BNT162b2 Vaccine Candidate Against COVID-19

Vaccines and Related Biological Products Advisory Committee

December 10, 2020

Introduction

Kathrin Jansen, PhD
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Pfizer

Presentation Agenda

Introduction

Kathrin Jansen, PhD
Senior Vice President and Head of Vaccine R&D

BNT162b2 Development Program

- Non-Clinical Data
- Clinical Safety
- Clinical Efficacy

William Gruber, MD, FAAP , FIDSA
Senior Vice President Vaccine Clinical R&D

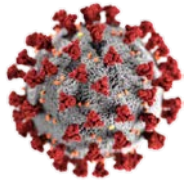
Benefit- Risk & Conclusions

Kathrin Jansen, PhD
Senior Vice President and Head of Vaccine R&D

BNT162b2 Vaccine

Proposed Indication:

Prevention of Coronavirus Disease 2019 (COVID-19) caused by SARS-CoV-2



Individuals 16 years of age and older

DOSE LEVEL and REGIMEN	• **30 µg** • **2 doses given greater than or equal to 21 days apart**
PRESENTATION	• **5 dose multidose vial**
STORAGE*	• **-80ºC to -60ºC** • **5 days at 2º-8ºC**

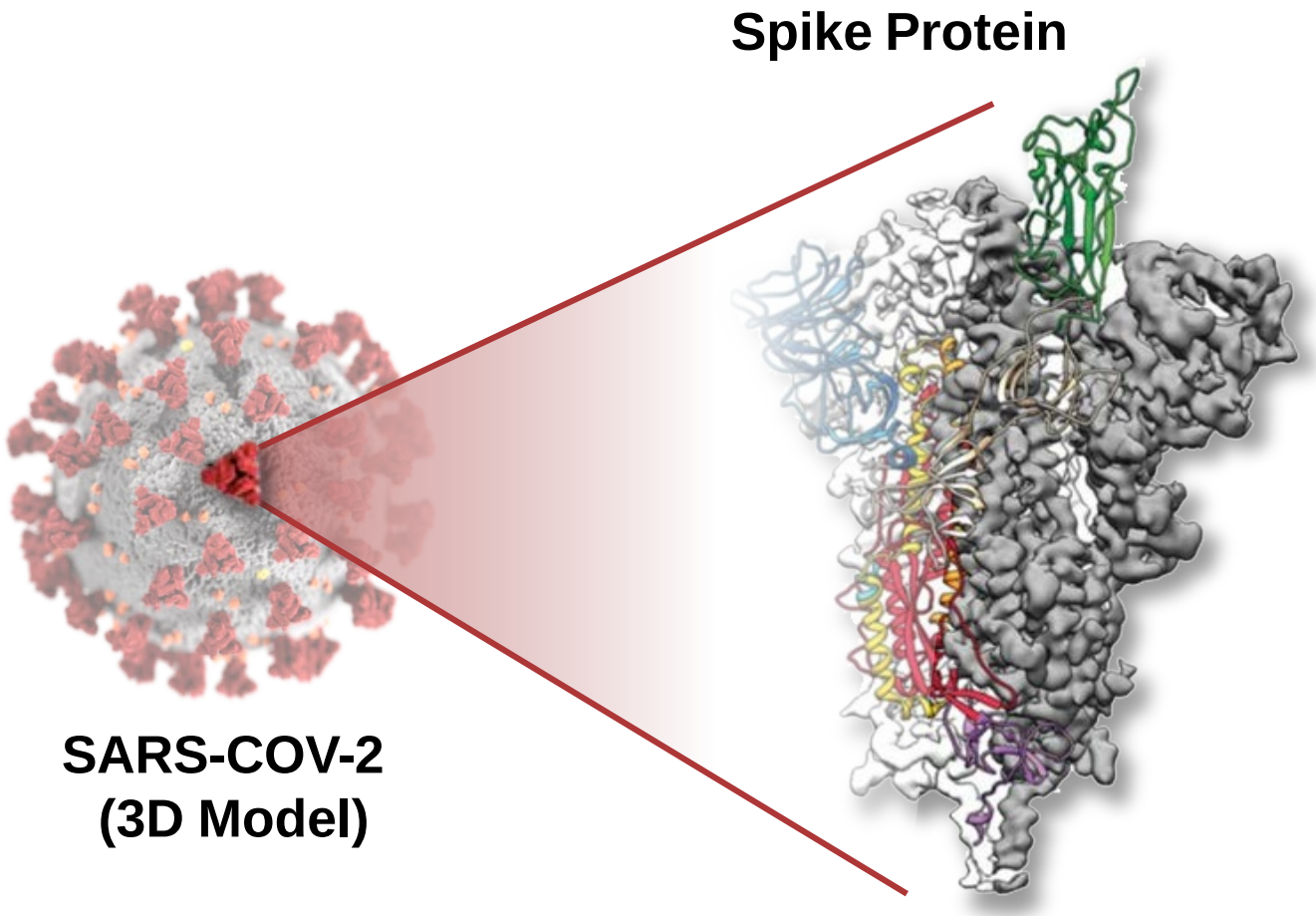
COVID-19 and the Current Health Crisis

- **First case of COVID 19 identified in Wuhan, China in December 2019**
- **Worldwide Pandemic declared in March ’20**
- **~65 million reported cases globally; ~1.5 million deaths (12/3/20)[1]**
  - Severity and case fatality rate highest in elderly and those with hypertension, diabetes, cardiovascular disease, obesity, men, Native Americans, blacks and latinx[2]
  - Groups at high risk for acquisition include healthcare workers, nursing home patients, meat processing plants, correctional facilities, military
- **Recent dramatic increases globally including the United States[2]**
- **Serologic studies indicate we are nowhere near herd immunity thresholds in the US[3]**
- **Treatments are being identified but have limitations**
  - Antivirals, steroids, monoclonal cocktails and hyperimmune plasma

The only way to return to normal lives may be with safe and efficacious vaccines

1. JHU COVID19 site https://coronavirus.jhu.edu/map.html;
2. https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/index.html;
3. https://covid.cdc.gov/covid-data-tracker/#national-lab

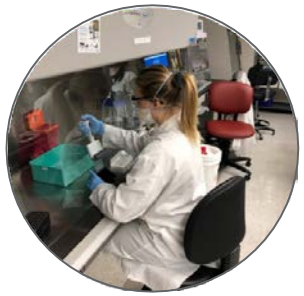
Importance of SARS-COV-2 Spike Protein



1. Wrapp et al., 2020, *Science*.

Advantages of mRNA Vaccine Platform

Safety



Non-infectious, chemically defined, no viral foreign proteins

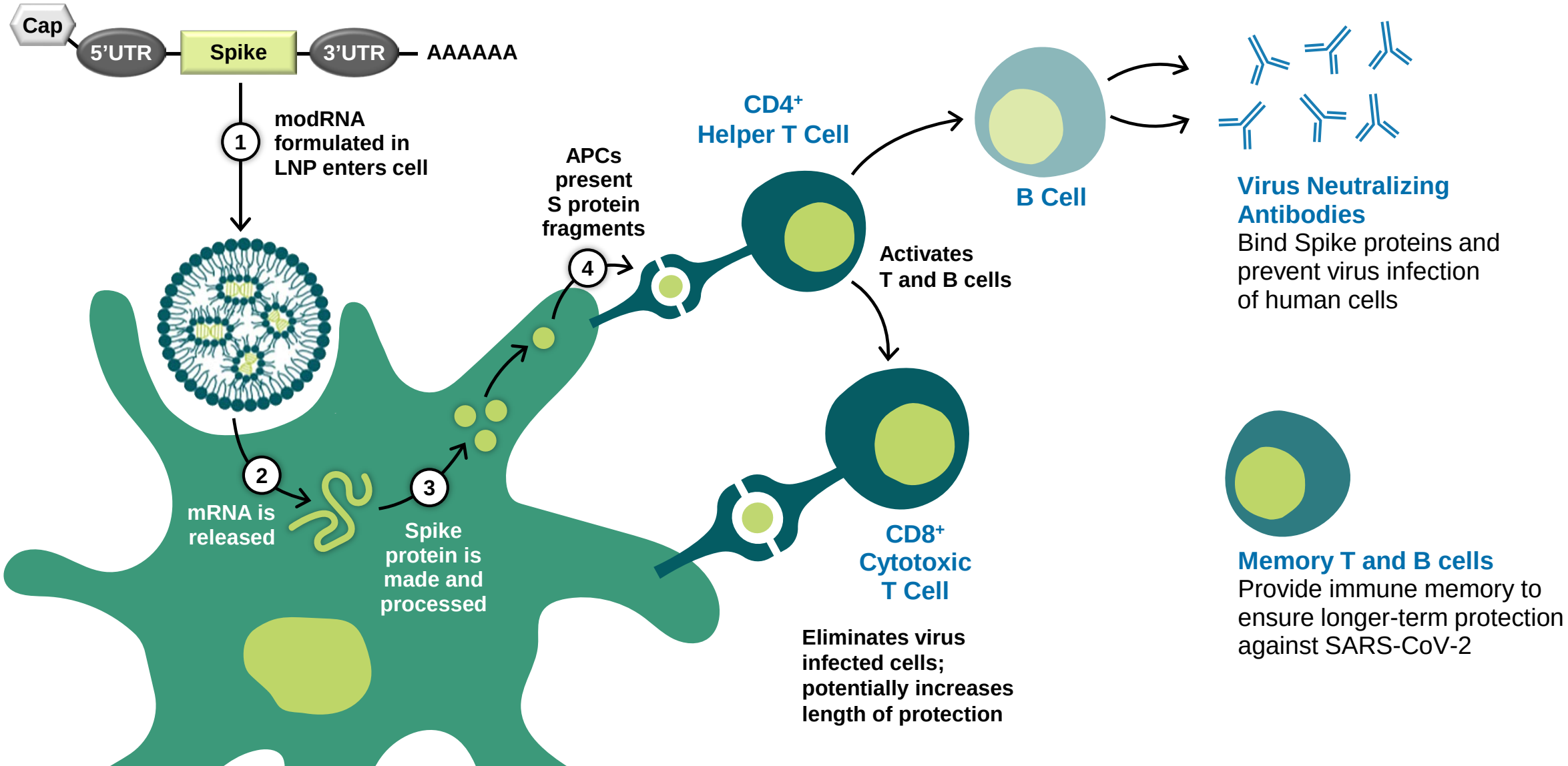
Efficacy

Broad immune responses, minimal risk of anti-vector immunity, and permits **frequent boosting**

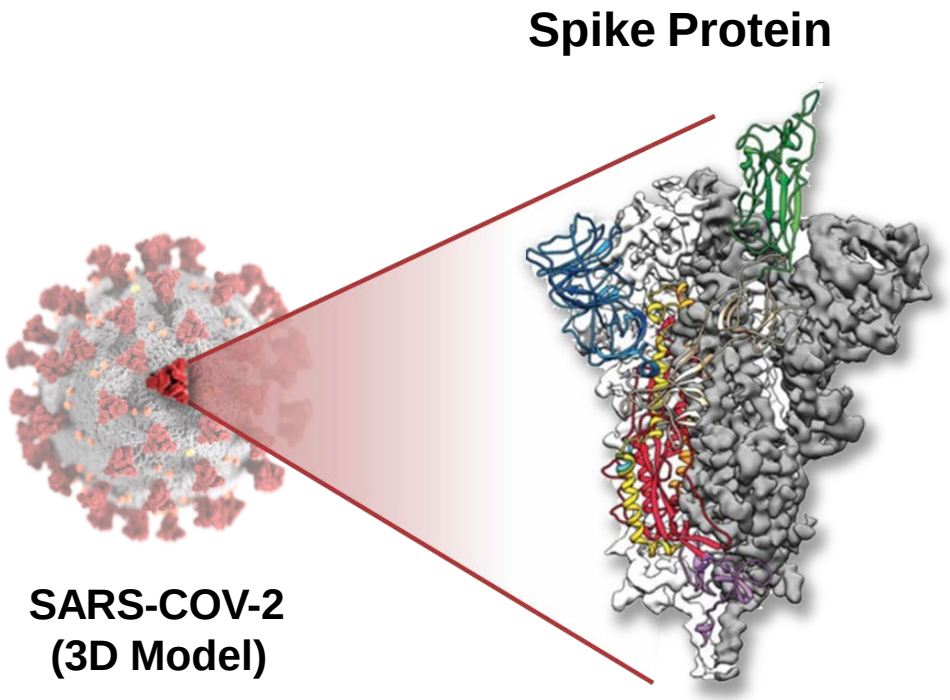
Rapid Response

Technology enables **rapid development** and **quick production scaling**

Mode of Action of the BNT162 Vaccine Candidates



Selection of Pfizer/BioNTech COVID-19 Vaccine BNT162b2



Initially Four Vaccine Candidates

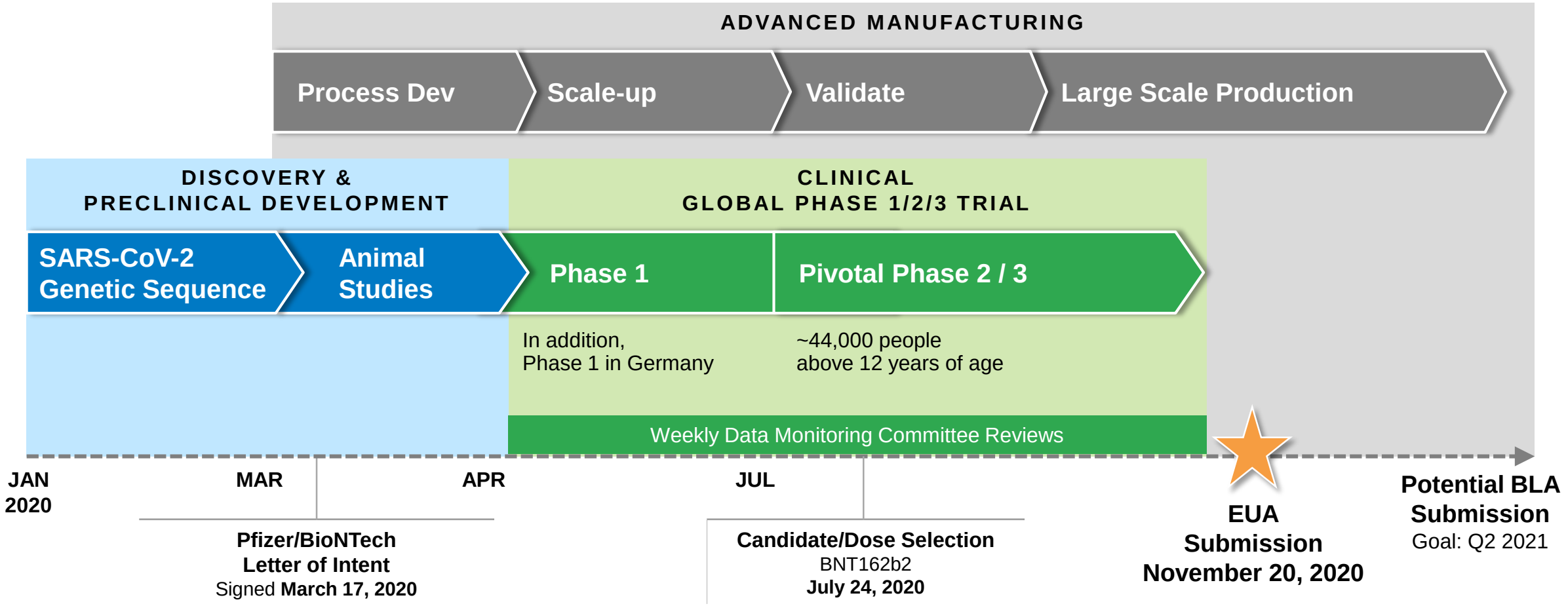
	Variant	Target	RNA Construct	Regimen
1	162a1	RBD subunit	uRNA	Prime/boost
2	162b1	RBD subunit	modRNA	Prime/boost
3	**162b2**	**P2-mutated full spike protein**	**modRNA**	**Prime/boost**
4	162c2	P2-mutated full spike protein	saRNA	Single injection

uRNA: unmodified mRNA
modRNA: nucleoside modified mRNA saRNA: self-amplifying mRNA
1. Wrapp et al., 2020, *Science.*

Top Priorities for Vaccine Development

- **COVID-19 Vaccine development has followed normal vaccine development principles:**
  1. The vaccine must be proven effective, meaning it can help prevent COVID-19 in at least a majority of vaccinated people
  2. The vaccine must be proven safe, with robust safety data generated from thousands of people
  3. The vaccine must be consistently manufactured at the highest quality standards
- **In response to global health crisis we progressed our program swiftly while ensuring highest compliance and quality standards and ensuring safety**

Responding to the Global Health Crisis with the BNT162b2 Vaccine



Note: All future dates represented in graphic reflect anticipated timelines and are subject to clinical, technical, and regulatory success

BNT162b2 – Meets EUA Guidance for COVID-19

Clear and Compelling Data Demonstrating Vaccine's Safety and Efficacy

- ☐ Nonclinical data supports vaccine effectiveness and safety
- ☐ Phase 1 and 2 data support safety and efficacy and duration of protection
- ☐ Meets all safety data expectations for follow up durations and subject number
- ☐ Vaccine Safety / COVID-19 outcomes in individuals with prior SARS-CoV-2
- ☐ Sufficient cases of severe COVID-19 to support low risk for vaccine-induced ERD
- ☐ Final Analysis with a point estimate over 50% (95% efficacy)
- ☐ Vaccine's benefits outweigh its risks based on well-designed Phase 3 clinical trial
- ☐ Consistent Manufacturing data with appropriate controls
- ☐ Plans for active follow up of safety under EUA

BNT162b2 Development Program

William Gruber, MD, FAAP, FIDSA
Senior Vice President Vaccine Clinical R&D
Pfizer

Non-Clinical Data

Key Nonclinical Studies with BNT162b2

Study No.	Study Description	Key Message
Toxicology Studies		
38166	17-Day, 2 or 3 Dose (1 Dose/Week) IM Toxicity in Rats With a 3 Week Recovery Period	**Completed with no safety concerns**
20GR142	17-Day IM Toxicity Study of BNT162b2 and BNT162b3c in Wistar Han Rats with a 3-Week Recovery	**Completed with no safety concerns**
20256434	A Combined Fertility and Developmental Study (Including Teratogenicity and Postnatal Investigations) of BNT162b1, BNT162b2 and BNT162b3 by the Intramuscular Route in the Wistar Rat	**Ongoing with preliminary results mid-December 2020**
Pharmacology Studies		
VR-VTR-10671	BNT162b2 Immunogenicity and Evaluation of Protection against SARS-CoV-2 Challenge in Rhesus Macaques	**Completed and showed that BNT162b2 protects against SARS-CoV 2**

Vogel A, Kanevsky I, Che Y, et al. bioRxiv 2020.09.08.280818; doi: https://doi.org/10.1101/2020.09.08.280818 [preprint]4b

Clinical Safety, Immunogenicity, and Efficacy of BNT162b2

Efficacy & Safety Topics

- **Phase 1 German and US studies**
  - Safety
  - Immunogenicity
- **Phase 2/3 global study**
  - Study design
  - Primary/secondary objectives
  - COVID-19 definitions
  - Safety
  - Efficacy

BNT162b2 Phase 1 Studies

German Study
BNT162-01

- 18-55 years of age
- 12 active vaccine/cohort
- Safety, immunogenicity
- Cell Mediated Responses

US Study
C4591001

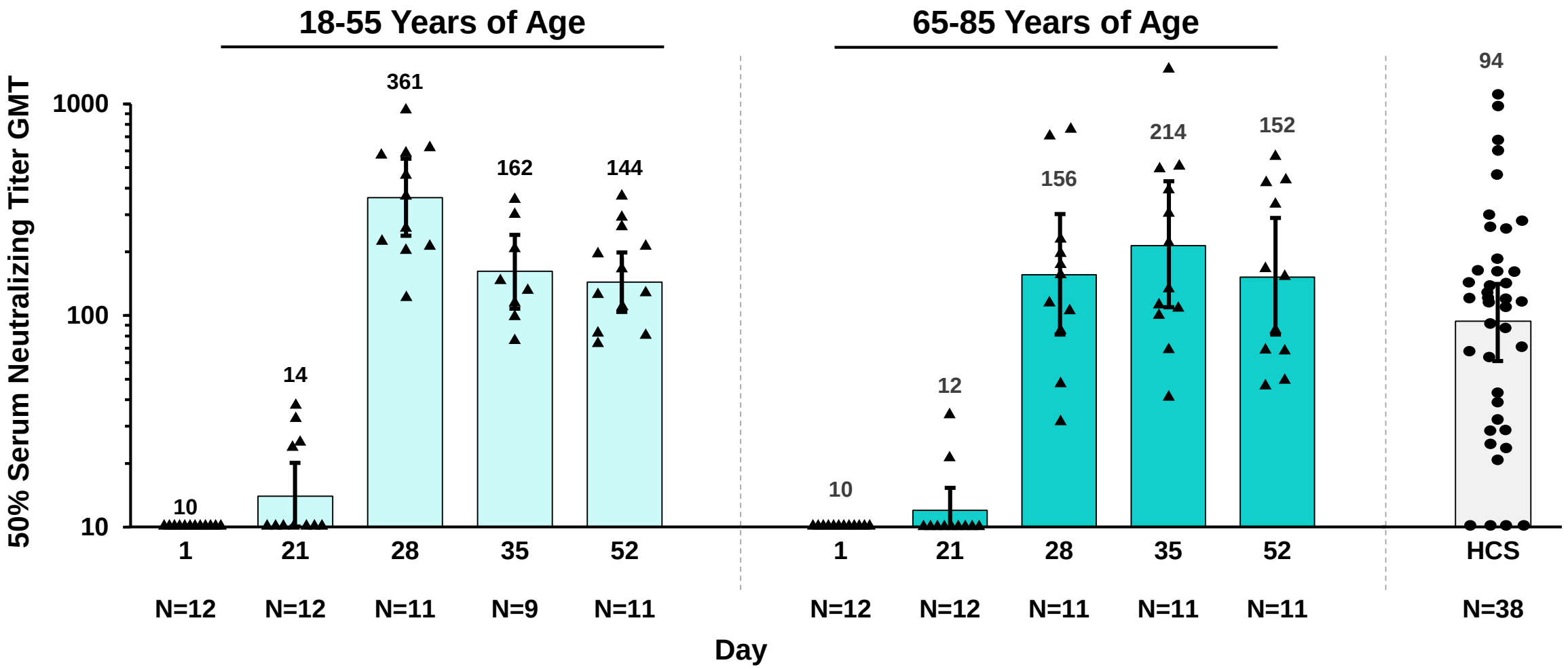
- 18-55 and 65-85 years of age
- 12 active vaccine, 3 placebo/cohort
- Safety, immunogenicity
- Reactogenicity by e-diary

Reactogenicity in Phase 1

- **Mild-moderate injection site pain observed frequently**
- **Fever and chills observed, generally mild-moderate**
- **Reactogenicity was generally higher after Dose 2 than Dose 1**
- **Reactogenicity events after each dose of BNT162b2 in older adults were milder and less frequent than those observed in younger adults**

Sahin U, et al. *Nature*. 2020.
Walsh EE, et al. *N Engl J Med*. 2020

Two 30 µg Doses of BNT162b2 Induce Neutralizing Antibody Titers Comparable or Higher than Natural Infection



Walsh EE, et al. *N Engl J Med*. 2020

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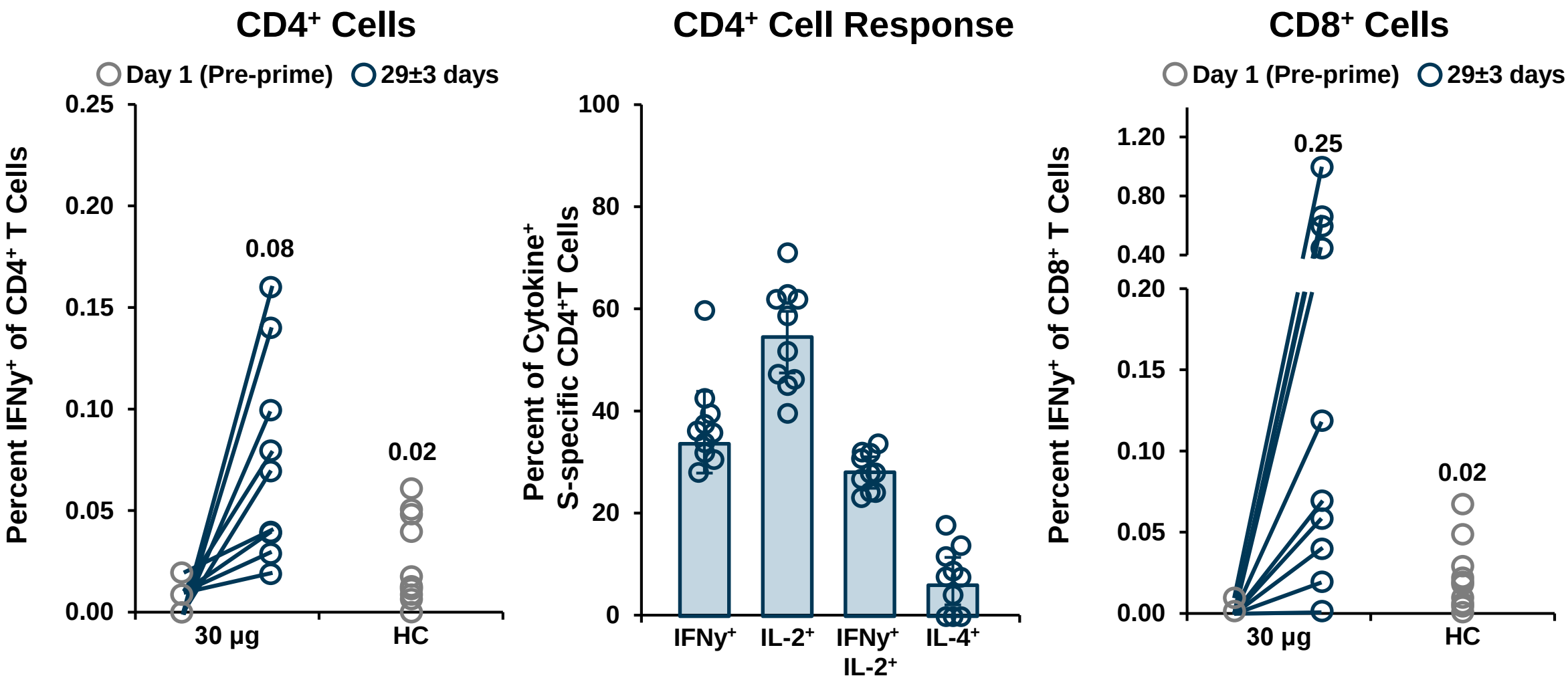
BNT162b2 Elicits Strong Th1-biased CD4+ and CD8+ T Cell Responses (German Trial)



Sahin et al., manuscript in preparation

Planned Subjects in Pivotal Study

- **44,000 healthy subjects enrollment target**
  - Stable chronic disease allowed
  - Stable HIV, HBV, HCV
- **At least 40% ages 56 years or older**
- **Balanced racial and ethnicity profile**
  - Black/African American
  - Asian
  - Hispanic/Latinx
- **Immunocompromised excluded**

Limited number of 12-15 yo not part of EUA application

Demographic Characteristics
Phase 2/3 (N=43,448)

		BNT162b2 (30 µg) N=21,720 n (%)	Placebo N=21,728 N (%)	Total N=43,448 n (%)
Sex	Male	11,183 (51.5)	10,942 (50.4)	22,125 (50.9)
	Female	10,537 (48.5)	10,786 (49.6)	21,323 (49.1)
Race	White	17,839 (82.1)	17,857 (82.2)	35,696 (82.2)
	Black or African American	2,091 (9.6)	2,107 (9.7)	4,198 (9.7)
	All others	1,790 (8.2)	1,764 (8.1)	3,554 (8.2)
Ethnicity	Hispanic/Latino	5,672 (26.1)	5,668 (26.1)	11,340 (26.1)
	Non-Hispanic/non-Latino	15,928 (73.3)	15,940 (73.4)	31,868 (73.3)
	Not reported	120 (0.6)	120 (0.6)	240 (0.6)
Age	16-55 Years	12,780 (58.8)	12,822 (59.0)	25,602 (58.9)
	>55 Years	8,940 (41.2)	8,906 (41.0)	17,846 (41.1)
	16-64 Years	17,176 (79.1)	17,190 (79.1)	34,366 (79.1)
	65-74 Years	3,620 (16.7)	3,646 (16.8)	7,266 (16.7)
	≥75 Years	924 (4.3)	892 (4.1)	1,816 (4.2)

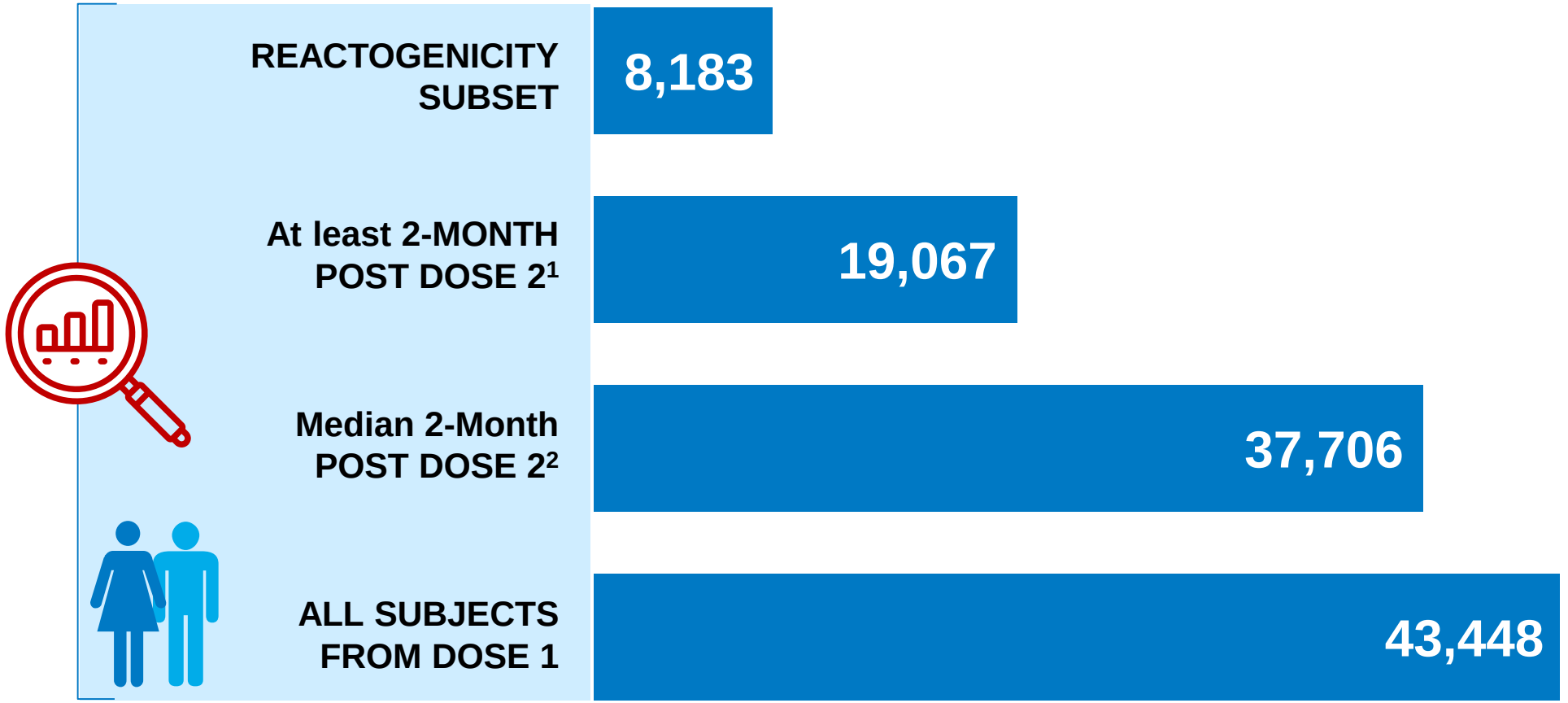
>9000 (20.9%)

Safety

Safety Review by Independent Data Monitoring Committee

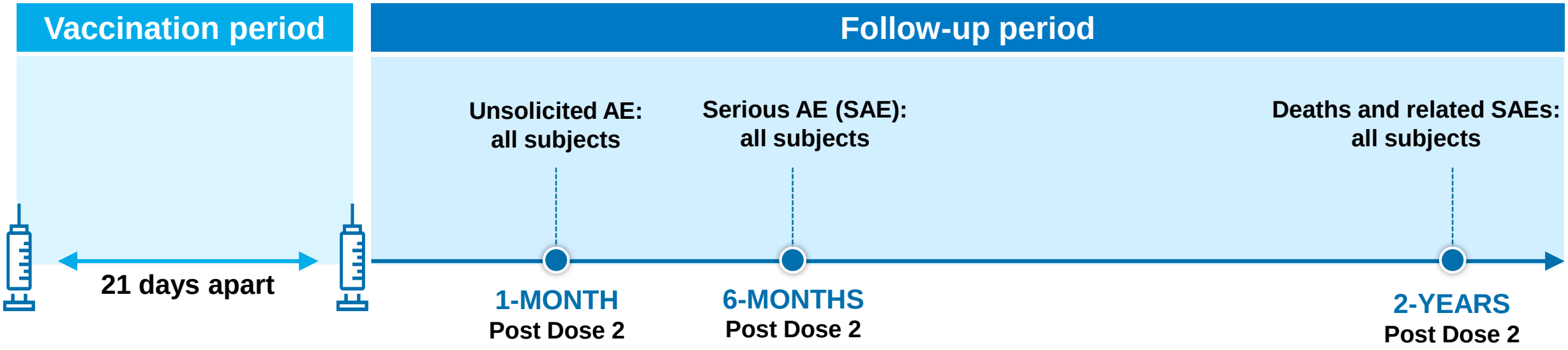
- **DMC consists of 4 adult/ pediatric infectious diseases experts, and one statistician all with expertise in assessing vaccine safety, immune response, and efficacy**
- **DMC meets weekly to review unblinded safety data**
- **DMC has identified no safety concerns during the duration of the clinical trial and recommended that study continues as planned at all safety reviews**

Summary of Safety Data



1. All subjects who have at least 2 months of safety follow-up post dose 2
2. 91.6% (34,532) had at least 1 month of safety follow-up post dose 2

Phase 2/3 Safety – Study Start 27 July, 2020



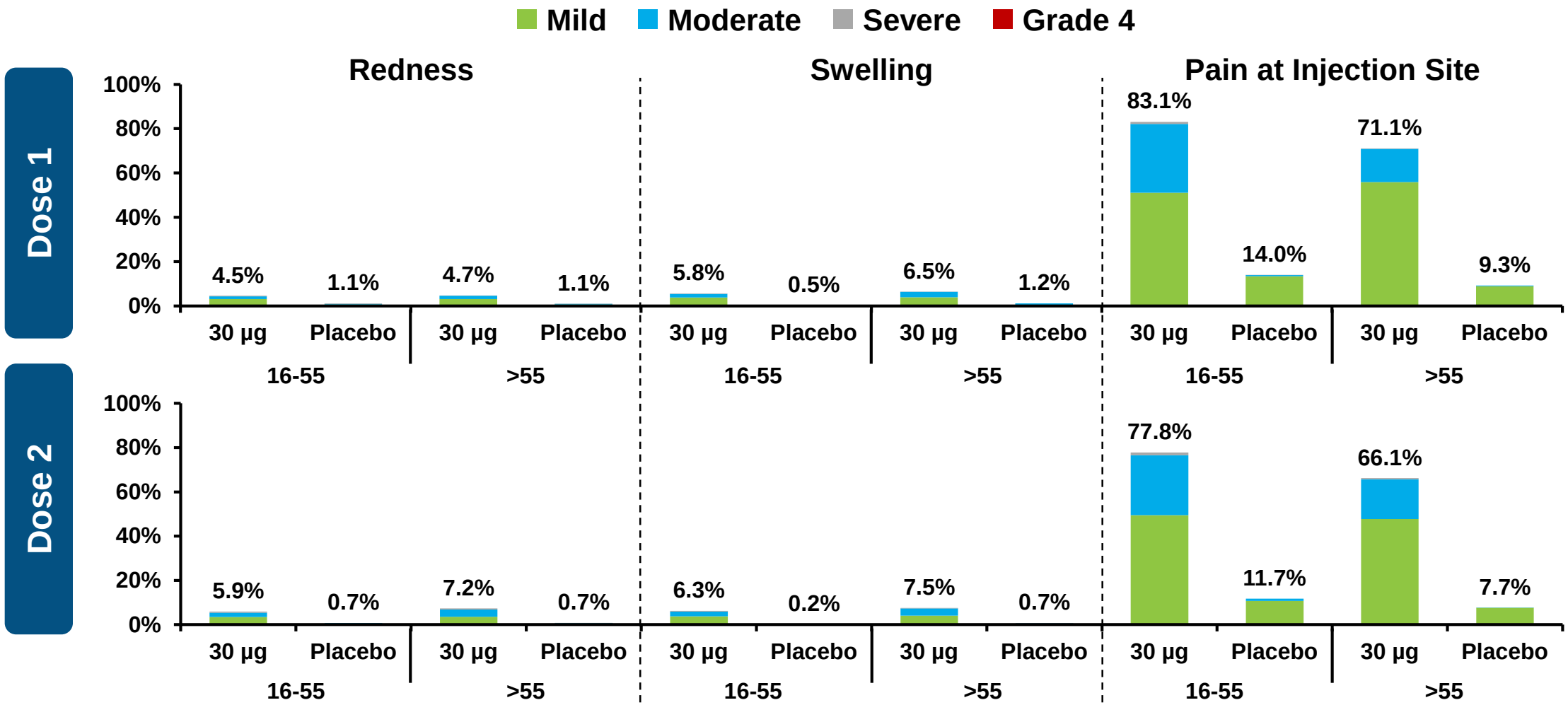
Active surveillance begins after 1st dose
Potential COVID-19 symptoms **TRIGGER** telehealth or in-person visit and nasal swab

7 DAYS

7 DAYS

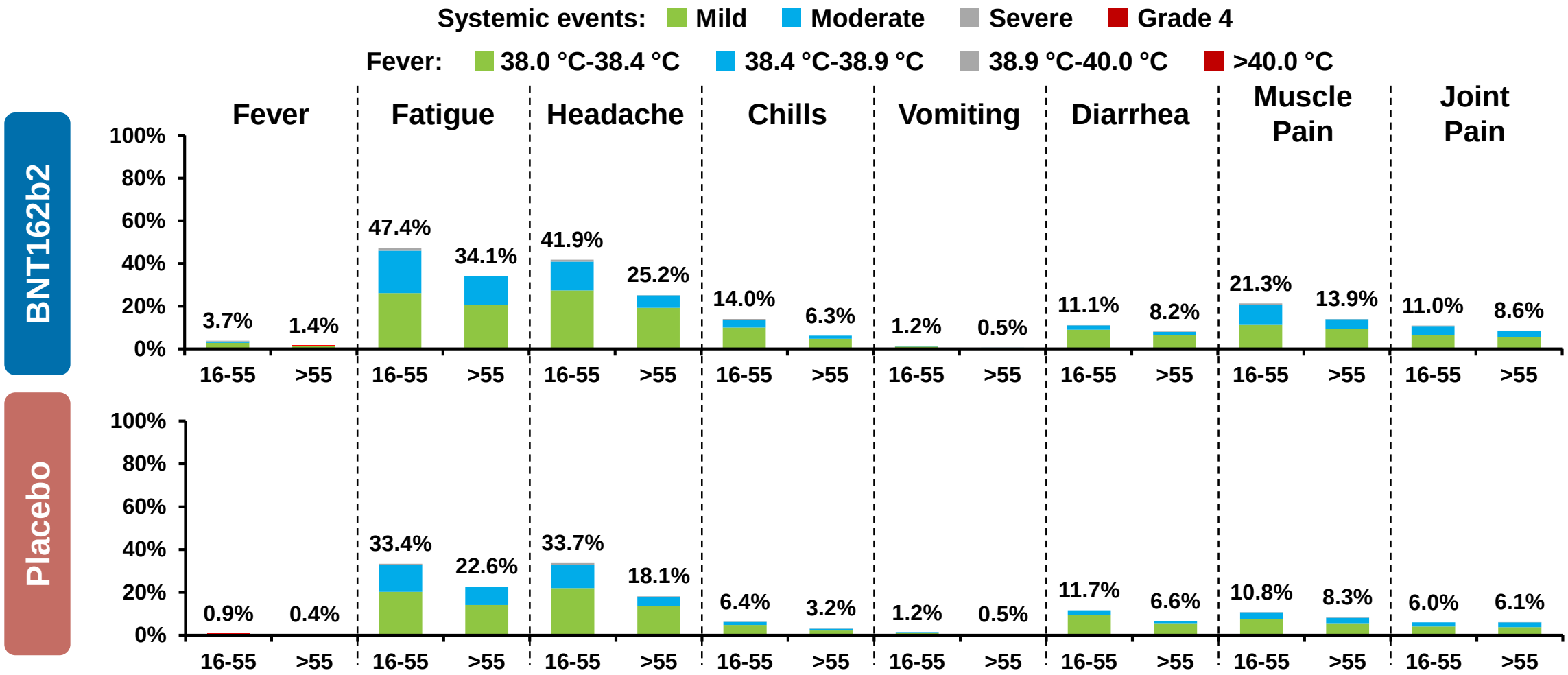
Reactogenicity:
at least 6,000 subjects, at least 500 in each country

eDiary: Local Events Within 7 Days From Dose 1 and 2 in 16-55 and >55 Year Olds (N=8,183)



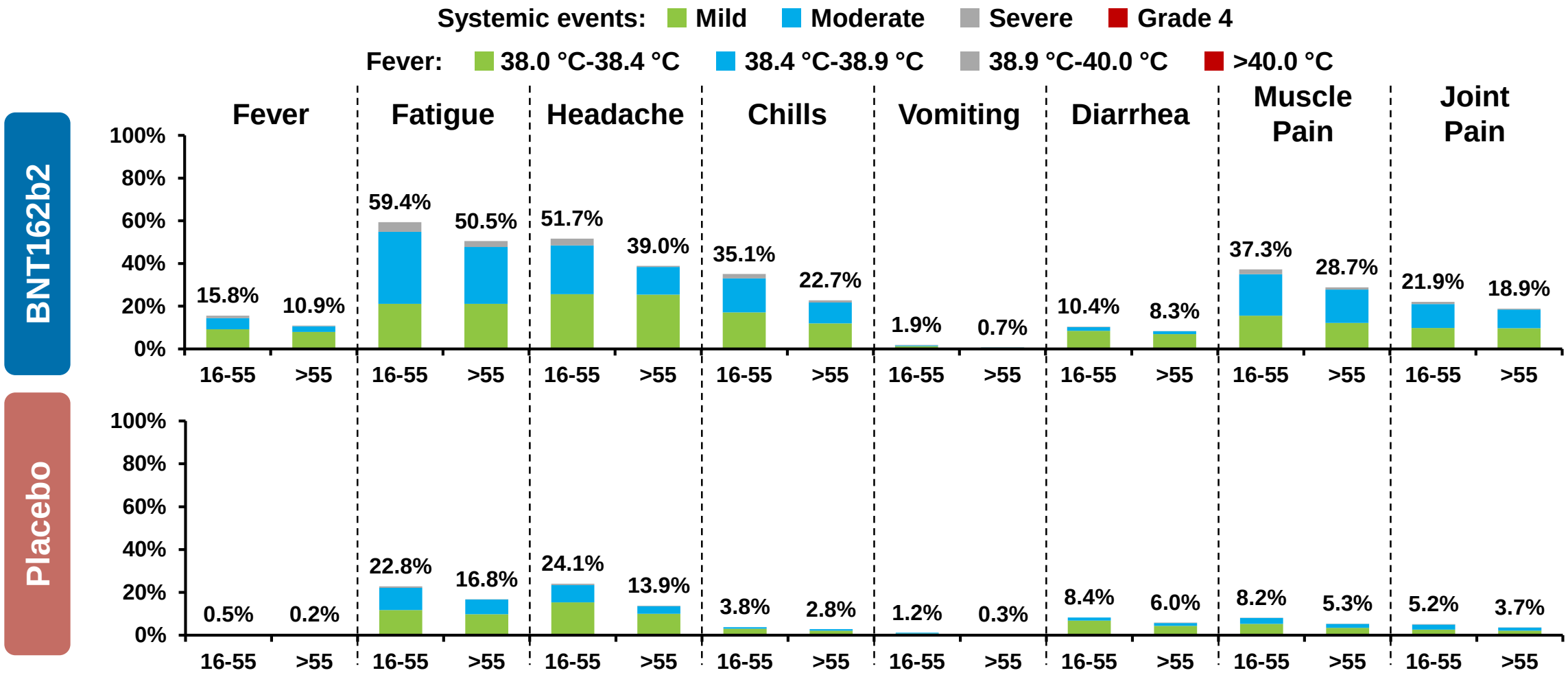
Redness and sweeling severity definition: Mild= >2-5cm, Moderate= >5-10 cm; Severe= >10 cm; Grade 4= necrosis
Pain at injection site severity definition: Mild=no interference; Moderate=some interference; Severe=prevents daily activity; Grade 4=ER visit or hospitalization
Dose 1: 16-55 yrs N=4589; >55 yrs N=3594 Dose 2: 16-55 yrs N=4201 >55 yrs N=3306

eDiary: Systemic Events Within 7 Days From Dose 1 in 16-55 and >55 Year Olds (N=8,183)



Fatigue, headache, chills, muscle pain, joint pain severity definition: Mild=no interference; Moderate=some interference; Severe=prevents daily activity; Grade 4=ER visit or hospitalization
Vomiting severity definition: Mild=1-2 time in 24h; Moderate=>2times in 24h; Severe=Requires IV hydration; Grade 4=ER visit or hospitalization
Diarrhea severity definition: Mild=2-3 times in 24h; Moderate=4-5 times in 24h; Severe=6 or more times in 24h; Grade 4=ER visit or hospitalization
Dose 1: 16-55 yrs N=4589; >55 yrs N=3594 Dose 2: 16-55 yrs N=4201 >55 yrs N=3306

eDiary: Systemic Events Within 7 Days From Dose 2 in 16-55 and >55 Year Olds (N=8,183)



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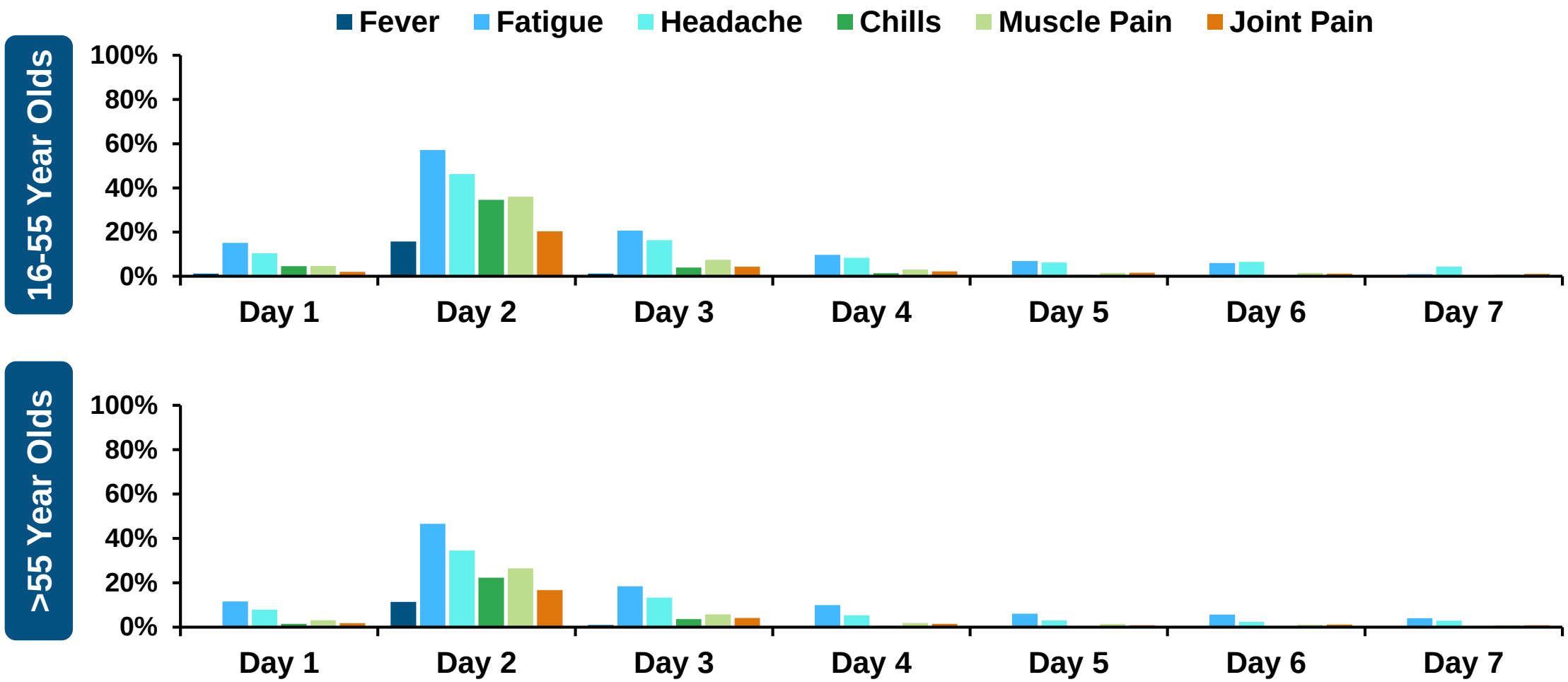
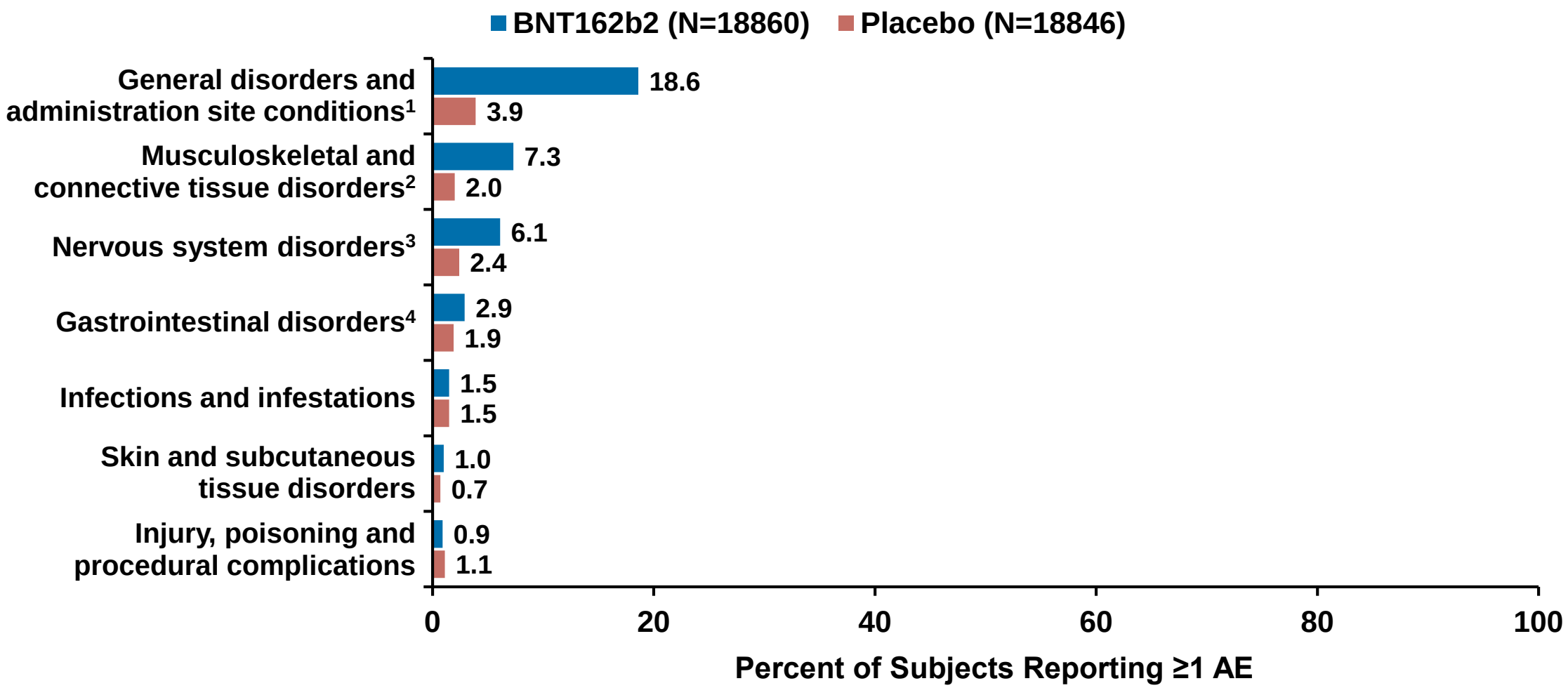
Dose 1: 16-55 yrs N=4589; >55 yrs N=3594 Dose 2: 16-55 yrs N=4201 >55 yrs N=3306

eDiary: Systemic Events Each Day From Dose 2 in 16-55 and >55 Year Olds (N=8,183) BNT162b2



Adverse Events ≥1.0% by System Organ Class

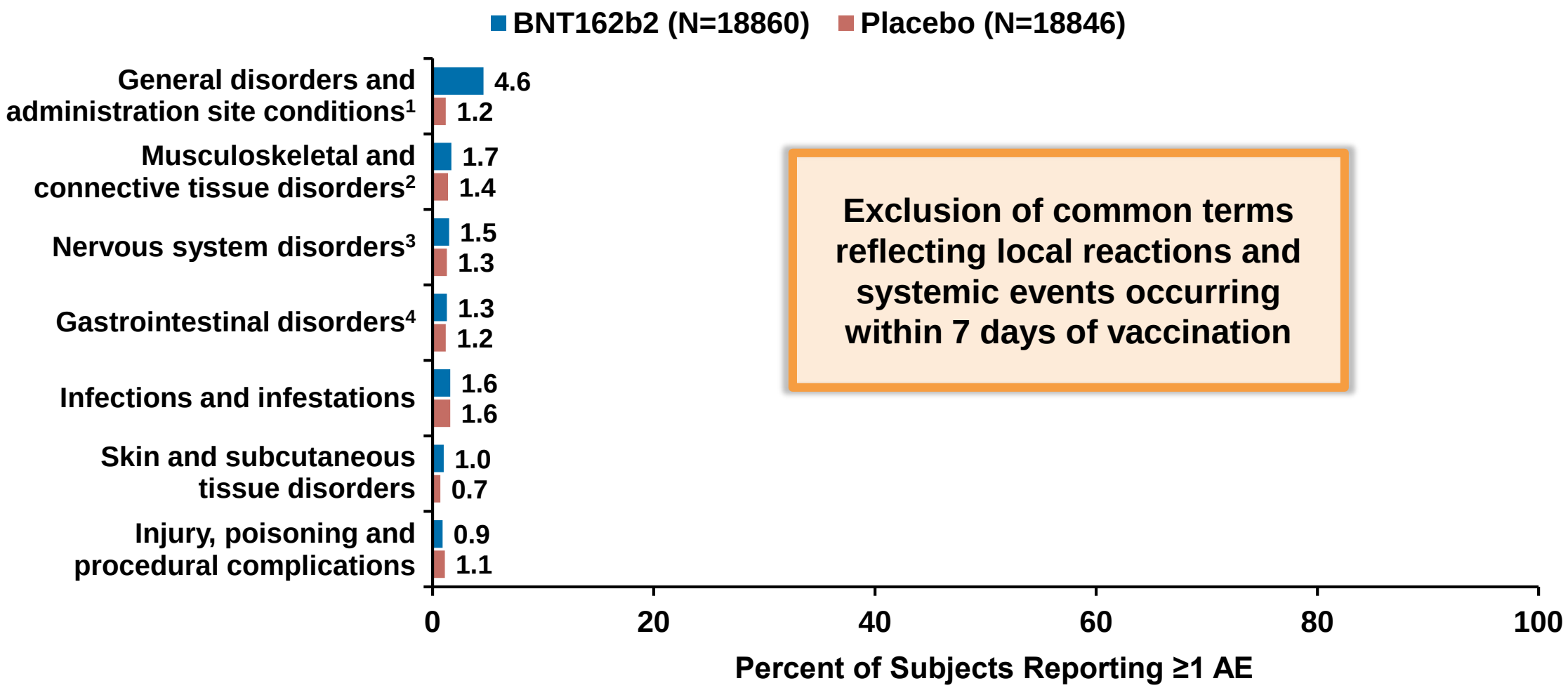
~50% of Subjects with Mean of 2 Months Post Dose 2 (N=37,706)



1. Predominantly reflect local reactions at the injection site and systemic reactions of fatigue and chills
2. Predominantly reflect myalgias and arthralgia's as part of systemic events
3. Predominantly reflects Headache
4. Predominantly reflects diarrhea and vomiting

Adverse Events ≥1.0% by System Organ Class

~50% of Subjects with Mean of 2 Months Post Dose 2 (N=37,706)



Exclusion of common terms reflecting local reactions and systemic events occurring within 7 days of vaccination

1. Predominantly reflect local reactions at the injection site and systemic reactions of fatigue and chills
2. Predominantly reflect myalgias and arthralgia's as part of systemic events
3. Predominantly reflects Headache
4. Predominantly reflects diarrhea and vomiting

Serious Adverse Events by System Organ Class ≥0.1%
All Enrolled Subjects (N=43,448)

	BNT162b2 (30 µg) N=21,720 n (%)	Placebo N=21,728 n (%)
Any event	126 (0.6)	111 (0.5)
Infections and infestations	27 (0.1)	17 (0.1)
Cardiac disorders	18 (0.1)	18 (0.1)
Nervous system disorders	18 (0.1)	16 (0.1)
Neoplasms benign, malignant and unspecified (incl cysts and polyps)	11 (0.1)	8 (0.0)
Injury, poisoning and procedural complications	8 (0.0)	12 (0.1)

Deaths

All Enrolled Subjects (N=43,448)

	BNT162b2 (30 µg) N=21,720 n (%)	Placebo N=21,728 n (%)
Deaths	**2 (0.0)**	**4 (0.0)**

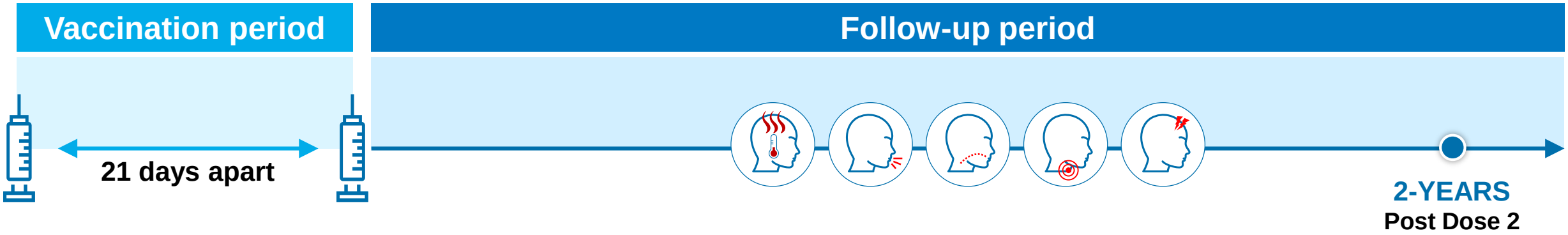
Safety Conclusions

- **Tolerability and safety profile of BNT162b2 at 30 µg administered as a 2-dose regimen 21 days apart is favorable**

- **No clinically significant safety findings other than mild or moderate reactogenicity were identified**

Efficacy

Phase 2/3 Efficacy Analysis



Prior infection status

Before each dose

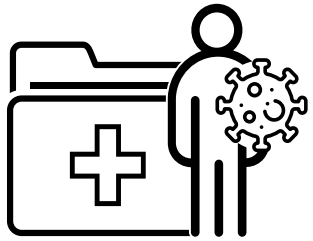
- Swab for SARS-CoV-2 PCR
- Blood for N-antigen antibodies

Active surveillance begins after 1st dose

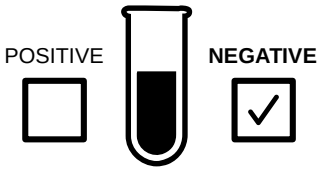
Potential COVID-19 symptoms **TRIGGER** telehealth or in-person visit and nasal swab

*Only primary and secondary endpoints after dose 2

COVID-19 First Primary Endpoint Case Definition



COVID-19 Case



Baseline **NEGATIVE** by serology & PCR

=

1 or more
of these symptoms

Fever	**New or increased cough**	**New or increased shortness of breath**
Chills	**New or increased muscle pain**	**New loss of taste/smell**
Sore throat	**Diarrhea**	**Vomiting**

+

Positive validated PCR in central laboratory

CDC definition also includes fatigue, headache, nasal congestion or runny nose, and nausea

First COVID-19 Occurrence From 7 Days After Dose 2

Phase 2/3 Efficacy – Final Analysis

Subjects WITHOUT Evidence of Infection Prior to 7 days after Dose 2

	BNT162b2 (30 µg) N=18,198		Placebo N=18,325				
Efficacy Endpoint	n	Surveillance Time (n)	n	Surveillance Time (n)	VE (%)	(95% CI)	Pr (VE >30%)
First COVID-19 occurrence >7 days after Dose 2	8	2.214 (17,411)	162	2.222 (17,511)	95.0	(90.3, 97.6)	>0.9999

Total surveillance time: 1000 person-years for all subjects within each group at risk for the endpoint..
Pr=Posterior probability

First COVID-19 Occurrence From 7 Days After Dose 2

Phase 2/3 Efficacy – Final Analysis: Subgroups

Subjects WITHOUT Evidence of Infection Prior to 7 days after Dose 2

		BNT162b2 N=18,198 n	Placebo N=18,325 n	VE (%)	(95% CI)
Overall		8	162	95.0	(90.0, 97.9)
Age	18-64 years	7	143	95.1	(89.6, 98.1)
	65-74 years	1	14	92.9	(53.1, 99.8)
	≥75 years	0	5	100.0	(-13.1, 100.0)
Sex	Male	3	81	96.4	(88.9, 99.3)
	Female	5	81	93.7	(84.7, 98.0)
Race	White	7	146	95.2	(89.8, 98.1)
	Black or African American	0	7	100.0	(31.2, 100.0)
	All Others	1	9	89.3	(22.6, 99.8)
Ethnicity	Hispanic/Latino	3	53	94.4	(82.7, 98.9)
	Non-Hispanic/Non-Latino	5	109	95.4	(88.9, 98.5)
Country	Argentina	1	35	97.2	(83.3, 99.9)
	Brazil	1	8	87.7	(8.1, 99.7)
	USA	6	119	94.9	(88.6, 98.2)

First COVID-19 Occurrence From 7 Days After Dose 2

Phase 2/3 Efficacy – Final Analysis: Risk Factor Subgroups

Subjects WITHOUT Evidence of Infection Prior to 7 days after Dose 2

		BNT162b2 N=18,198 n	Placebo N=18,325 n	VE (%)	(95% CI)
Overall		8	162	95.0	(90.0, 97.9)
At risk[1]	Yes	4	86	95.3	(87.7, 98.8)
	No	4	76	94.7	(85.9, 98.6)
Age group at risk	16-64 and not at risk	4	69	94.2	(84.4, 98.5)
	16-64 and at risk	3	74	95.9	(87.6, 99.2)
	≥65 and not at risk	0	7	100.0	(29.0, 100.0)
	≥65 and at risk	1	12	91.7	(44.2, 99.8)
Obese[2]	Yes	3	67	95.4	(86.0, 99.1)
	No	5	95	94.8	(87.4, 98.3)
Age group and obese	16-64 and not obese	4	83	95.2	(87.3, 98.7)
	16-64 and obese	3	60	94.9	(84.4, 99.0)
	≥65 and not at obese	1	12	91.8	(44.5, 99.8)
	≥65 and obese	0	7	100.0	(27.1, 100.0)

[1] At least one of Charlson Comorbidity index or obesity
[2] Obesity: BMI ≥ 30 kg/m^2

First COVID-19 Occurrence From 7 Days After Dose 2 by Comorbidity Status – Evaluable Efficacy (7 Days) Population

Subjects WITHOUT Evidence of Infection Prior to 7 days after Dose 2

	BNT162b2 (30 µg) N=18,198		Placebo N=18,325			
	n	Surveillance Time (n)	n	Surveillance Time (n)	VE (%)	(95% CI)
Overall	8	2.214 (17,411)	162	2.222 (17,511)	95.0	(90.0, 97.9)
Comorbidity						
No comorbidity	4		76		94.7	(85.9, 98.6)
Any comorbidity	4		86		95.3	(87.7, 98.8)
Any malignancy	1		4		75.7	(-145.8, 99.5)
Cardiovascular	0		5		100.0	(-0.8, 100.0)
Chronic pulmonary disease	1		14		93.0	(54.1, 99.8)
Diabetes	1		19		94.7	(66.8, 99.9)
Obese (≥30.0 kg/m^2)	3		67		95.4	(86.0, 99.1)
Hypertension	2		44		95.4	(82.6, 99.5)
Diabetes (including gestational diabetes)	1		20		95.0	(68.7, 99.9)

First COVID-19 Occurrence From 7 Days After Dose 2

Phase 2/3 Efficacy – Final Analysis

Subjects WITH or WITHOUT Evidence of Infection Prior to 7 days after Dose 2

	Vaccine Group (as Randomized)						
	BNT162b2 (30 µg) N=19,965		Placebo N=20,172				
Efficacy Endpoint	n	Surveillance Time (n)	n	Surveillance Time (n)	VE (%)	(95% CI)	Pr (VE >30%)
First COVID-19 occurrence >7 days after Dose 2	9	2.332 (18,559)	169	2.345 (18,708)	94.6	(89.9, 97.3)	>0.9999

Total surveillance time: 1000 person-years for all subjects within each group at risk for the endpoint..
Pr=Posterior probability

Definition of Severe COVID-19 Case Per FDA Guidance

- **Any of the following:**
  - Admission to ICU
  - Clinical signs at rest indicative of severe systemic illness (RR ≥30 breaths per minute, HR ≥125 beats per minute, SpO2 ≤93% on room air at sea level, or PaO2/FiO2 <300 mm Hg)
  - Evidence of shock (SBP <90 mm Hg, DBP <60 mm Hg, or requiring vasopressors)
  - Significant acute renal, hepatic, or neurologic dysfunction
  - Respiratory failure (defined as needing high-flow oxygen, non-invasive ventilation, mechanical ventilation, or ECMO)
  - Death

BNT162b2 Protects Against Severe Disease

Phase 2/3 Efficacy – Final Analysis (FDA Definition)

	BNT162b2 (30 µg) N=18,198		Placebo N=18,325				
Efficacy Endpoint	n	Surveillance Time (n)	n	Surveillance Time (n)	VE (%)	(95% CI)	Pr (VE >30%)
First Severe COVID-19 occurrence ≥7 days after Dose 2	1	2.215 (17,411)	3	2.232 (17,511)	66.4	(-124.8, 96.3)	0.7429

	BNT162b2 (30 µg) N=21,669		Placebo N=21,686			
Efficacy Endpoint	n	Surveillance Time (n)	n	Surveillance Time (n)	VE (%)	(95% CI)
First Severe COVID-19 occurrence after Dose 1	1	4.021 (21,314)	9	4.006 (21,259)	88.9	(20.1, 99.7)

Total surveillance time: 1000 person-years for all subjects within each group at risk for the endpoint.
Pr=Posterior probability

BNT162b2 Protects Against Severe Disease

Phase 2/3 Efficacy – Post-Hoc Analysis (CDC Definition)

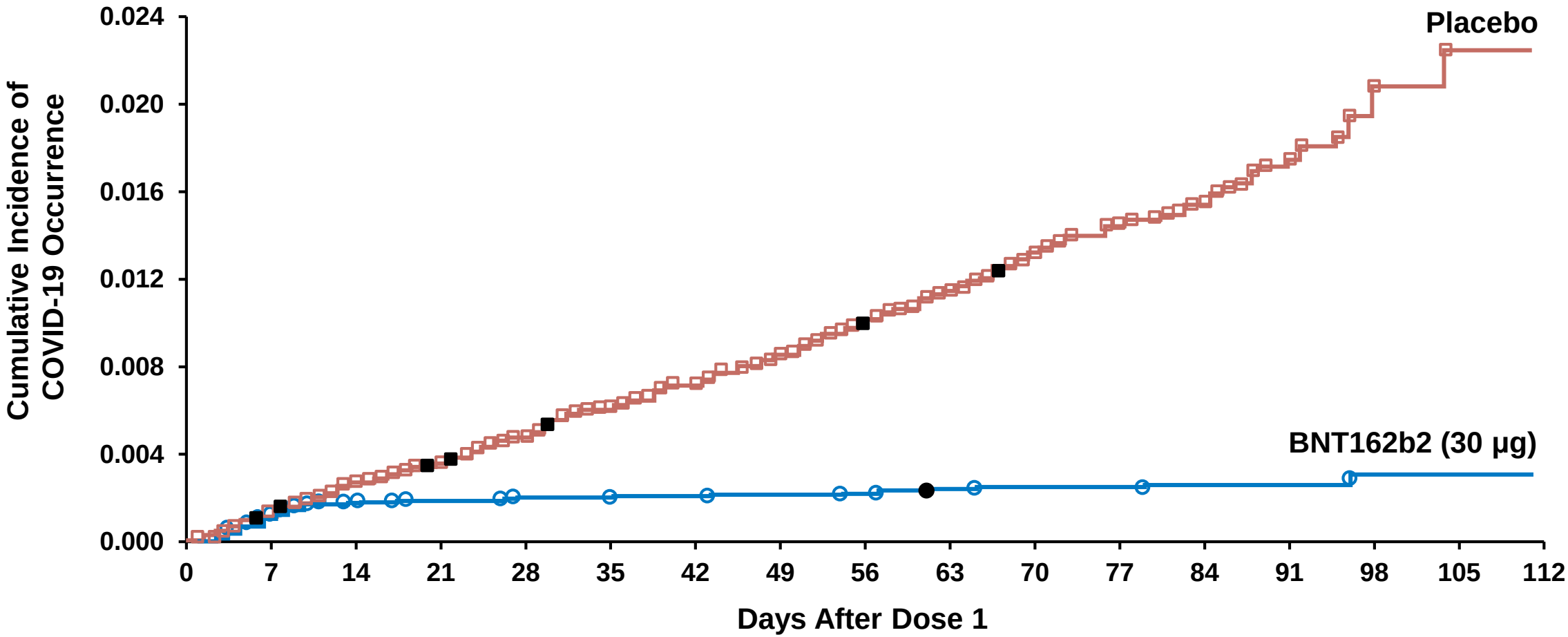
Severe illness – CDC Definition: hospitalization, admission to ICU, intubation or mechanical ventilation or death

	BNT162b2 (30 µg) N=18,198		Placebo N=18,325			
Efficacy Endpoint	n	Surveillance Time (n)	n	Surveillance Time (n)	VE (%)	(95% CI)
First Severe COVID-19 occurrence ≥7 days after Dose 2	0	2.213 (17,399)	5	2.229 (17,495)	100.0	(-9.9, 100.0)

	BNT162b2 (30 µg) N=21,669		Placebo N=21,686			
Efficacy Endpoint	n	Surveillance Time (n)	n	Surveillance Time (n)	VE (%)	(95% CI)
First Severe COVID-19 occurrence after Dose 1	1	4.018 (21,299)	14	4.001 (21,238)	92.9	(53.2, 99.8)

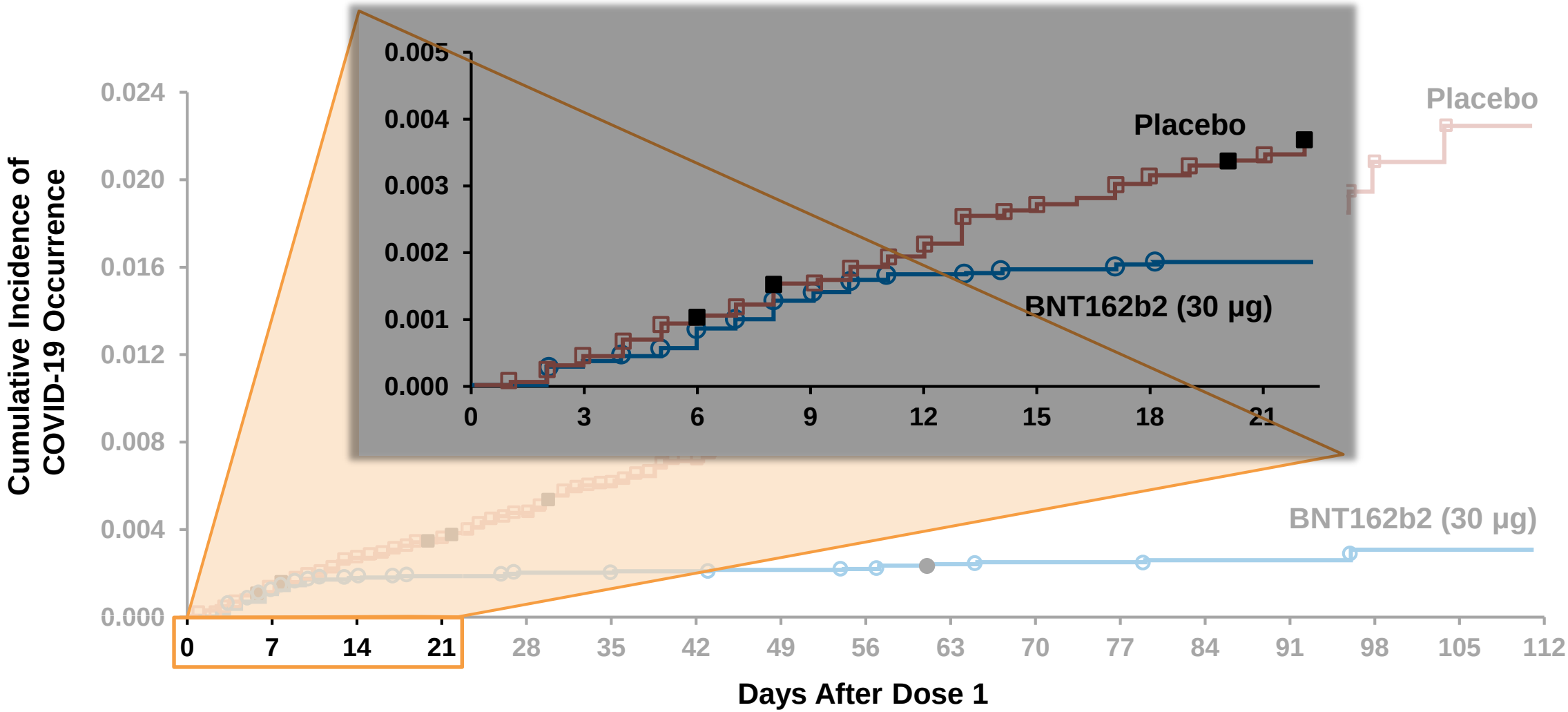
Total surveillance time: 1000 person-years for all subjects within each group at risk for the endpoint.
"Severe illness from COVID-19 is defined as hospitalization, admission to the ICU, intubation or mechanical ventilation, or death"
https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html

Cumulative Incidence of COVID-19 After Dose 1



Solid fill marker indicates subjects with severe COVID-19 per FDA definition

Cumulative Incidence of COVID-19 After Dose 1



Solid fill marker indicates subjects with severe COVID-19 per FDA definition

First COVID-19 Occurrence After Dose 1

	BNT162b2 (30 µg) N=21,669 n	Placebo N=21,686 n	VE (%)	(95% CI)
COVID-19 occurrence after Dose 1	50	275	82.0	(75.6, 86.9)
After Dose 1 and before Dose 2	39	82	52.4	(29.5, 68.4)
Dose 2 to 7 days after Dose 2	2	21	90.5	(61.0, 98.9)
≥7 days after Dose 2	9	172	94.8	(89.8, 97.6)

Efficacy Conclusions

- **Both primary objectives met success criteria**
- **In individuals without prior SARS-CoV-2 infection, observed Vaccine efficacy against COVID-19 occurring at least 7 days after Dose 2 was 95%, with high probability (97.5%) that the true vaccine efficacy is at least 90%**
- **Observed Vaccine Efficacy was >93% for the first primary endpoint across age, race, ethnicity, and at-risk subgroups**

Efficacy Conclusions (Continued)

- **Per FDA definition, 9 severe COVID-19 cases were observed in the placebo group and 1 in the BNT162b2 group after dose 1**
- **Early onset of protection is apparent from the cumulative incidence curve, with divergence by 14 days after Dose 1**
- **Overall, the efficacy results show that BNT162b2 at 30 µg provides protection against COVID-19 in participants who had or did not have prior SARS-CoV-2 infection**

Summary of Safety Analyses Available

EUA

Reactogenicity in ~8,000 total

AE/SAE assessed in 37,706 total with median 2 month follow-up post dose 2

AE/SAE in 43,448 total in age 16 years and above

BLA

Reactogenicity >8,000 total

AE/SAE assessed in ~44,000 total with at least 6000 participants with 6 month or more post dose 2

Reactogenicity and AE/SAE in 12-15 year old cohort

Note: Active vaccination in half of the subjects

Summary of Efficacy Analyses Available

	EUA	BLA	
Efficacy on 164+ cases • With and With/Without prior infection • Cases after 7 days post-dose 2	✓	✓	EUA data
Cases after 14 days post-dose 2	✓	✓	EUA data
Severe cases after 7 & 14 days post-dose 2	✓	✓	EUA data
Efficacy by subsets	✓	✓	EUA data
Phase 1 Immunogenicity 1m PD2 in 18-55 and 65-85 years of age	✓	✓	EUA data
Phase 2 Immunogenicity 1m PD2 in 18-55 and 56-85 years of age	✓	✓	EUA data

Additional Planned Analyses

- Efficacy against asymptomatic infection
- Persistence of protection
- 12-15 yo immunobridging

Note: Active vaccination in half of the subjects

Management of Placebo Recipients

- **Ethical responsibility to inform study participants of COVID-19 vaccine availability under EUA**
- **Eligible participants in the placebo group will have the option to receive the vaccine**
  - Participants who meet the EUA and current recommendation guidelines eligibility criteria
  - Vaccination of other participants will expand over time
- **Participants have the option to remain blinded through study completion**
- **The study will continue for the planned 24 months**

Pharmacovigilance & Pharmacoepidemiology Plan

Pharmacovigilance

- Expanded intake capability with AE portal
- Active follow-up of safety reports
- Frequent signal detection and evaluation
- Post-approval safety monitoring
- Clinical studies in vulnerable populations

Pharmacoepidemiology Studies

- Safety event background rates (contextualization)
- Extended follow up (30 months) for high-severity low-incidence events in large populations
- Vaccine effectiveness

Proactive Risk minimization

- Labeling & Educational Materials
- Real-time product quality monitoring (cold-chain)

Collaborate with Vaccine Safety Stakeholders

- Interface with CDC (VAERS, V-SAFE, VSD, CISA) to optimize pharmacovigilance activities
- Collaborate with international groups to ensure consistent approach to PV

Real-world, Test-negative Design (TND) Vaccine Effectiveness Studies

Against severe, important endpoints like:

- Hospitalization
- Emergency Dept. (ED) visits

In specific populations:

- Race/ethnicity
- Elderly
- Nursing home residents
- Healthcare workers

Understand VE:

- When vaccine is used in “real-world” conditions outside controlled trial
- In broader populations

Studies will complement CDC planned effectiveness studies

Plans for BNT162b2 Clinical Studies Beyond C4591001

- **Boostability**
- **Dose ranging and studies in pediatrics**
- **Use in pregnancy**
- **Use in Immunocompromised**
- **Refrigerator stable second-generation formulation**
- **Co-administration of influenza vaccine being considered**

Benefit-Risk & Conclusions

Kathrin Jansen, PhD
Senior Vice President & Head of Vaccine R&D
Pfizer

BNT162b2 – Meets EUA Guidance for COVID-19

Clear and Compelling Data Demonstrating Vaccine's Safety and Efficacy

- ☑ Nonclinical data supports vaccine effectiveness and safety
- ☑ Phase 1 and 2 data support safety and efficacy and longer duration of protection
- ☑ Meets all safety data expectations for follow up durations and subject number
- ☑ Vaccine Safety / COVID-19 outcomes in individuals with prior SARS-CoV-2
- ☑ Sufficient cases of severe COVID-19 to support low risk for vaccine-induced ERD
- ☑ Final Analysis with a point estimate over 50% (95% efficacy)
- ☑ Vaccine's benefits outweigh its risks based on well-designed Phase 3 clinical trial
- ☑ Consistent Manufacturing data with appropriate controls
- ☑ Plans for active follow up of safety under EUA

Positive Benefit-Risk of BNT162b2 Vaccine

- **Effective for the proposed indication:**
  - Prevention of Coronavirus Disease 2019 (COVID-19) caused by SARS-CoV-2 in individuals 16 years of age and older
- **No safety concerns identified in 43,448 subjects analyzed**
  - No evidence of enhanced disease in vaccine recipients
- **Observed overall efficacy was 95%**
  - Efficacious in younger and older adults
  - Efficacious across diverse demographics and at-risk individuals
  - Efficacious against severe disease

Why an EUA for BNT162b2?

THE VACCINE IS TOLERABLE AND HIGHLY EFFICACIOUS

- **Vaccine efficacy of 95%**
- Similar efficacy for key high-risk subgroups including the elderly and racial/ethnic minorities
- Reactogenicity profile and SAEs comparable to other licensed vaccines
- Extensive post-approval pharmacovigilance in place

TIMING IS IMPORTANT TO IMPACT THE PANDEMIC

- **55,000 US deaths per month** could occur over the next few months[1]
- A COVID-19 vaccine can prevent many deaths[2]
- A pandemic vaccine must be introduced **before the peak** of cases to have maximal impact[2,3]
- A highly effective vaccine may be able to induce herd immunity[4]

1. IHME. https://covid19.healthdata.org/united-states-of-america?view=total-deaths&tab=trend Estimates from Dec 2020-Feb 1 2021
2. Biggerstaff M. Oct 2020 ACIP meeting. Up to 20–35% of cases and deaths can be averted with a vaccine if it is introduced before COVID-19 incidence starts falling. Based on vaccination of persons during Phase 1A and 1B of likely COVID-19 vaccine allocation plan with an infection-blocking vaccine. Assumes 200M total vaccine courses (ie, 2 dose regimens) during this allocation period. https://www.cdc.gov/vaccines/acip/meetings/slides-2020-10.html
3. Biggerstaff M, Reed C, Swerdlow D, et al. *Clinical Infectious Diseases* 2015;60(S1):S20–9
4. Anderson R, Vegvari C, Truscott J, Collyer BS. Lancet. Published Online November 4, 2020 https://doi.org/10.1016/ S0140-6736(20)32318-7

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  - Colleagues at BioNTech, and Pfizer

BNT162b2 Vaccine Candidate Against COVID-19

Vaccines and Related Biological Products Advisory Committee

December 10, 2020

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