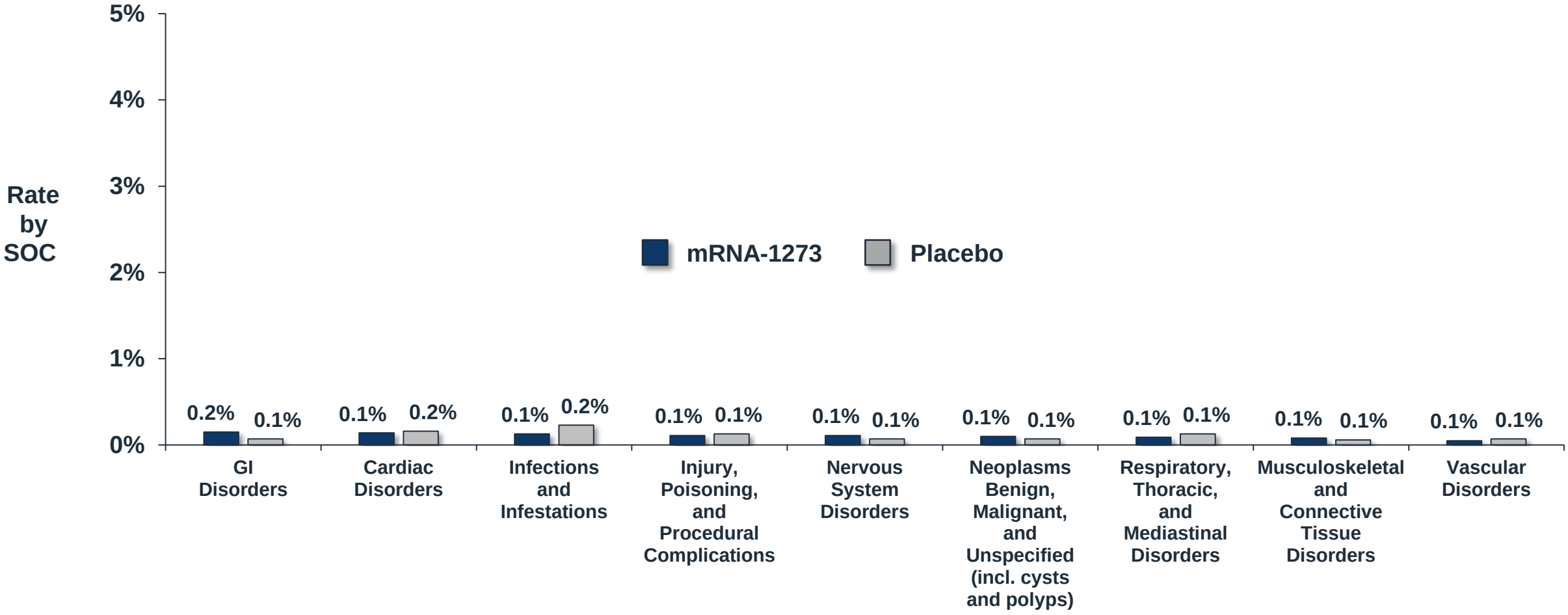
Safety Set, 9-Week Median Follow-up



System Organ Class occurring at rate > 0.6%

Study 301: Rates of SAEs Were Comparable Between Groups

Safety Set, 9-Week Median Follow-up



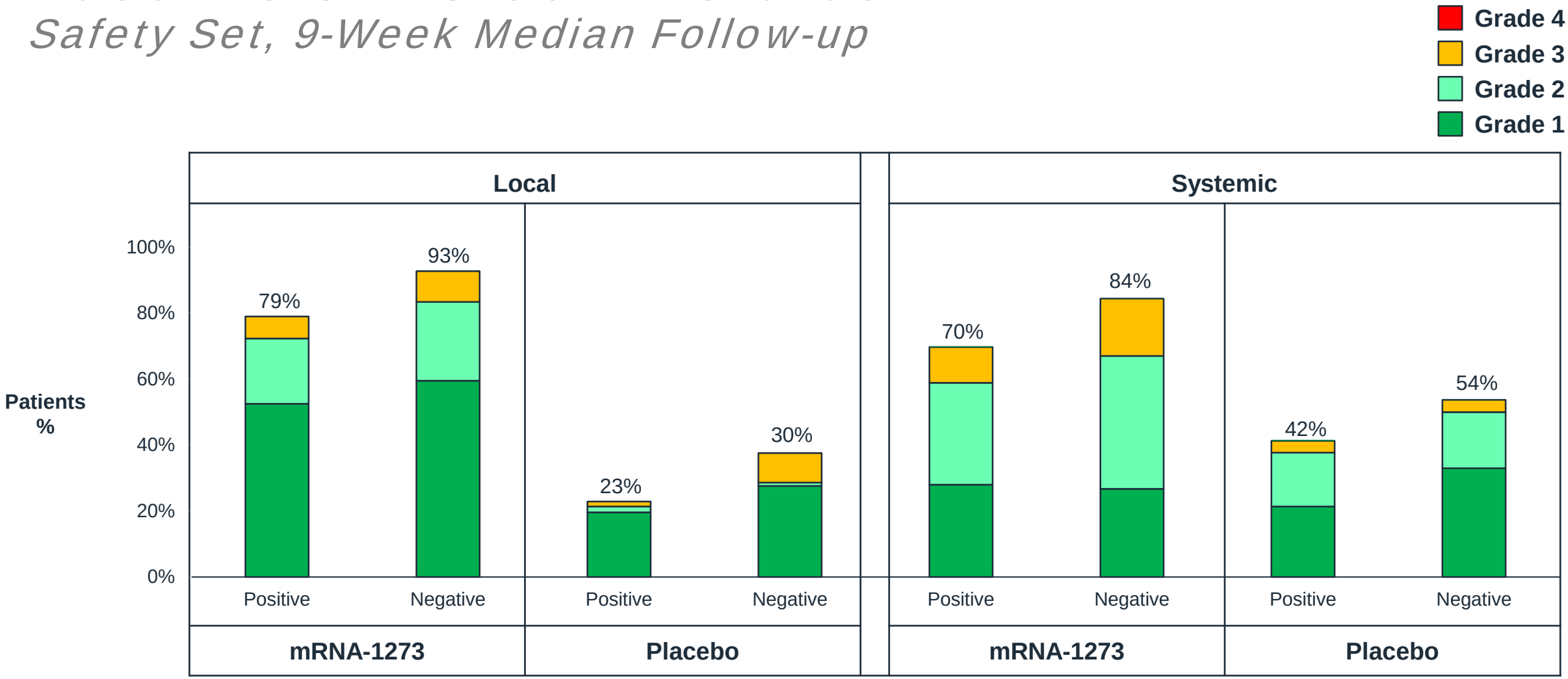
System Organ Class occurring at rate > 0.05%

Study 301: Deaths Through December 3, 2020

Preferred Term	mRNA-1273 n=6	Placebo n=7	Relationship to Treatment
Abdominal injury (intra-abdominal perforation)	-	1	Not related
Cardio-respiratory arrest	1	1	Not related
Completed suicide	1	-	Not related
COVID-19	-	1	Not related
Head injury	1	-	Not related
Myocardial infarction	1	2	Not related
Multisystem organ failure	1	-	Not related
Not otherwise specified	1	1	Not related
Systemic inflammatory response syndrome (dermatitis bullous)	-	1	Not related

Study 301: Any Solicited Adverse Reaction by Baseline SARS-CoV-2 Status

Safety Set, 9-Week Median Follow-up



Missing baseline SARS-CoV-2 assessment for 288 mRNA-1273 and 235 Placebo participants

Investigations Unable to Identify Cases Suggestive of mRNA-1273 Anaphylaxis

- No participants excluded for history of anaphylaxis, urticaria, or other significant hypersensitivity
- 2 anaphylactic reactions reported as unsolicited AEs
  - 1 placebo occurring 10 days after 1st dose
  - 1 mRNA-1273 occurring 63 days after 2nd dose
- Conducted anaphylaxis Standardized MedDRA Query (SMQ), including review of events within 48 hours
  - 0 met Brighton Collaboration Anaphylaxis Case Definition

Vaccine Safety Monitoring During the EUA

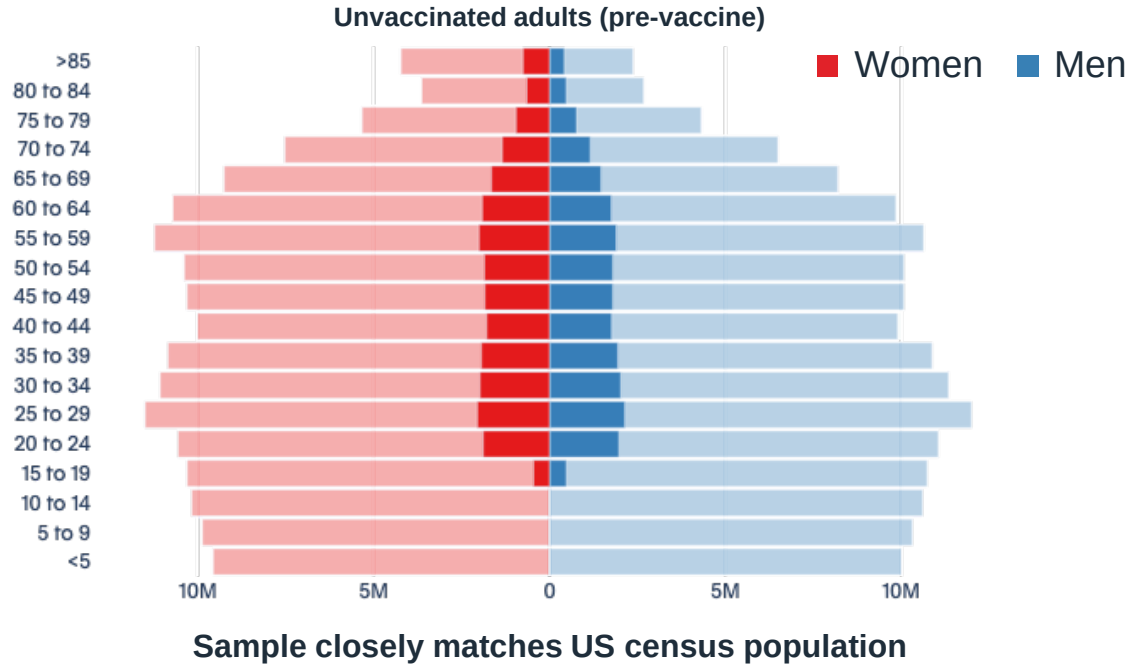
Integrated US Vaccine Monitoring Developed to Complement USG and other Established Systems

- Address known concerns associated with vaccines by
  - Monitoring AESI in VAERS, other programs and real-world healthcare data
  - Conducting cohort study of pregnant women who receive vaccine
- Monitor long term effectiveness through integrated healthcare system
- Identify and assess new safety signals using
  - Open-ended surveillance of AE reports
  - Real world healthcare claims data

AESI: adverse event of special interest
VAERS: vaccine adverse event reporting system

Active Surveillance Program to Complement US Government Systems

Expected Rates of AESIs
Among US adults (pre-vaccination)



Sample closely matches US census population

45 million US adults
Closed adjudicated health insurance claims

Capture Observed Rates of AESIs

Cohort data updated every 2 weeks to analyze observed over expected AEs

Open claims provide early visibility on vaccination

Capacity to add new safety signals to the monitoring plan

45+ million US adults
Open and closed health insurance claims linked at the patient level through privacy sparing methods

Collaboration is Key to Successful Vaccine Safety Monitoring in Global Pandemic

- Moderna Pharmacovigilance and Risk Management Plans being reviewed by FDA and international regulators
- Interface with vaccine safety stakeholders
  - US FDA and CDC and associated advisory committees
  - International regulatory and public health agencies

Perspective Regarding Placebo Recipients

Moderna Study 301

Lindsey R Baden, MD

Brigham and Women's Hospital

Harvard Medical School

COVID-19 Prevention Network

BRIGHAM HEALTH
BWH BRIGHAM AND WOMEN'S HOSPITAL

DANA-FARBER CANCER INSTITUTE

HARVARD MEDICAL SCHOOL

Disclosures

- Co-PI of the Moderna Study 301, CoVPN 3001 study
  - Funding from NIAID for this activity
  - No funding from Moderna

A Key Consideration for Study 301 Volunteers

- Their viewpoint – especially given the EUA (12/11) for a SARS-CoV-2 vaccine
  - We must enhance (not undermine) their trust and engagement
  - They are making rapid informed decisions
    - If we make it difficult for them, they will not come back
    - We are asking them for extra visits, blood draws, questionnaires for ~18 months
  - We must provide them information and choice in a timely manner
  - We must ensure equity in volunteer management

Study 301 Participants Eligible for Vaccination

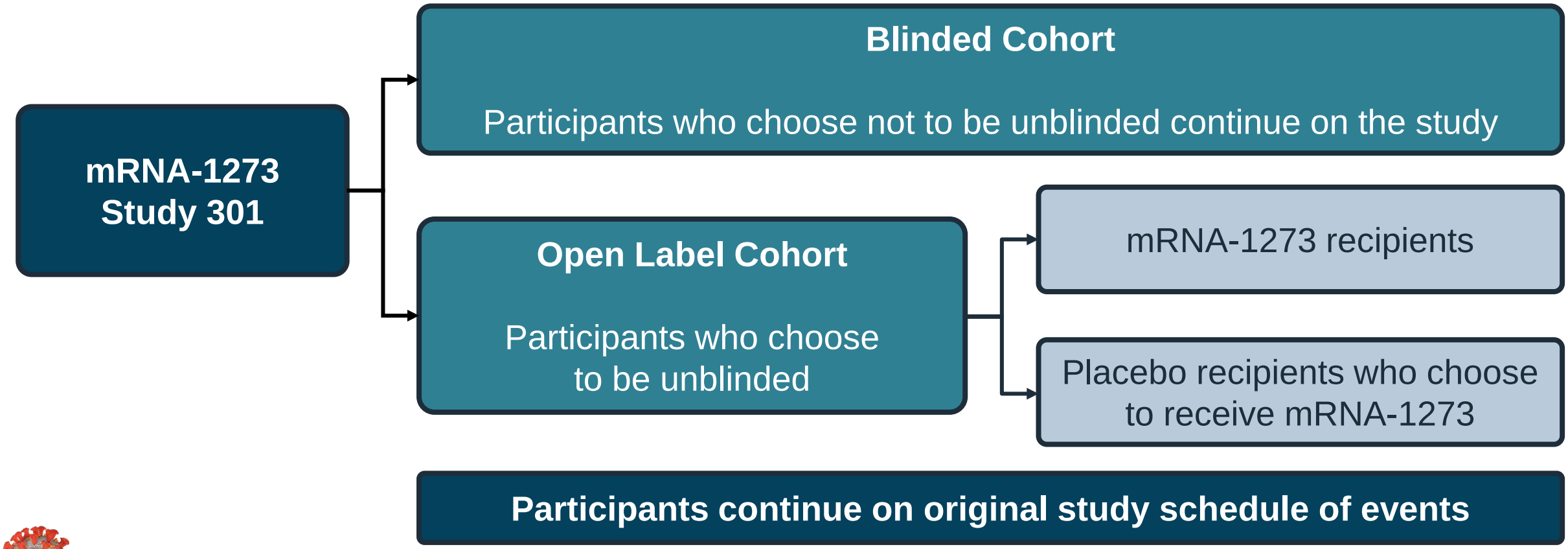
Based on Current CDC Guidance

- Phase 1a: 7,613 Healthcare workers
- Phase 1b: 7,030 Critical Infrastructure workers
- Phase 1c: 7,520 aged 65+
- Phase 1c: 5,065 aged 18-65 and at risk of severe disease

Clinical study vaccine supplies at sites will otherwise go to waste, and can't be used for EUA supply

Proposed Path Forward

Enables Crossover and Minimizes Loss of Follow-up



Advantages of Proposed Trial Design

- Benefits Volunteers
  - Not disadvantaged by trial participation
  - Maintains trust and engagement
  - Allows participants to make rapid and informed decisions
  - Ensure equity in volunteer management
- Benefits Society
  - Maintains trial integrity
  - Minimizes loss of follow-up
  - Allows rigorous, continued collection of safety and effectiveness data
  - Supports future BLA submission

Emergency use of the MODERNA COVID-19 VACCINE for active immunization to prevent COVID-**19 in individuals ≥ 18 years of age**

Tal Zaks, MD PhD

Chief Medical Officer

ModernaTX, Inc.

Data Support Emergency Use Authorization

- Exceed FDA efficacy criteria for BLA
  - VE = 94.1% (89.3%, 96.8%), $p < 0.0001$
  - Consistency among subgroups
  - Very high efficacy maintained against severe disease
- Safety profile well characterized in > 15,000 vaccine recipients
  - Majority of solicited injection and systemic AEs reported as mild-to-moderate and resolve, occur ≤ 7 days of injection

Emergency Use Authorization (EUA) Application for mRNA-1273

ModernaTX, Inc.

Vaccines and Related Biological Products Advisory Committee

December 17, 2020