



# V116: An Investigational Adult Specific Pneumococcal Conjugate Vaccine

## Key Results from the Phase 3 Clinical Development Program

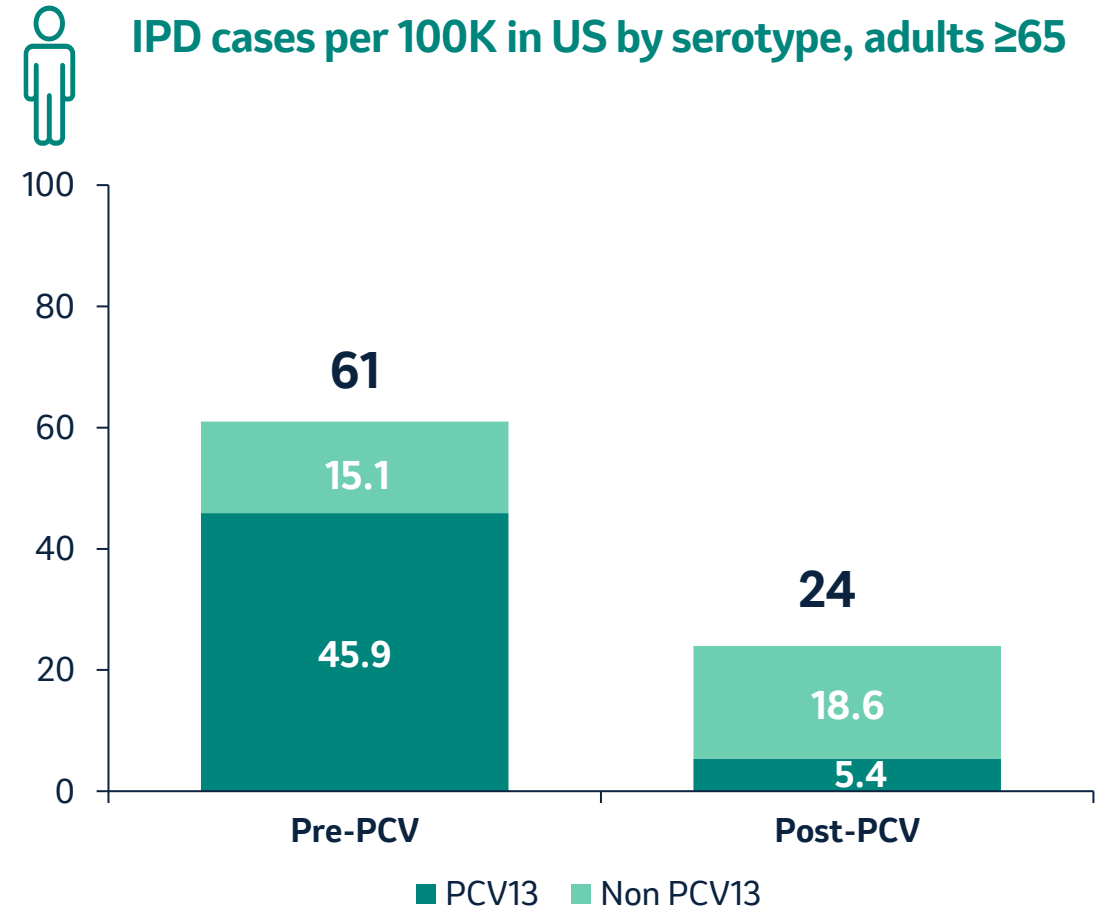
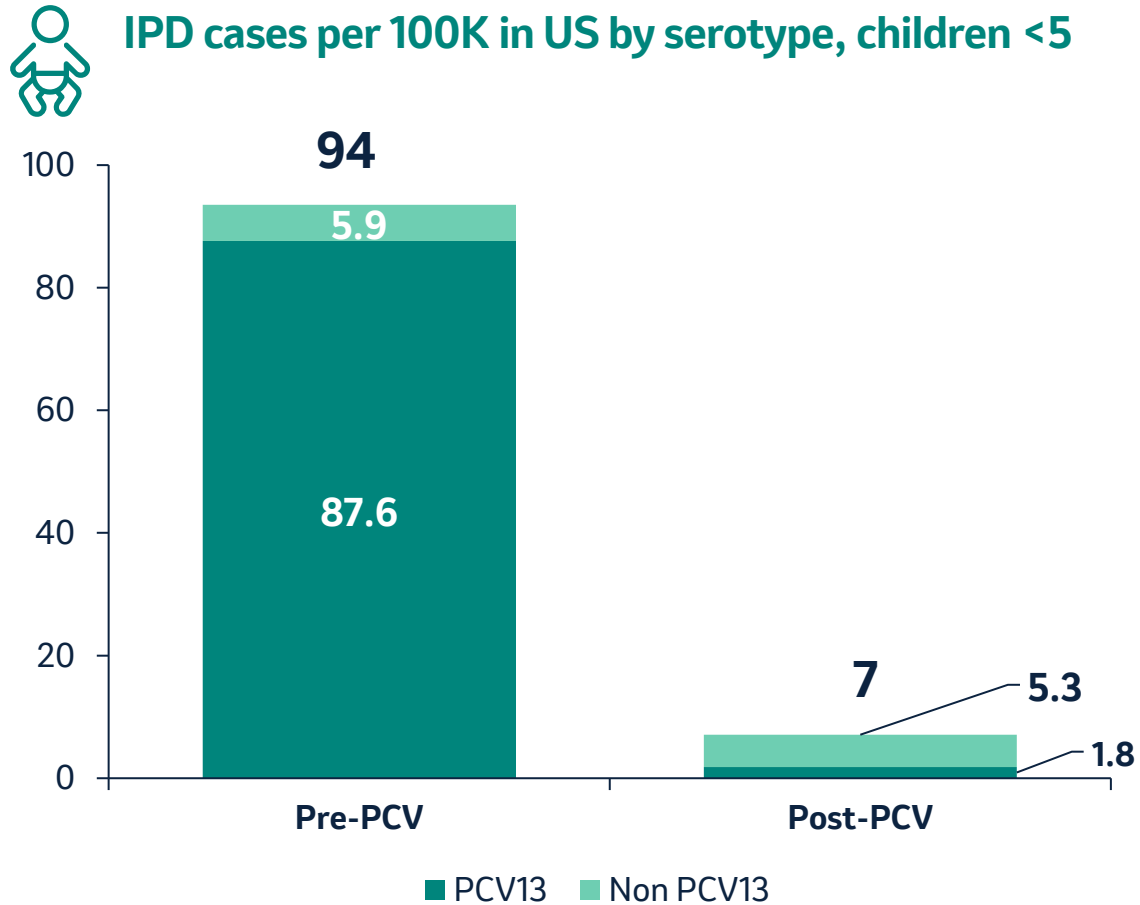
ACIP Meeting, 29-Feb-2024

Heather Platt, M.D., on behalf of the V116 team  
Distinguished Scientist, Global Clinical Development  
Merck Research Laboratories  
Merck & Company, Inc.

# Presentation

- ◆ Rationale for Development of V116
- ◆ Overview of V116 Adult Clinical Development Program
- ◆ Immunogenicity Results
  - Vaccine naïve adults  $\geq 18$  years of age
  - Vaccine experienced adults  $\geq 50$  years of age
- ◆ Integrated Summary of Safety
  - Vaccine naïve and vaccine experienced adults  $\geq 18$  years of age
- ◆ Supportive Studies
  - V116 in individuals living with HIV
  - V116 administered with concomitant influenza vaccine
  - V116 lot consistency
- ◆ Conclusions
- ◆ Questions

# The introduction of PCVs has significantly decreased disease incidence in children and changed epidemiology of IPD in adults in the US



\*Centers for Disease Control and Prevention, IPD serotype data 2019, as compiled from data provided through Active Bacterial Core surveillance (ABCs).

# Rationale for Development of V116

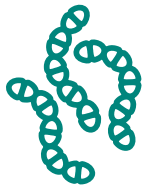
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**Indirect protection through pediatric vaccination**

PCV use in infants has significantly decreased the burden of disease in adults through **indirect protection**.

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**Unmet medical need in adults**

The burden of disease in adults remains high; IPD due to **non-vaccine serotypes** has increased in adults.

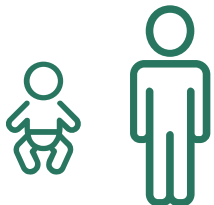
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**Population-specific vaccination**

V116 being developed as a **population-specific vaccine** to prevent invasive disease and pneumonia in adults.

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**Complementary to pediatric PCVs**

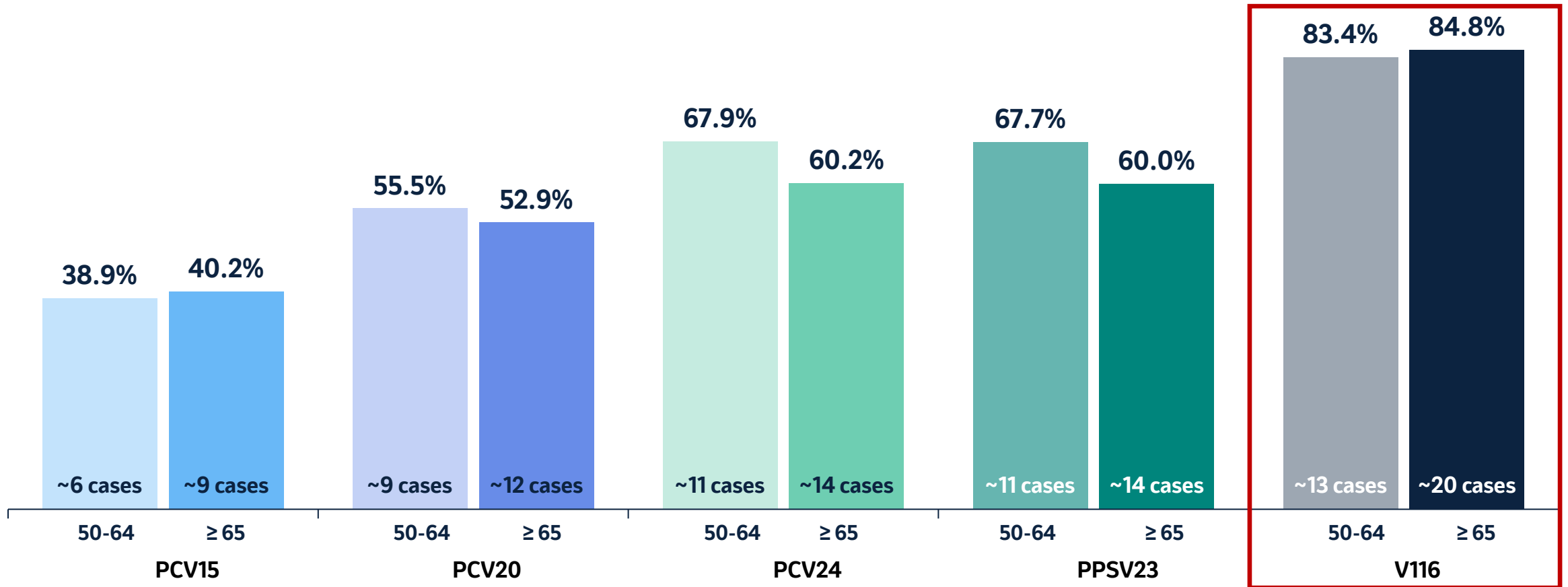
V116 is designed to **complement PCV pediatric immunization** programs.

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# In adults 50–64 and ≥65 years of age, serotypes in V116 are responsible for the majority of residual IPD in adults

IPD coverage (% of serotypes and cases per 100,000) in US Adults 50–64 and ≥65 years of age, 2019



# V116 Phase 3 Clinical Development Program

# V116 Clinical Development Program focused on enrolling participants at risk for pneumococcal disease

**V116-P004**  
Clinical Lot Consistency  
(n=2040)

18 - 49 years old

**V116-P003**  
Pivotal  
(n=2600)

≥ 18 years old

**V116-P005**  
Concomitant Flu  
(n=1000)

≥ 50 years old

**V116-P006**  
Vaccine Experienced  
(n=700)

**V116-007**  
High Risk (HIV)  
(n=300)

≥ 18 years old

**V116-008**  
At-Risk Adults  
(n=900)

18 - 64 years old

**V116-013**  
Pediatric with Increased Risk  
(n=820)

≥ 2 - <18 years old



# 4 Studies in the V116 BLA submission represent a broad, diverse patient population

<b>V116-P004</b> Clinical Lot Consistency (n=2040)	<b>V116-P003</b> Pivotal (n=2600)	<b>V116-P005</b> Concomitant Flu (n=1000)	<b>V116-P006</b> Vaccine Experienced (n=700)
18 - 49 years old	≥ 18 years old	≥ 50 years old	

**Over 6,500 adults enrolled**

- >1/3 were ≥65 years

**Vaccine-Experienced**

- 18% of adults had previously received a pneumococcal vaccine

**Adults with Increased Risk**

- >1/3 had 1 or more chronic medical condition

# Immunogenicity & Safety Endpoints in the V116 Program



## Immunogenicity Endpoints

### OPA responses supported primary objectives:

- Serotype specific OPA Geometric Mean Titers (GMTs)
- Proportion of participants with  $\geq 4$ -fold rise in OPA responses from baseline to Day 30 postvaccination

### OPA and IgG responses supported secondary objectives:

- Serotype specific IgG Geometric Mean Concentrations (GMCs)
- Proportion of participants with  $\geq 4$ -fold rise in IgG responses from baseline to Day 30 postvaccination
- Geometric Mean Fold Rise (GMFR) of OPA and IgG responses
- Reverse Cumulative Distribution Curves (RCDCs) for OPA and IgG responses

Immune responses were assessed in validated multiplex opsonophagocytic (OPA) and electrochemiluminescence (ECL IgG) assays



## Safety Endpoints

### Primary Safety Endpoints:

- Solicited injection site events Day 1-5 postvaccination: erythema, swelling, injection-site pain
- Solicited systemic events Days 1-5 postvaccination: headache, myalgia, fatigue
- Serious vaccine-related events Day 1 through the duration of participation in the study

### Additional Safety Endpoints:

- Unsolicited AEs, Vaccine related AEs, Any SAE
- Maximum temperature Day 1-5 postvaccination

Participants reported adverse events on an electronic vaccine report card.

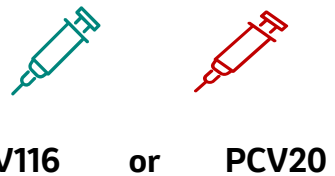
V116-003

A Phase 3, Randomized, Double-blind, Active Comparator-controlled Clinical Study to Evaluate the Safety, Tolerability, and Immunogenicity of V116 in Pneumococcal Vaccine-naïve Adults


# V116-003 Study Design


**Cohort 1 (≥50 years of age)**  
 N=2362 Participants  
 randomized 1:1, V116 to PCV20  
 (Stratified by age: 50-64, 65-74, 75-84, ≥85)

**Cohort 2 (18-49 years of age)**  
 N=301 Participants  
 randomized 2:1, V116 to PCV20




## Immunogenicity assessment

 **Prevaccination Immunogenicity (Day 1)**

 **Postvaccination Immunogenicity (Day 30)**

## Safety assessment

 **eVRC, solicited AEs**

**Serious and nonserious AEs**

**Serious AEs**



# V116-003: Primary study objectives

## Primary immunogenicity

### In adults $\geq 50$ years:

- Demonstrate that V116 is **noninferior** to PCV20 for 10 common serotypes
  - Lower bound of the 2-sided 95% CI of the OPA GMT ratio (V116/PCV20) to be **>0.5**
- Demonstrate that V116 is **superior** to PCV20 for 11 unique serotypes
  - Lower bound of the 2-sided 95% CI of the OPA GMT ratio (V116/PCV20) to be **>2.0**
  - 2-sided 95% CI of the differences (V116 - PCV20) between the proportions of participants with a  $\geq 4$ -fold rise to be **>10%**

### In adults 18–49 years:

- Demonstrate V116 **immunobridges** to adults 50-64 years of age for 21 serotypes in V116
  - Lower bound of the 2-sided 95% CI of the OPA GMT ratio (V116 18-49/V116 50-64 years ) to be **>0.5**

## Primary safety

- To evaluate the safety and tolerability of V116 as assessed by the proportion of participants with adverse events (AEs)
  - **Solicited injection site** events Day 1-5 postvaccination: erythema, swelling, injection-site pain
  - **Solicited systemic events** Days 1-5 postvaccination: headache, myalgia, fatigue
  - **Serious vaccine-related events** Day 1 through the duration of participation in the study

## V116-003 Baseline Characteristics

*In each cohort, baseline characteristics were balanced between the treatment groups*

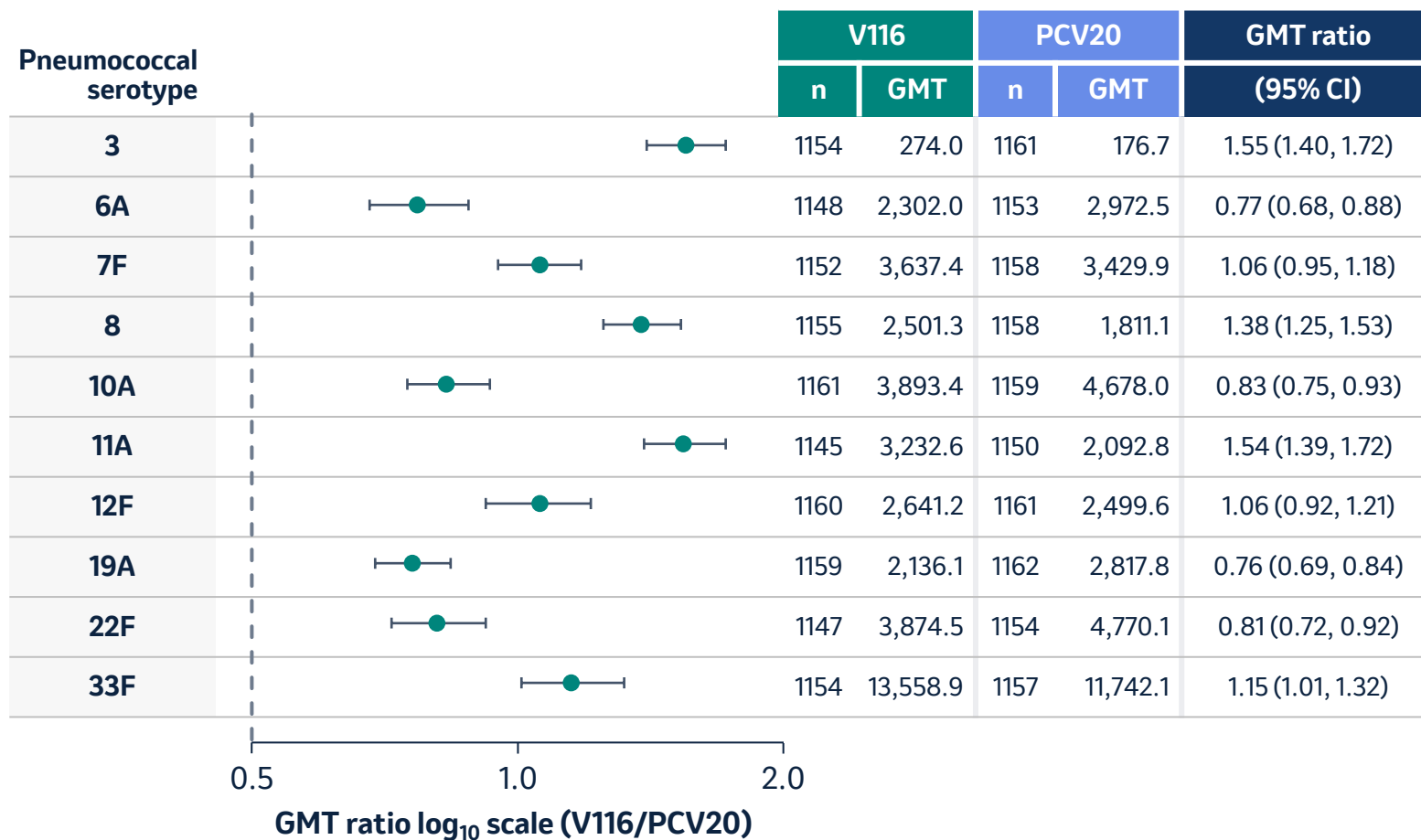
	Cohort 1 (Age ≥50 years)		Cohort 2 (Ages 18-49 years)	
	V116, N=1179	PCV20, N=1177	V116, N=200	PCV20, N=100
<b>Sex</b>				
Female	687 (58.3)	670 (56.9)	137 (68.5)	64 (64.0)
<b>Age (yr)</b>				
Median (min to max)	65 (50-91)	65 (50-97)	36 (18-49)	34 (18-49)
18-49, n (%)	0 (0)	0 (0)	200 (100)	100 (100)
50 to 64, n (%)	589 (50.0)	587 (49.9)	0 (0)	0 (0)
65 to 74, n (%)	464 (39.4)	464 (39.4)	0 (0)	0 (0)
75-84, n (%)	112 (9.5)	113 (9.6)	0 (0)	0 (0)
≥ 85, n (%)	14 (1.2)	13 (1.1)	0 (0)	0 (0)
<b>Race</b>				
Asian	148 (12.6)	168 (14.3)	38 (19.0)	15 (15.0)
Black or African American	116 (9.8)	115 (9.8)	13 (6.5)	14 (14.0)
Multiple	26 (2.2)	30 (2.5)	9 (4.5)	6 (6.0)
White	867 (73.5)	844 (71.7)	139 (69.5)	62 (62.0)
Other	21 (1.8)	19 (1.6)	1 (0.5)	3 (3.0)
<b>Ethnicity</b>				
Hispanic or Latino	259 (22.0)	242 (20.6)	58 (29.0)	24 (24.0)
<b>Pneumococcal Risk Factors</b>				
1 Risk Factor	347 (29.4)	328 (27.9)	45 (22.5)	18 (18.0)
2 or More Risk Factors	100 (8.5)	81 (6.9)	3 (1.5)	1 (1.0)

V116-003 Cohort 1: ≥50 years of age  
*V116 is noninferior to PCV20 for the 10 common serotypes*

**Primary immunogenicity objective**

- V116 is noninferior to PCV20 for the 10 common serotypes.
- The lower bounds of the two-sided 95% confidence intervals (CIs) are greater than 0.5 for all 10 common serotypes.

Postvaccination OPA GMT Ratios for **Common Serotypes**

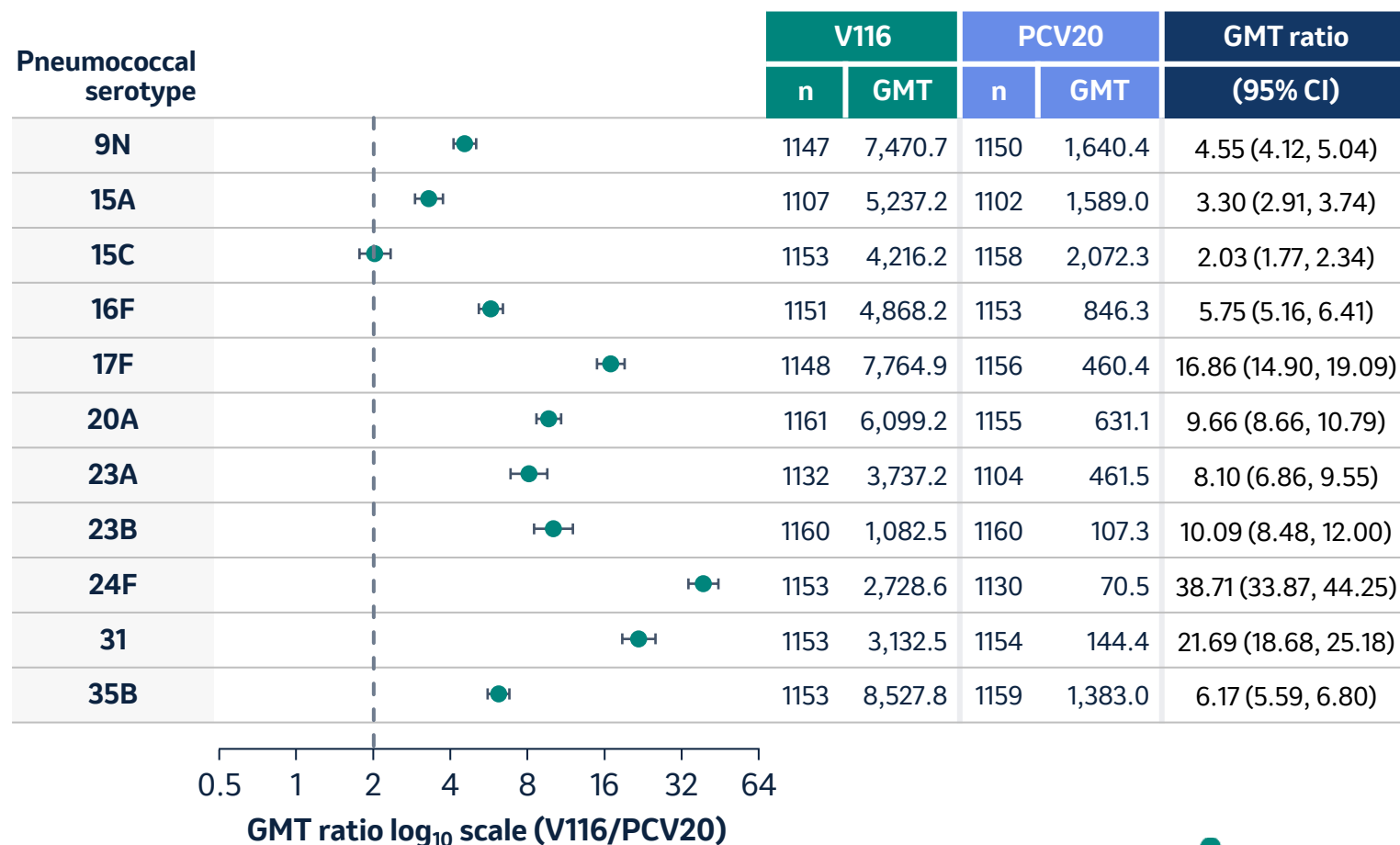


V116-003 Cohort 1: ≥50 years of age  
*V116 is superior to PCV20 for 10 of 11 unique serotypes*

**Primary immunogenicity objective**

- V116 is superior to PCV20 for 10 of 11 unique serotypes in V116.
- The lower bounds of the two-sided 95% CIs are >2.0 for 10 of 11 unique serotypes in V116.
- For serotype 15C, the lower bound of the 95% CI is 1.77.

Postvaccination OPA GMT Ratios for **Unique Serotypes**



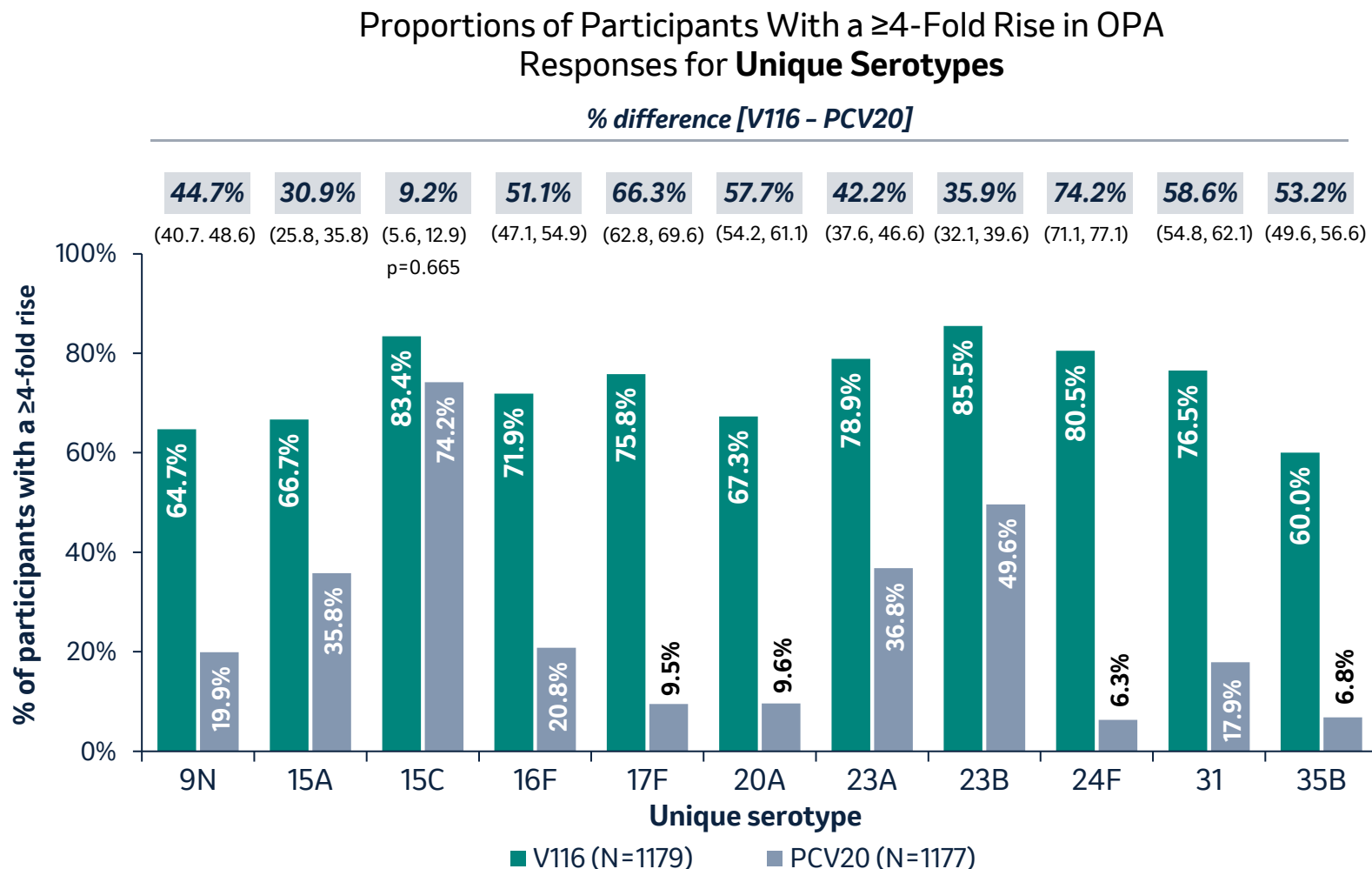
Superiority criteria met if the lower bound of the 95% CI is >2.0



V116-003 Cohort 1: ≥50 years of age  
*V116 is superior to PCV20 for 10 of 11 unique serotypes*

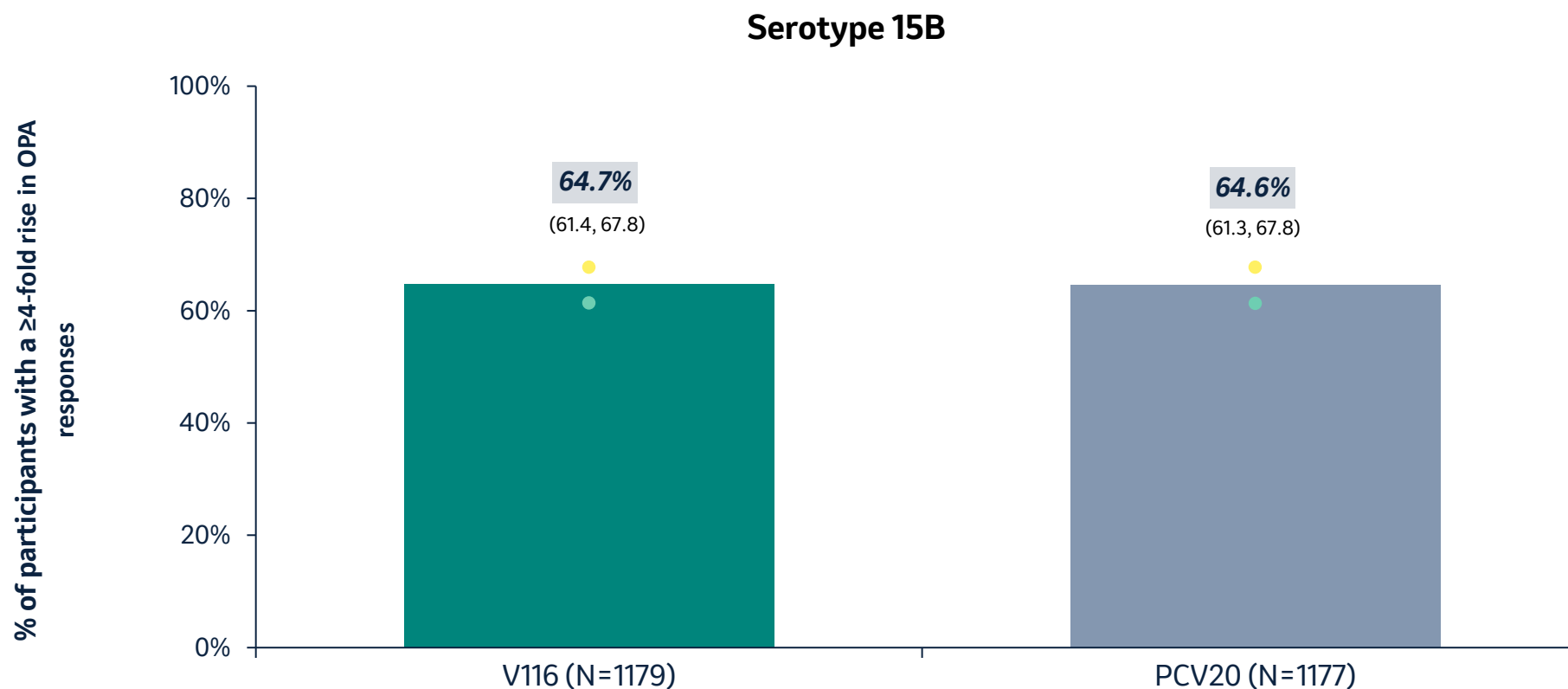
**Primary immunogenicity objective**

- V116 is superior to PCV20 for 10 of 11 unique serotypes in V116.
- The lower bounds of the 2-sided 95% CIs are > 10 percentage points for 10 of 11 serotypes.



V116-003 Cohort 1:  $\geq 50$  years of age

*V116 elicits robust cross reactive antibody responses to serotype 15B*



V116 includes serotype 15C  
and elicited cross-reactive  
immune responses to 15B

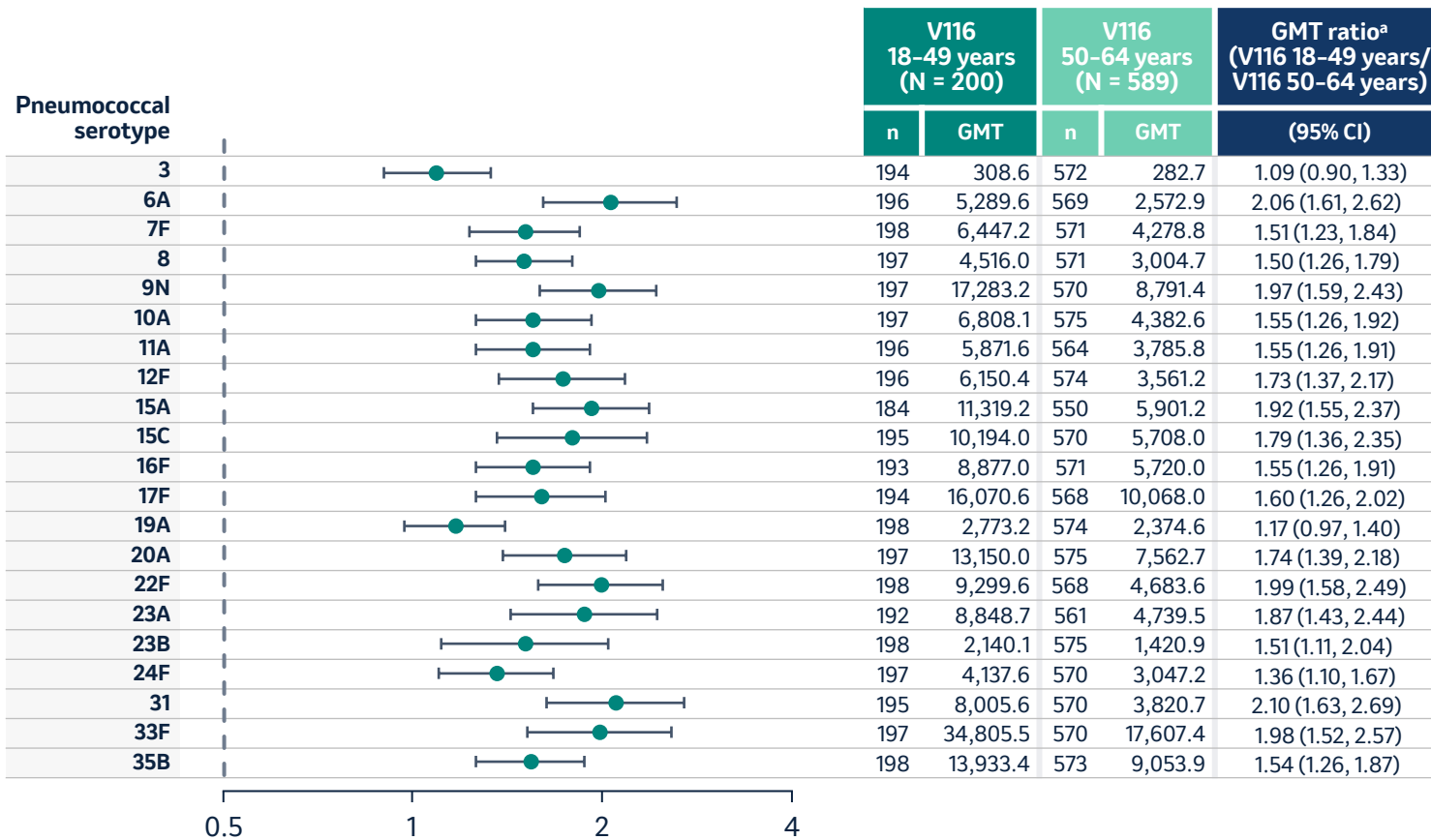
PCV20 includes  
serotype 15B

V116-003: Cohort 2: 18-49 years of age

*V116 immunobridges to participants 50-64 years of age for all 21 serotypes*

**Primary immunogenicity objective**

- V116 in participants 18 to 49 years of age immunobridges to V116 in participants 50 to 64 years of age for the 21 serotypes in V116.
- The lower bound of the two-sided 95% CIs is >0.5 for all 21 serotypes in V116.

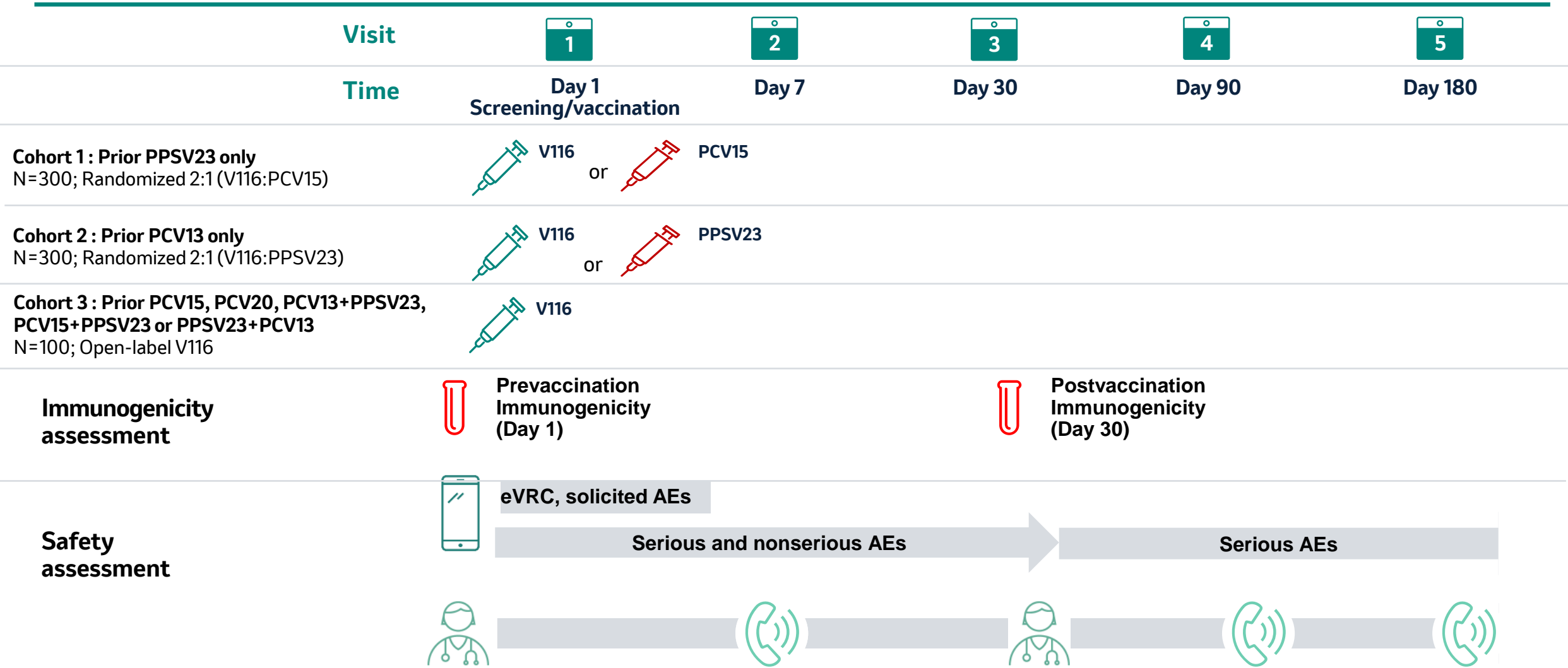


GMT ratio log<sub>10</sub> scale (V116 18-49/V116 50-64)

# V116-006

V116-006: A Phase 3 Clinical Study to Evaluate the Safety, Tolerability, and Immunogenicity of V116 in Pneumococcal Vaccine-Experienced Adults 50 Years of Age or Older

# V116-006 Study Design



Participants used an electronic Vaccine Report Card (eVRC) to report solicited AEs Days 1-5 postvaccination and other AEs through Day 30 postvaccination

# V116-006 Primary study objectives



## Primary immunogenicity

### In adults $\geq 50$ years:

To evaluate the serotype-specific opsonophagocytic activity (OPA) geometric mean titers (GMTs) at 30 days postvaccination for all serotypes included in V116



## Primary safety

- To evaluate the safety and tolerability of V116 as assessed by the proportion of participants with adverse events (AEs)
  - **Solicited injection site** events Day 1–5 postvaccination: erythema, swelling, injection-site pain
  - **Solicited systemic events** Days 1–5 postvaccination: headache, myalgia, fatigue
  - **Serious vaccine-related events** Day 1 through the duration of participation in the study

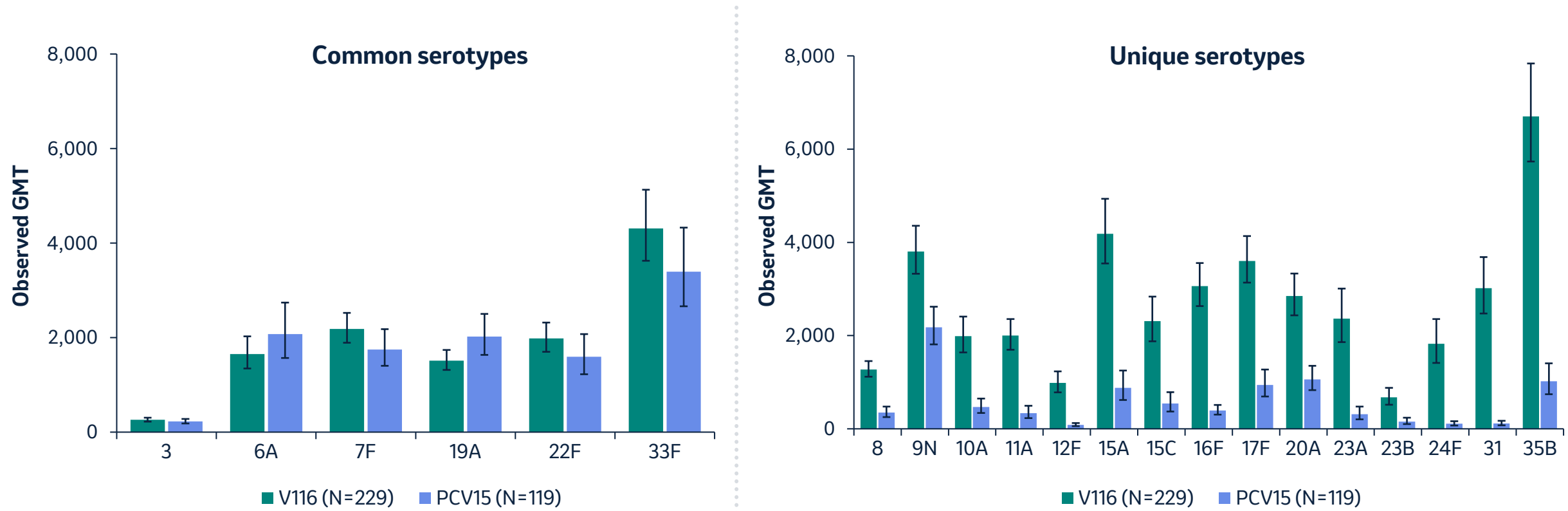
# V116-006 Participant Characteristics

*Enrollment is balanced in each cohort and reflects the pneumococcal vaccination history*

	Cohort 1 (prior PPSV23)		Cohort 2 (prior PCV13)		Cohort 3
	V116 N=229	PCV15 N=119	V116 N=174	PPSV23 N=85	V116 N=105
<b>Sex</b>					
Male	112 (48.9)	59 (49.6)	74 (42.5)	36 (42.4)	50 (47.6)
Female	117 (51.1)	60 (50.4)	100 (57.5)	49 (57.6)	55 (52.4)
<b>Age (yr)</b>					
50 to 64	48 (21.0)	25 (21.0)	80 (46.0)	39 (45.9)	17 (16.2)
≥65	181 (79.0)	94 (79.0)	94 (54.0)	46 (54.1)	88 (83.8)
Mean ± SD	68.7 ± 7.5	69.0 ± 7.1	65.5 ± 7.8	65.4 ± 6.6	71.0 ± 7.6
Median (range)	69.0 (50 to 86)	69.0 (51 to 88)	66.0 (50 to 83)	65.0 (51 to 81)	71.0 (53 to 91)
<b>Race</b>					
Asian	96 (41.9)	47 (39.5)	55 (31.6)	25 (29.4)	13 (12.4)
Black or African American	6 (2.6)	3 (2.5)	3 (1.7)	1 (1.2)	6 (5.7)
Multiple	2 (0.9)	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.0)
White	125 (54.6)	69 (58.0)	116 (66.7)	59 (69.4)	85 (81.0)
<b>Ethnicity</b>					
Hispanic or Latino	21 (9.2)	17 (14.3)	34 (19.5)	16 (18.8)	14 (13.3)
<b>Time since last pneumococcal vaccination</b>					
1 to 4 years	108 (47.2)	54 (45.4)	135 (77.6)	66 (77.6)	78 (74.3)
5 to 9 years	85 (37.1)	45 (37.8)	33 (19.0)	18 (21.2)	27 (25.7)
≥10 years	36 (15.7)	20 (16.8)	6 (3.4)	1 (1.2)	0 (0.0)

V116-006 Cohort 1:  $\geq 50$  years of age who previously received PPSV23

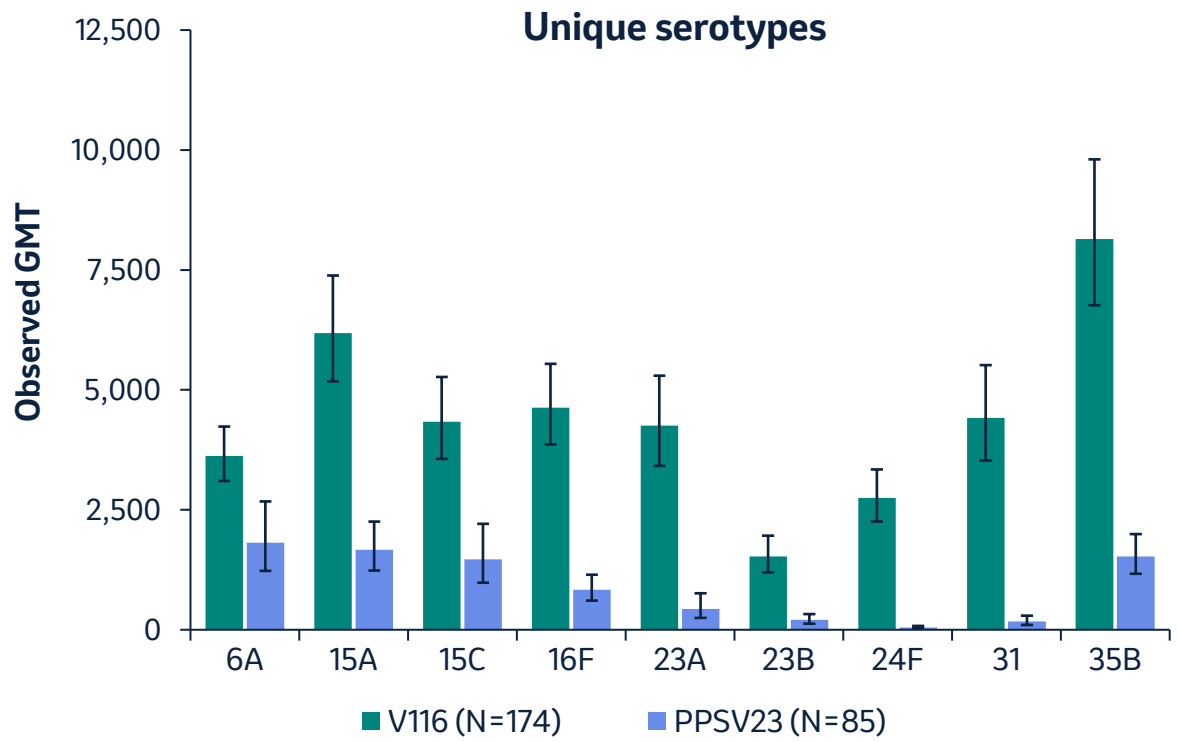
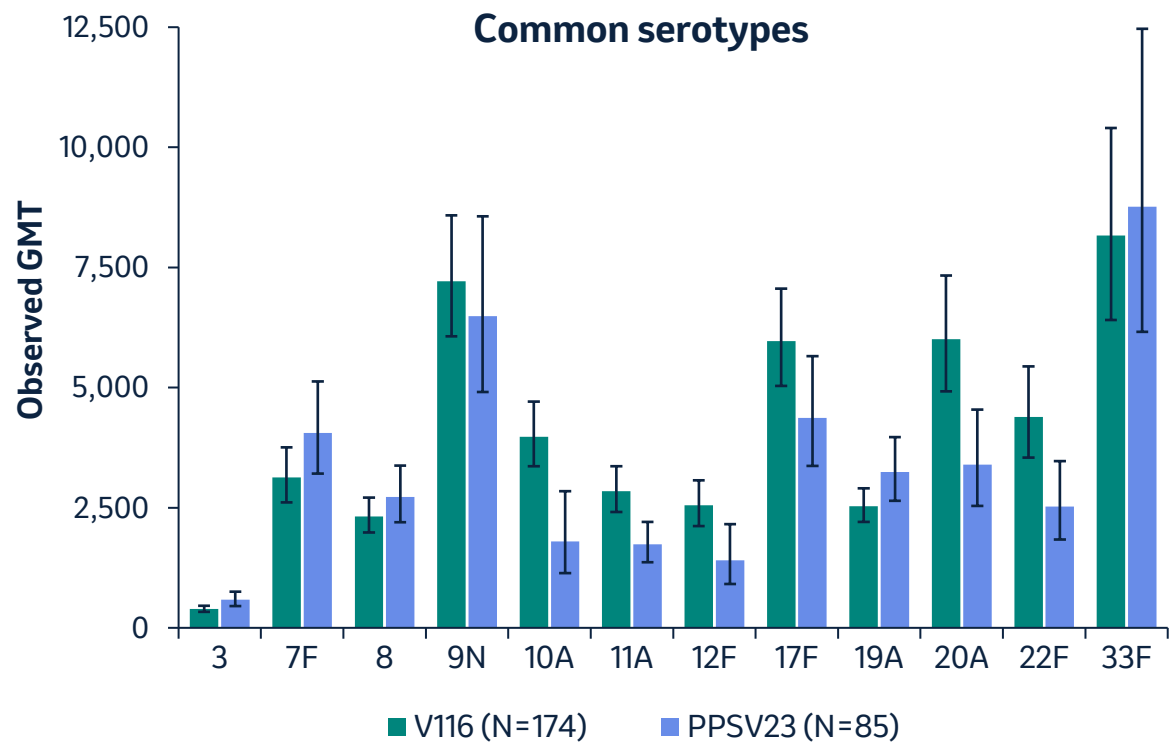
*V116 elicits comparable immune responses to PCV15; higher immune responses for serotypes unique to V116*



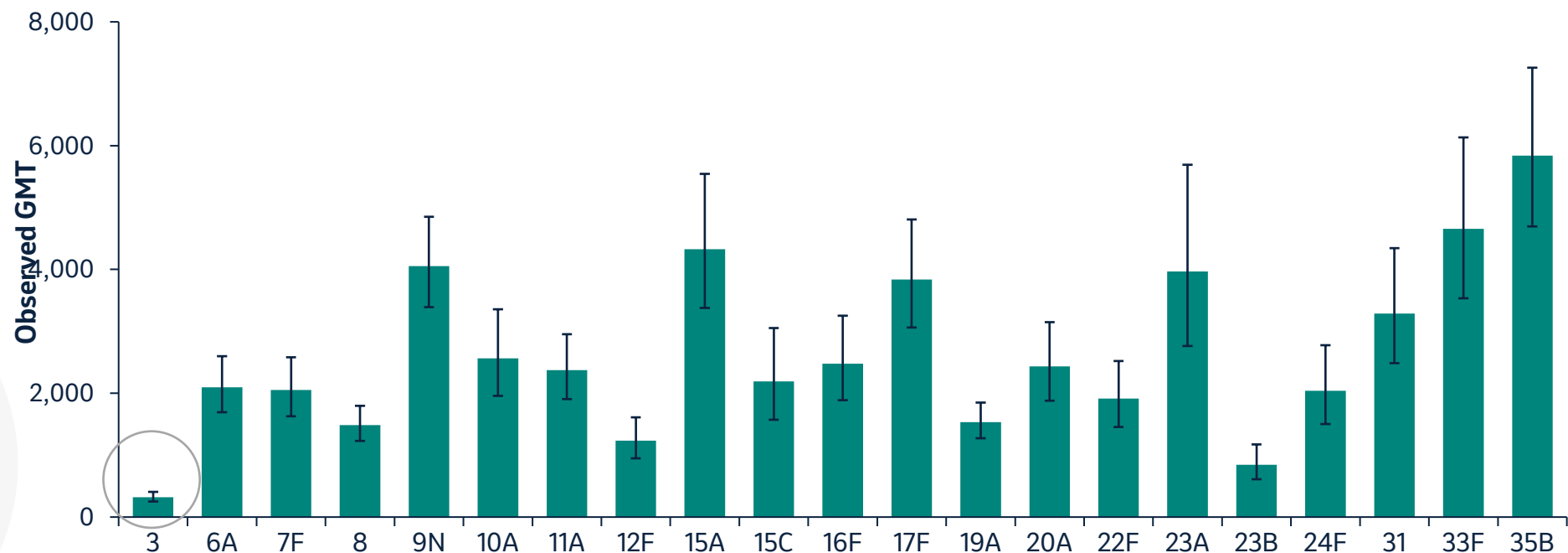
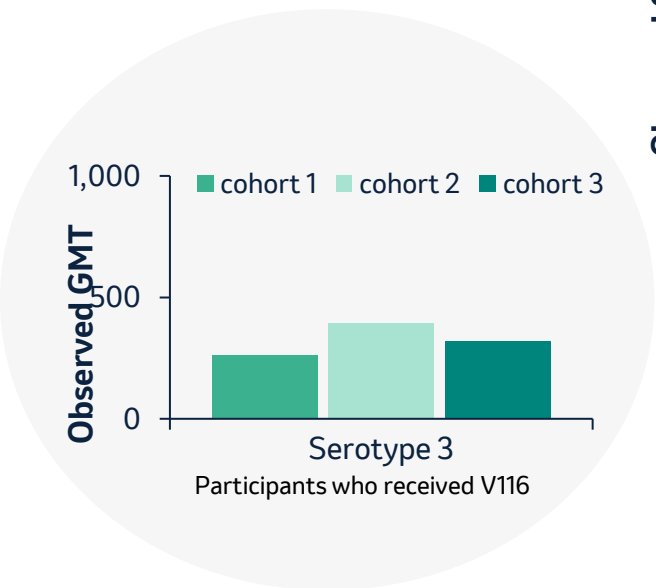


V116-006 Cohort 2: ≥50 years of age who previously received PCV13

*V116 elicits comparable immune responses to PPSV23; higher immune responses for serotypes unique to V116*



V116-006 Cohort 3: ≥50 years of age who previously received other pneumococcal vaccine(s)\*  
*V116 is immunogenic in individuals who previously received a pneumococcal vaccine*



\*Prior PCV13+PPSV23 [n=45], PCV15+PPSV23 [n=5], PPSV23+PCV13 [n=54], PCV15 [n=1], or PCV20 [n=0]

# Integrated Summary of Safety

Integrated Analysis of Safety in the  
Phase 3 Clinical Development Program

*V116 is well tolerated in adults  $\geq 18$  years of age with a safety profile comparable to currently licensed pneumococcal vaccines*

Adverse Event Summary (V116-003, V116-004, V116-005 <sup>a</sup> , V116-006)	V116 (N=4,020)		Control <sup>b</sup> (N=2,018)	
	n	(%)	n	(%)
With adverse events (Day 1 – 30)	2695	(67.0)	1386	(68.7)
With vaccine-related adverse events (Day 1-30) <sup>c</sup>	2555	(63.3)	1297	(64.3)
Solicited	2516	(62.6)	1279	(63.4)
Unsolicited	313	(7.8)	123	(6.1)
with SAEs (Day 1 - Day 30)	14	(0.3)	7	(0.3)
with vaccine-related SAEs (Day 1 - Day 30)	2	(0.0)	0	(0.0)
with SAEs within 30 minutes postvaccination	1	(0.0)	0	(0.0)
Who died <sup>d</sup>	6	(0.1)	3	(0.1)
with vaccine-related deaths <sup>c</sup>	0	(0.0)	0	(0.0)

<sup>a</sup> Only participants from V116-005 vaccinated with V116 in the sequential group are included in the V116 group.

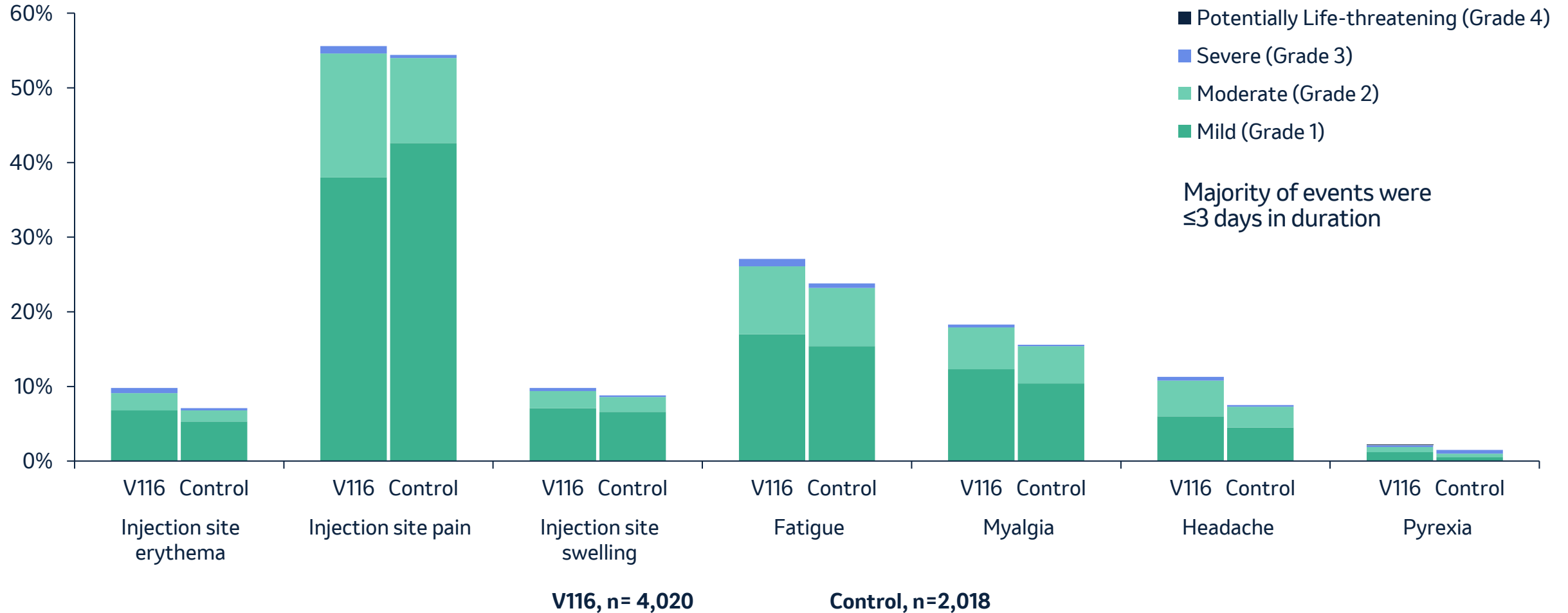
<sup>b</sup> Control group includes participants vaccinated with PCV15, PCV20, or PPSV23

<sup>c</sup> As determined by the investigator; all injection site adverse events are assessed as vaccine-related

<sup>d</sup> 6 deaths in the V116 group in the Integrated Safety Summary; 7 deaths in the V116 group across the Phase 3 studies when the concomitant group from P005 is included.

*Frequency and intensity of solicited adverse events were comparable in V116 and control groups*

Solicited adverse events by intensity (%)



Solicited events include erythema, injection site pain, injection site swelling, fatigue, headache, and myalgia were solicited from Day 1 through Day 5 postvaccination. Pyrexia was defined as temperature ≥ 100.4 °F (38.0 C) solicited from Day 1 through Day 5 postvaccination.

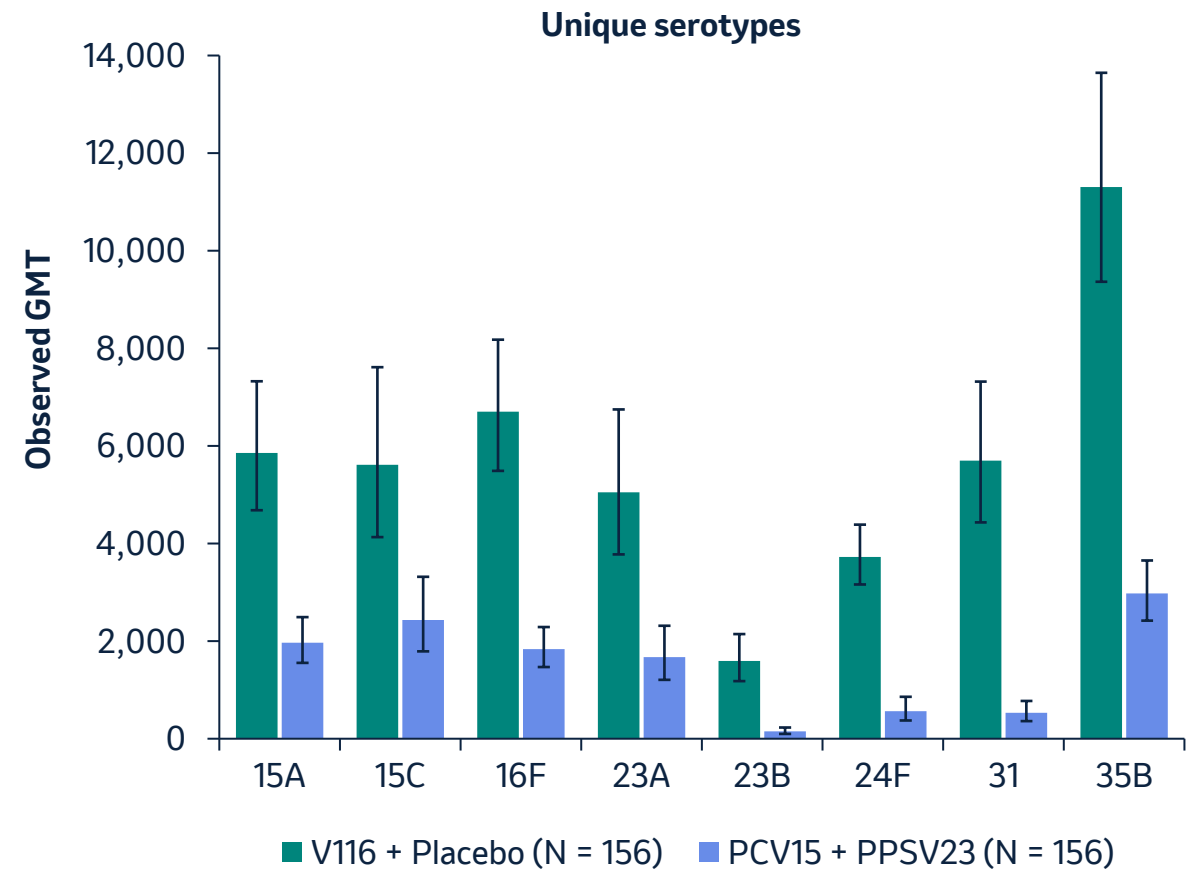
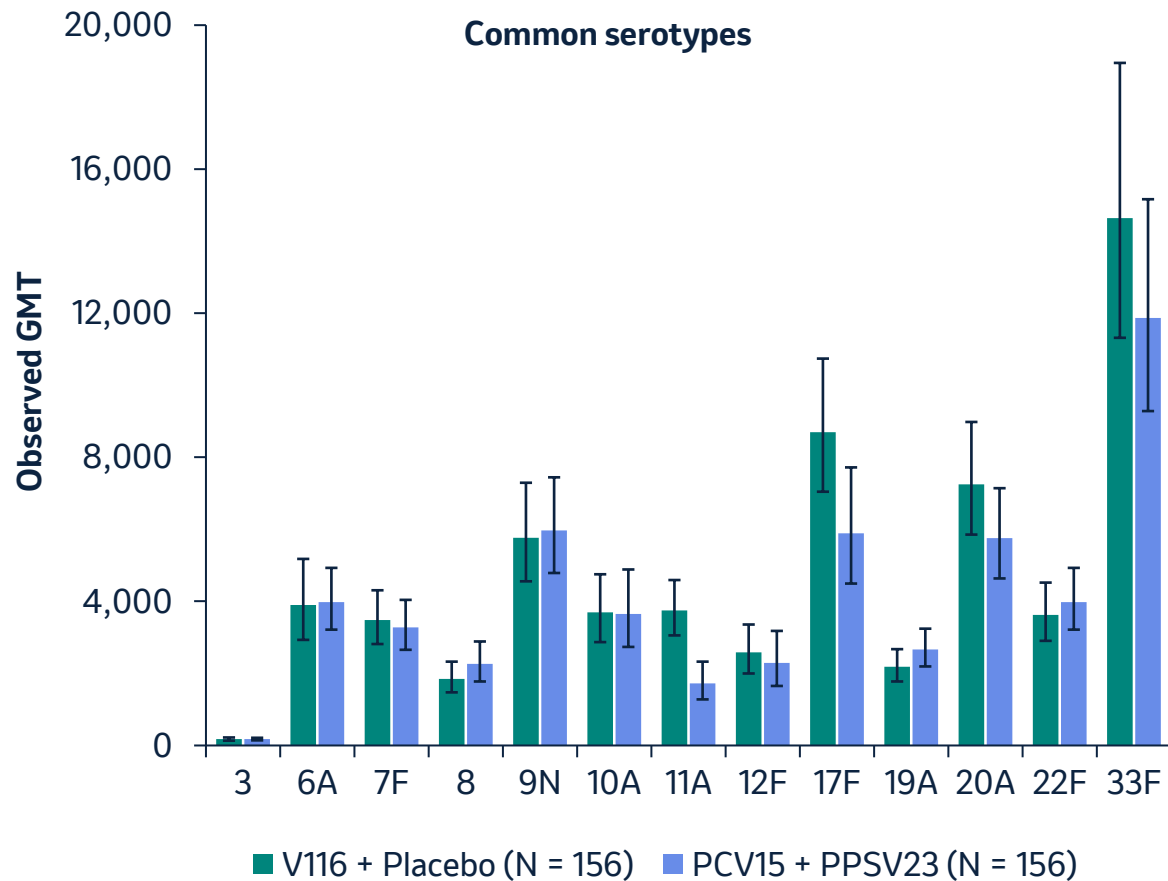
# Phase 3 Supportive Studies

V116-007: V116 in Adults Living with HIV

V116-005: V116 with Concomitant Quadrivalent Influenza Vaccine (QIV)

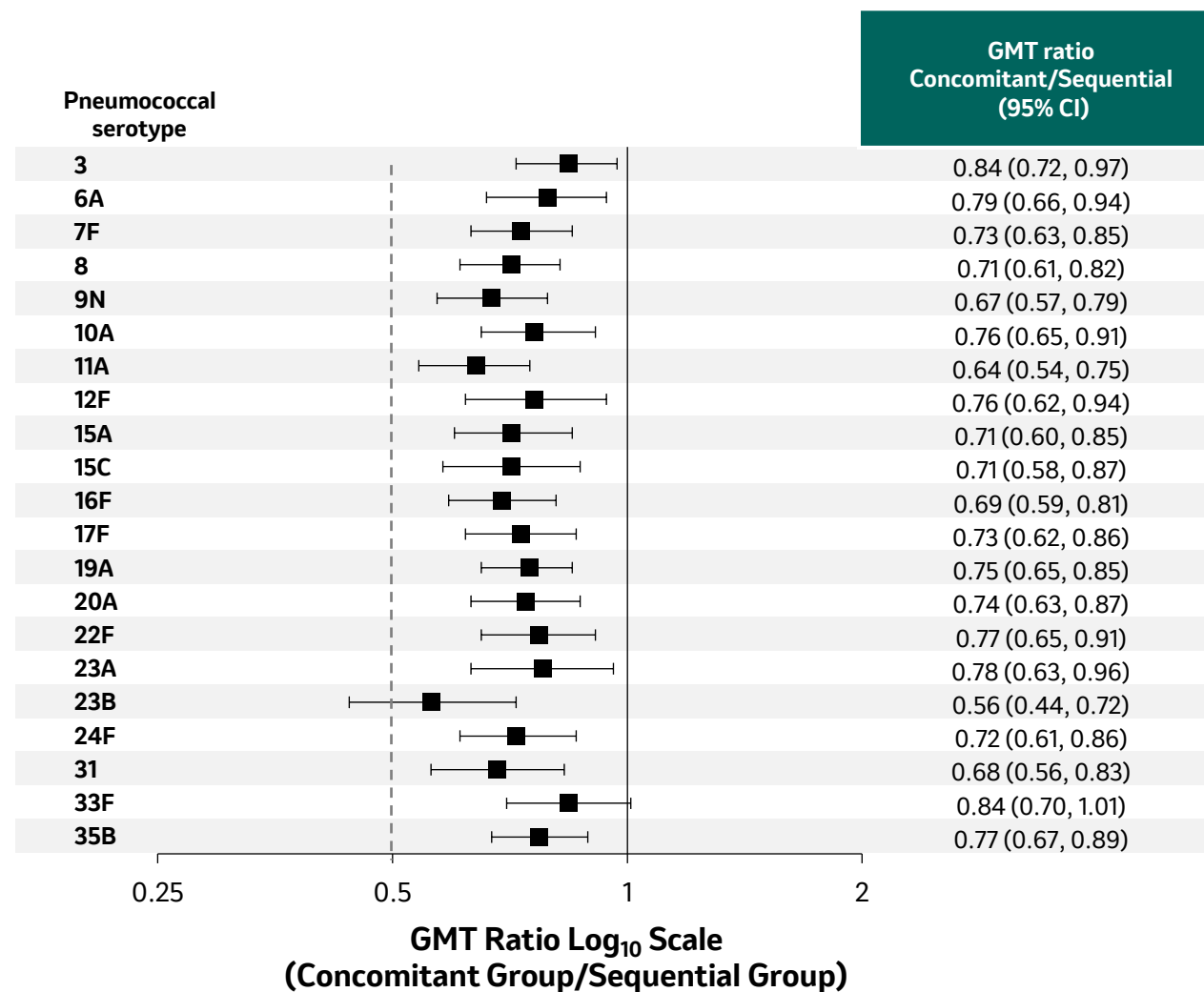
V116-004: V116 Lot Consistency

*V116-007: In adults living with HIV, V116 elicits comparable immune responses to PCV15+PPSV23, & higher immune responses for unique serotypes*



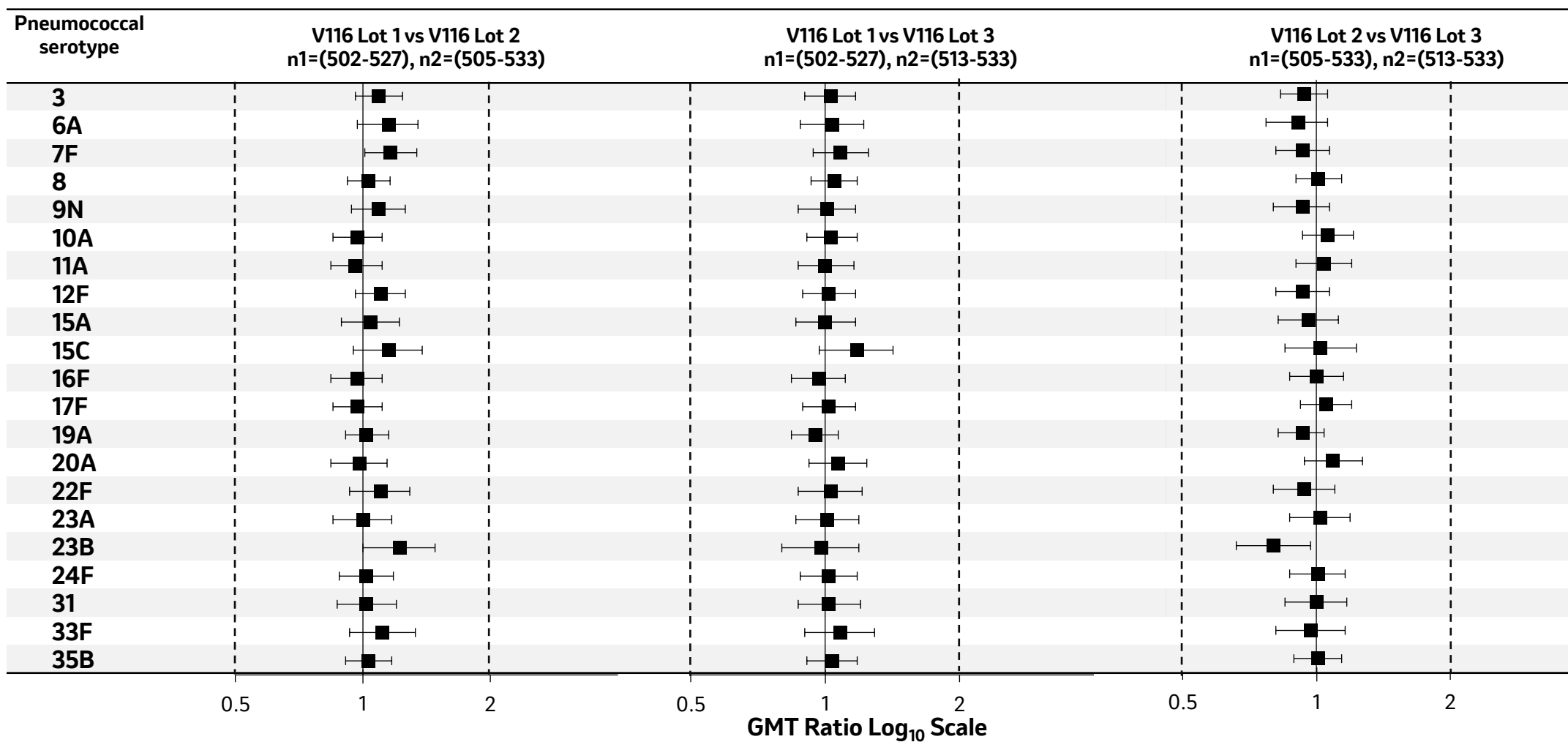
## V116-005: V116 elicits robust immune responses when administered concomitantly with influenza vaccine

- V116 administered concomitantly with influenza vaccine is noninferior to V116 administered sequentially with influenza vaccine for 20 of 21 serotypes
- QIV administered concomitantly is noninferior to QIV administered sequentially for 3 of 4 strains





## V116-004: V116 Immune responses were equivalent across 3 manufacturing lots



Note: dashed lines indicate the margins for the equivalence test

# Phase 3 Summary & Conclusions

# V116 Phase 3 Clinical Development Summary



**In adults  $\geq 18$  years of age, who are pneumococcal vaccine-naïve and vaccine experienced, with and without risk conditions:**

- V116 elicits **robust immune responses** to all 21 serotypes contained in the vaccine
- V116 is **noninferior to PCV20** for all common serotypes and **superior to PCV20** for 10 of 11 serotypes unique to V116 in pneumococcal vaccine-naïve adults  $\geq 50$  years of age.
- V116 is immunogenic in pneumococcal **vaccine experienced adults**, regardless of the prior vaccine received
- V116 is immunogenic when administered concomitantly with inactivated **influenza vaccine**.
- V116 is **well-tolerated** with a safety profile generally comparable to currently licensed pneumococcal vaccines.

**V116 is the first adult specific PCV with the potential for broad public health impact through the prevention of invasive disease and pneumonia due to *S. pneumoniae*.**

Thank you



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