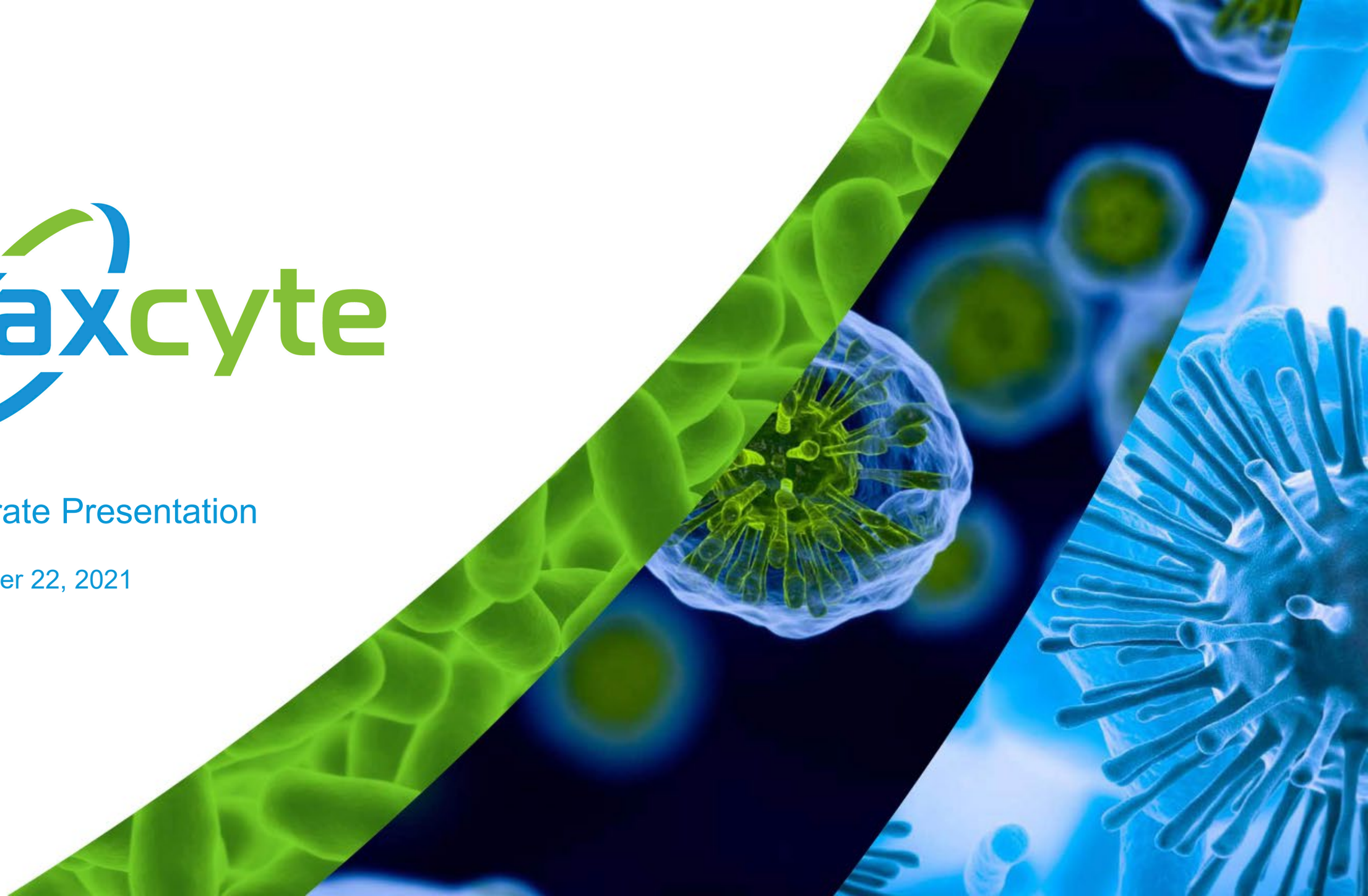
Vaxcyte

Corporate Presentation

September 22, 2021



Forward-Looking Statements

This presentation contains forward-looking statements within the meaning of The Private Securities Litigation Reform Act of 1995. These statements include but are not limited to, statements related to the benefits of Vaxcyte's vaccine candidates; the process and timing of anticipated future development of Vaxcyte's vaccine candidates, including the timing and submission of an IND application for VAX-24 and the initiation of the VAX-24 Phase 1/2 clinical proof-of-concept study thereafter; the timing and availability of topline data for VAX-24; the ability to complete the manufacturing of the GMP drug product; the achievement of future funding milestones; the use and availability of funds from CARB-X; the initiation of IND-enabling activities for VAX-A1 and the nomination of a final vaccine candidate for VAX-PG; the market opportunity for our vaccines; our expectations regarding the potential benefits, spectrum coverage and immunogenicity of our vaccine candidates; the timing of the initiation, progress and expected results of our preclinical studies, clinical trials and research and development plans; and other statements that are not historical fact. The words "anticipate," "believe," "continue," "could," "designed," "estimate," "expect," "intend," "may," "plan," "potential," "predict," "project," "should," "target," "will," "would" and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words.

These forward-looking statements are based on Vaxcyte's current expectations and actual results and timing of events could differ materially from those anticipated in such forward-looking statements as a result of risks and uncertainties, including, without limitation, risks related to Vaxcyte's product development programs, including development timelines, success and timing of chemistry, manufacturing and controls and related manufacturing activities; Vaxcyte's reliance on third-party manufacturers; potential delays or inability to obtain and maintain required regulatory approvals for its vaccine candidates; the risks and uncertainties inherent with preclinical and clinical development processes; the success, cost and timing of all development activities and clinical trials; sufficiency of cash and other funding to support Vaxcyte's development programs and other operating expenses; and the ongoing COVID-19 pandemic, which could materially and adversely affect Vaxcyte's business and operations. These and other risks are described more fully in Vaxcyte's filings with the Securities and Exchange Commission (SEC), including its Quarterly Report on Form 10-Q filed with the SEC on August 11, 2021 or in other documents Vaxcyte subsequently files with or furnishes to the SEC. Vaxcyte undertakes no duty or obligation to update any forward-looking statements contained in this release as a result of new information, future events or changes in its expectations.

Vaxcyte Mission Statement

Seeking to improve global health by developing superior & novel vaccines designed to prevent or treat some of the most common & deadly infectious diseases worldwide.

Key Corporate Highlights

Next-Generation Vaccine Company – Led by Pneumococcal Conjugate Vaccine (PCV) Franchise

Large Market Opportunity for PCV Franchise

- **Scalable PCV platform** enabling broader-spectrum PCVs: VAX-24 & VAX-XP
- **Lead candidate: VAX-24**
  - 24-valent PCV with potential to replace SOC
  - Anticipated IND filing in Jan-Jun ’22(1)
  - Anticipated Phase 1/2 data readout in late ’22-early ’23(1)

Cell-Free Protein Synthesis Platform

- Leverages **site-specific conjugation**
- Permits production of **“tough-to-make” antigens**
- Demonstrated speed, flexibility, and scalability

Disciplined Target Selection

- Targets **well-defined >$7B market segment**
- Honors **well-understood PCV MOA**
- Leverages established **surrogate immune endpoints** and clinical pathways

Robust Development Pipeline

- Platform unlocks large market opportunities:
  - **VAX-A1**: Novel Group A Strep conjugate vaccine
  - **VAX-PG**: Novel periodontitis therapeutic vaccine

Aligned Critical Resources

- **Strategic alignment** with Lonza (manufacturing)
- **Seasoned management team**, directors and advisors
- IPO in June 2020
- **Cash, cash equivalents and investments of $341.0M** at 6/30/21

(1) *Guidance provided as of August 11, 2021.*

Experienced Team, Board of Directors, and Scientific Advisors

Outstanding Track Record in Vaccines and Biopharma

Management Team

Grant Pickering, MBA
CEO & Co-founder

PROVENGE (sipuleucel-T)
ZELNATE
Victrio
FLONASE ALLERGY RELIEF

Jim Wassil, MS, MBA
COO

Prevnar 13 Pneumococcal 13-valent Conjugate Vaccine (Diphtheria CRM_{197} Protein)
BEXSERO Meningococcal Group B Vaccine
MENVEO
RotaTeq

Andrew Guggenhime, MBA
President & CFO

Dermira
Calistoga Pharmaceuticals
Facet Biotech

Jeff Fairman, PhD
VP Research & Co-founder

ZELNATE
Victrio

Paul Sauer, MBA
SVP PD & Manufacturing

Pulmozyme dornase alfa INHALATION SOLUTION
Zinbryta (daclizumab)

Board of Directors

Kurt von Emster
Interim Chairman
Abingworth partners in life science investing

Peter Hirth, PhD
Plexxikon

Heath Lukatch, PhD
RED TREE VENTURE CAPITAL

Halley Gilbert
NEO GENOMICS

Annie Drapeau
toast

Teri Loxam
SQZBIOTECH

Grant Pickering
Vaxcyte

Scientific Advisory Board

Jeff Almond, PhD
sanofi pasteur
The vaccines division of sanofi-aventis Group

Tony Ford-Hutchinson, PhD
MERCK

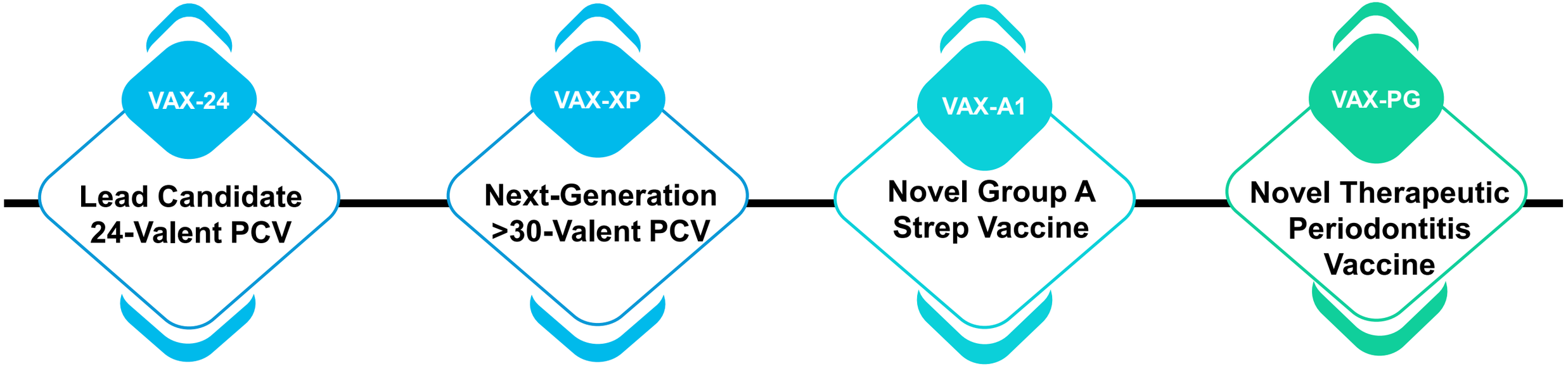
Bill Hausdorff, PhD
gsk GlaxoSmithKline Vaccines
Wyeth

Tom Monath, MD
CROZET BioPharma

Emmanuel Walter, MD, MPH
Duke University School of Medicine

Next-Generation Vaccine Pipeline

Focus on Superior PCV Franchise with Novel, Early Stage Pipeline to Follow



TARGET POPULATION	INFANTS & ADULTS	INFANTS & ADULTS	CHILDREN & ADULTS	ADULTS
	• Anticipate IND filing in Jan-Jun ’22(1) • Anticipate Phase 1/2 data readout in the adult population in late ’22-early ’23(1) • Published preclinical POC vs. Prevnar®13 (PCV13) and Pneumovax®23 (PPV23) in the journal *Vaccine*	• Completed preclinical POC vs. PCV13 and PPV23 • Investing to maximize PCV franchise optionality and value	• Anticipate initiating IND-enabling activities in 2H:21(1) • Supported with grant from CARB-X	• Anticipate selecting final vaccine candidate in 1H:22(1)

(1) *Guidance provided as of August 11, 2021.*

Cell-Free Protein Synthesis Platform Unlocks Multiple Vaccine Applications

Design and Produce Proteins Beyond Reach of Conventional Methods

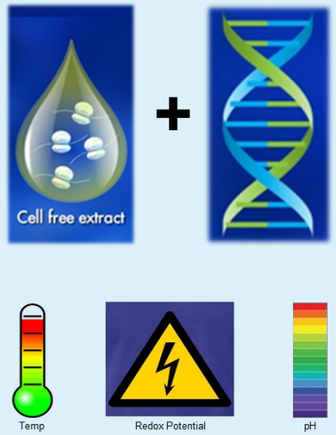
XpressCF Platform(1)

Cell-Free Protein Synthesis (CFPS):

- Transcriptional & translational (ribosomal) machinery from *E coli* stored as a frozen “extract”
- Produces singular protein of interest at high yields
- Uniquely enables site-specific conjugation via insertion of multiple nnAA conjugation anchors
- Uniquely permits protein production in non-physiological conditions

Speed, Flexibility, Scalability:

- Rapidly screen vaccine candidates
- Flexible reaction conditions
- Scaled to 1000L using standard equipment



Platform Capabilities

Superior Conjugate Vaccines:

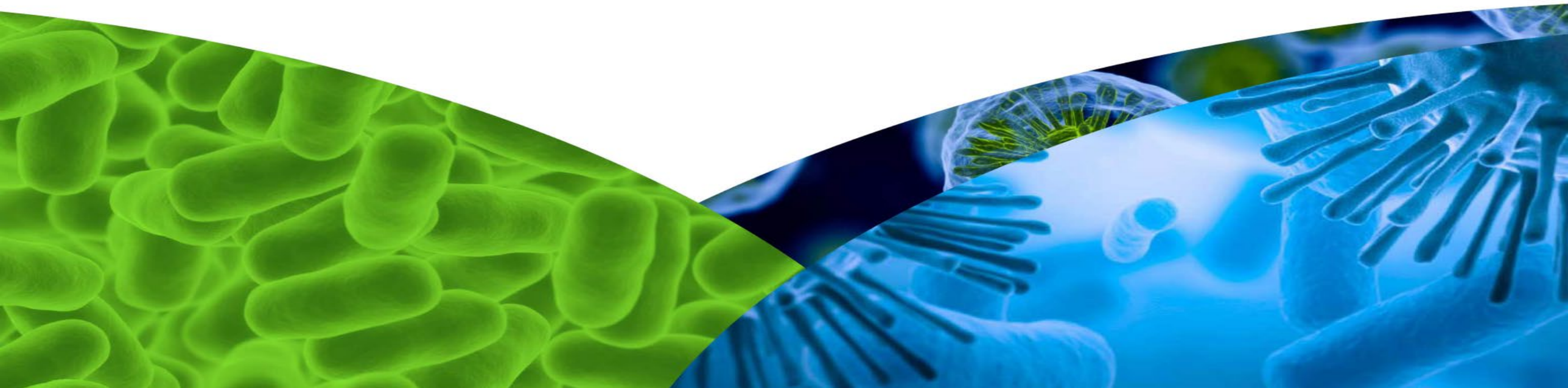
- Site-specifically attach antigens onto protein carriers designed to:
  - Enable consistent exposure of T-cell epitopes and/or B-cell epitopes on protein carrier
  - Avoid off target effects
- Designed to enable use of less protein carrier without sacrificing immunogenicity
- Enables broader-spectrum vaccines

Novel Protein Vaccines:

- Able to produce “tough-to-make” protein antigens that conform to target pathogens
- Increased likelihood of protective immune response

(1) *Exclusively licensed from Sutro Biopharma for the field of vaccines addressing infectious diseases.*

PCV Opportunity



Significant Unmet Needs Remain Despite SOC Today

Pneumococcal Vaccine Market Currently Dominated by Prevnar 13 Despite Coverage Limitations

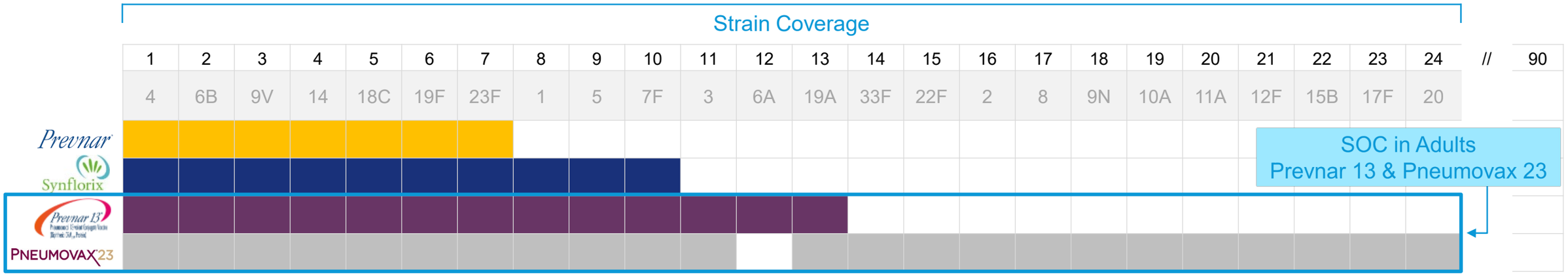
Most disease is caused by strains above and beyond PCV13, demonstrating need for a broader-spectrum PVC.

Leading cause of death globally for children under 5 years

~900K pneumococcal pneumonia cases in U.S. annually

Current SOC: Infants: PCV13 Adults: PCV13 & PPV23

Spectrum of coverage drives adoption



Incremental 11 strains cause majority of residual disease in US & EU, resulting in continued need for older, PS-only vaccine (Pneumovax 23)

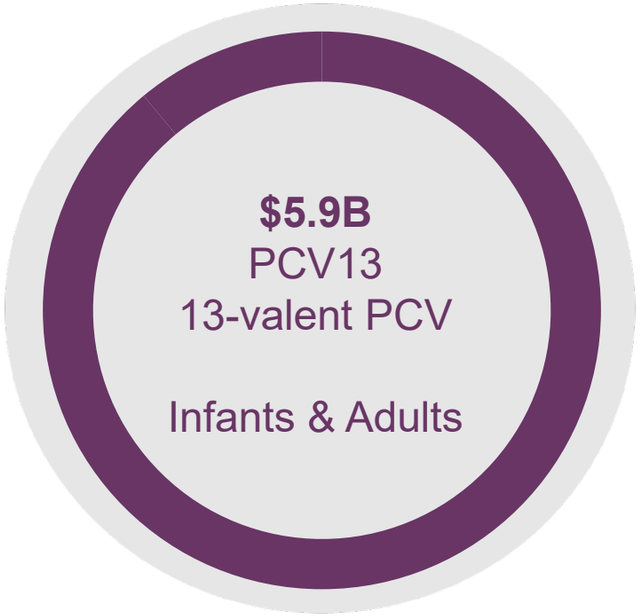
Source: Company's Filings; Industry Research (BIS Research 2018: Global Vaccine Market).

The Vaxcyte Opportunity to Prevent Pneumococcal Disease

Develop Broad-Spectrum, Potentially Category Leading PCV Franchise

>$7B Pneumococcal Vaccine Segment – led by Prevnar 13[(1)]

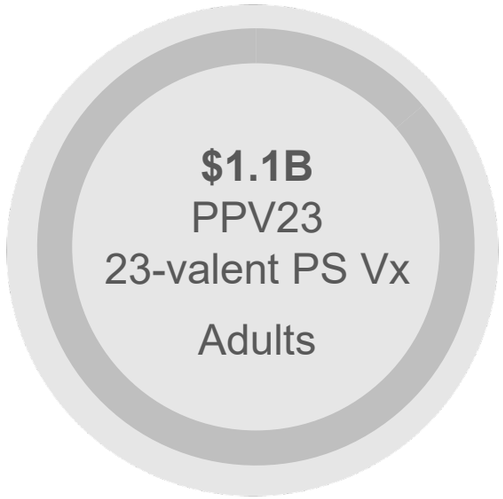
Pfizer



Highly efficacious; limited coverage

Prevnar 13® Pneumococcal 13-valent Conjugate Vaccine (Diphtheria CRM197 Protein)

Merck



Lower immunogenicity vs. PCVs; not boostable

PNEUMOVAX®23

GSK



Highly efficacious; limited coverage

Synflorix™

(1) *2020 Earnings releases. GSK revenues based on average 2020 GBP/USD exchange rate of 1.28.*

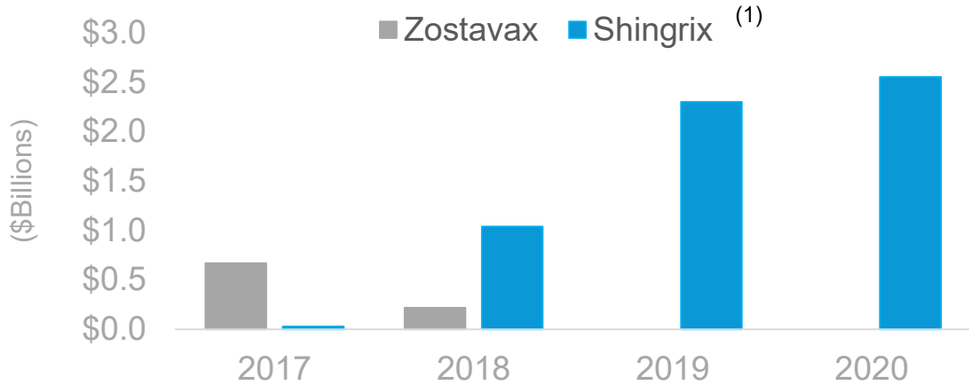
Pneumococcal Vaccine Market is Highly Attractive

VAX-24 has the Potential to Become the Most Broad-Spectrum PCV

Pneumococcal Vaccine Market Dynamics

- Spectrum of coverage drives adoption
- Highly attractive margins:
  - Prevnar 13 & Pneumovax 23 are premium priced in the US
- Durable revenue stream:
  - Prevnar 13 & Pneumovax have generated >$100B in revenues
- PCVs are best-in-class:
  - Well-understood T-cell dependent MOA tied to co-presentation of disease-specific polysaccharide antigens with mapped T-cell epitopes on protein carrier
  - Well-defined clinical development path: Non-inferiority to SOC using validated surrogate immune endpoints now adequate for full approval for follow-on PCVs
- Potential for rapid adoption: Governing body – ACIP recommendation drives uptake
  - Prevnar 13 vs Prevnar 7
  - Shingrix® vs Zostavax®

SHINGRIX
HERPES ZOSTER VACCINE (RION-LIVE RECOMBINANT, AS01B ADJUVANTED)



- FDA Approved in 4Q:2017 to prevent shingles in adults
- ACIP granted “preferred recommendation”
- Replaced the incumbent (Zostavax from Merck)

MOA = mechanism of action; SOC = standard of care; ACIP = US CDC Advisory Committee on Immunization Practices.
(1) Revenues reported in GSK (Shingrix) and Merck (Zostavax) financial filings.

Potential for Global Pneumococcal Market to Grow Beyond the $7B Today

June 2021 ACIP Working Group Recommendations for October 2021 Decision:
Support Need for PCVs Offering Broader Spectrum of Coverage for Use Among a Larger Adult Population

- Preferential recommendation for Pfizer's PCV20 vs. Merck PCV15 in adults

Supports broadest spectrum of coverage wins

- Initial PCV dose at age 50 vs. 65 today
- Begin dosing at age 19 - 49 for those with increased risk of pneumonia

Potential to significantly expand adult population and increase overall PCV market

- Remove Pneumovax 23 from adult regimen, replace with PCV20 only

Sets up opportunity for PCV booster dose at 65 years of age; further adding to potential market size

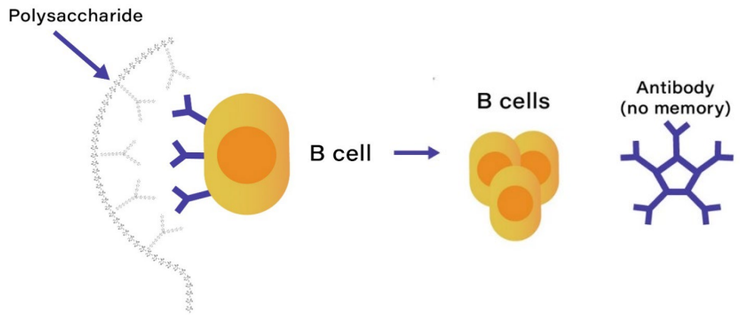


PCVs Overcome the Limitations of Polysaccharide-Only Vaccines

PCV Efficacy Driven by T-Cell Epitopes on Diphtheria Toxin Protein Carrier – CRM_{197} (1)

PS-Only Vaccine

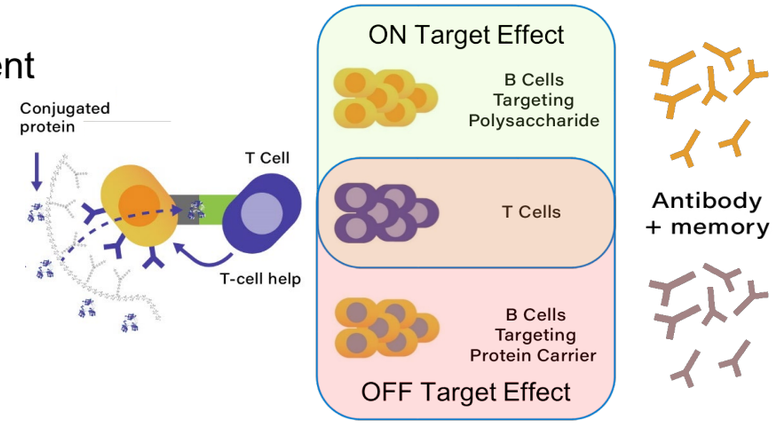
PNEUMOVAX 23



PCVs

Prevnar 13 Pneumococcal 13-valent Conjugate Vaccine (Diphtheria CRM_{197} Protein)

Synflorix





Broad Coverage But Limited Protection in Adults

– Not Boostable –

- Pneumococcal capsular polysaccharides (PS) antigens lead to:
  - Transient Ab responses (IgM) protect against sepsis, but not pneumonia
  - No T-cell mediated memory responses, thus no boost
  - Hyporesponsive effect inhibits ability to boost PCVs post-prime

Narrow Coverage But Highly Effective in Adults & Infants

– Boostable –

- Conjugation of PS to protein carrier leads to:
  - Enhanced Ab responses (IgG) that protect against pneumonia
  - T cell-mediated memory to provide boostable, durable protection
  - Characteristic interstrand crosslinked matrix-like structures

Note: Graphics adapted from Strugnell et al, Understanding Modern Vaccines, Vol 1, Issue 1, 61-88.

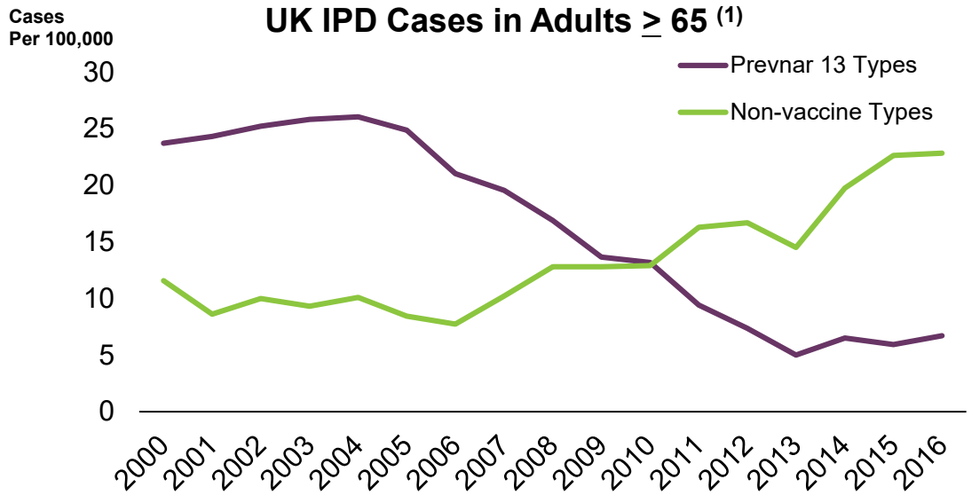
(1) Protein carrier in Prevnar 13 is a modified form of diphtheria toxin (CRM_{197}).

Limitations of Current PCVs

Coverage Expansion Needed to Address Circulating Disease, but Protein Carrier Backbone Problematic

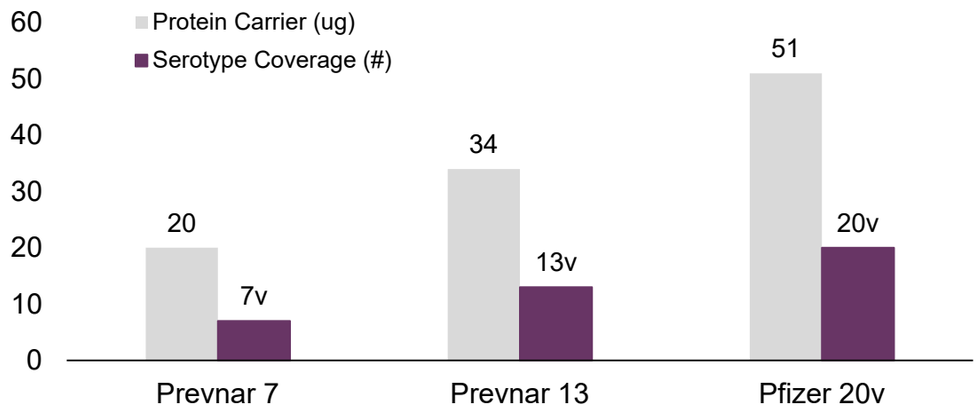
1 Serotype Replacement

- Phenomenon whereby non-PCV strains increase in disease prevalence after widespread PCV use
  - Prevnar 13 highly effective in prevention of IPD for included strains
  - Most residual disease caused by incremental 11 strains over and above Prevnar 13



2 Limitations of Conventional Chemistry

- Random conjugation
- Higher ratio of protein carrier to polysaccharide
- Further exacerbates carrier suppression



(1) *Ladhani et al, Lancet Infect Dis 2018 Apr;18(4):441-45 inclusive of unpublished raw data.*
(2) *Prevnar 20 BLA Clinical Review Memorandum. STN: 125731/0 June 8, 2021.*

Limitations of Current PCVs

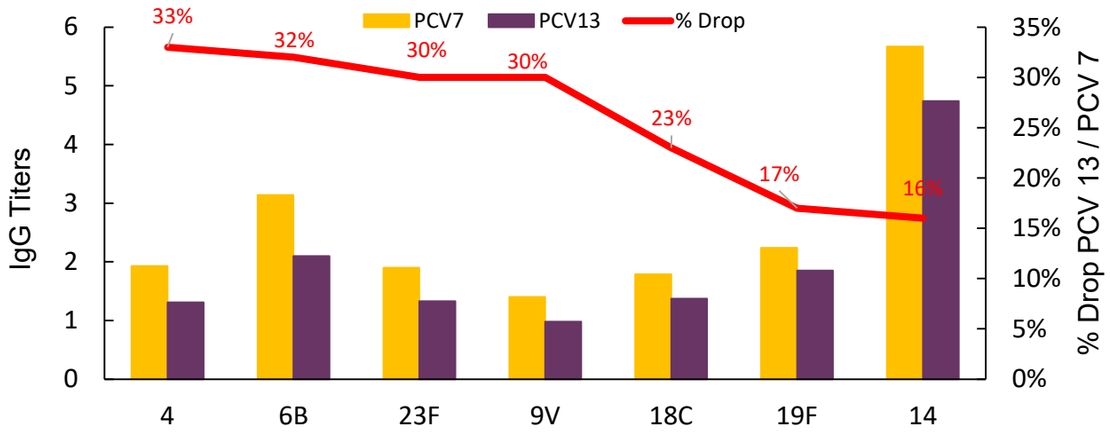
Coverage Expansion Using Conventional Chemistry Has Led to Carrier-Induced Immune Suppression

3

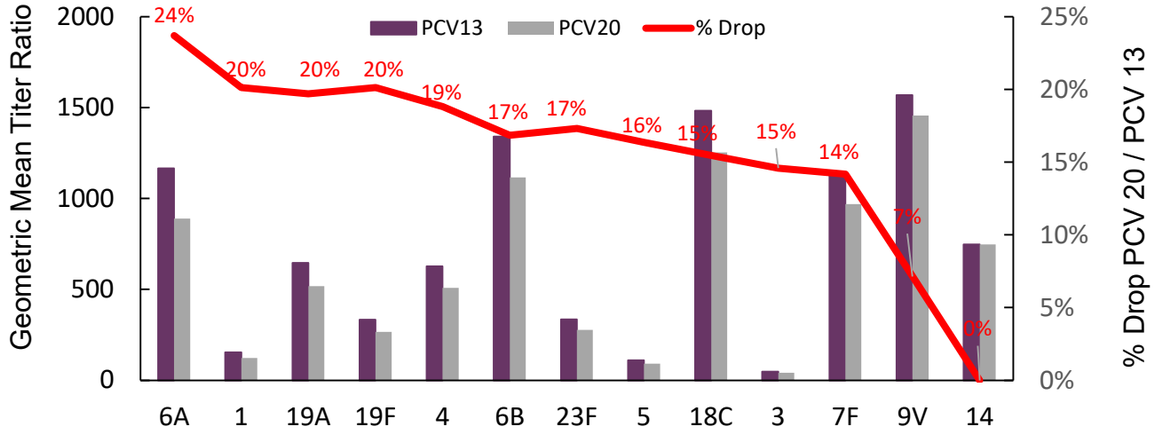
Carrier Suppression

- Reduced immune response to the target PSs due to the cumulative amount of the protein carrier
  - Expanded spectrum of coverage requires increasing protein carrier burden
  - Reduced immune responses demonstrated in both infants and adults

Infant Immune Responses (IgG): Prevnar 7 vs Prevnar 13 (1)

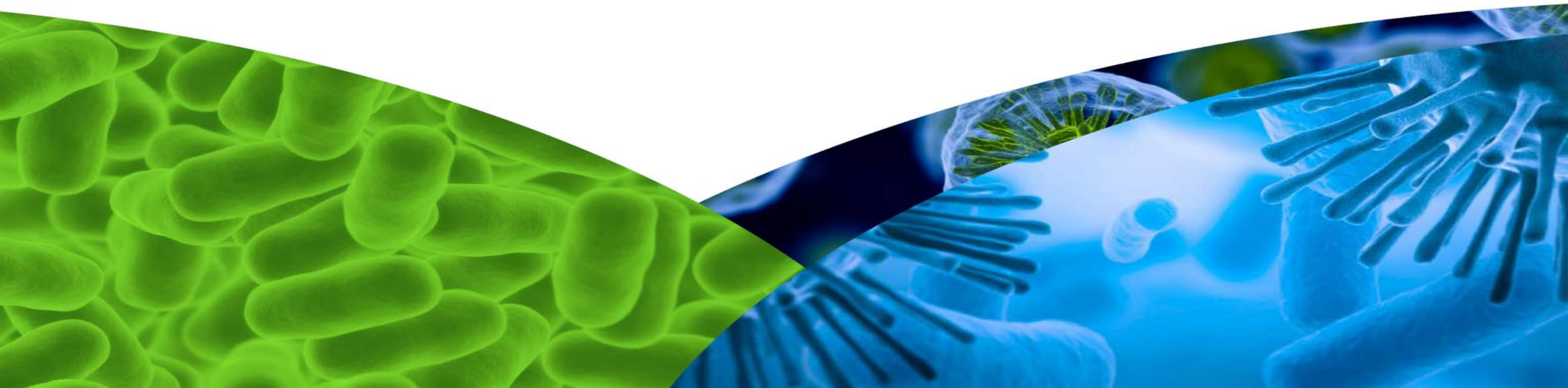


Adult Immune Responses (OPA): Prevnar 13 vs PCV20 (2)



(1) *Yeh et al, Pediatrics. 126: e493 (2010).*
(2) *Prevnar 20 BLA Clinical Review Memorandum. STN: 125731/0 June 8, 2021*

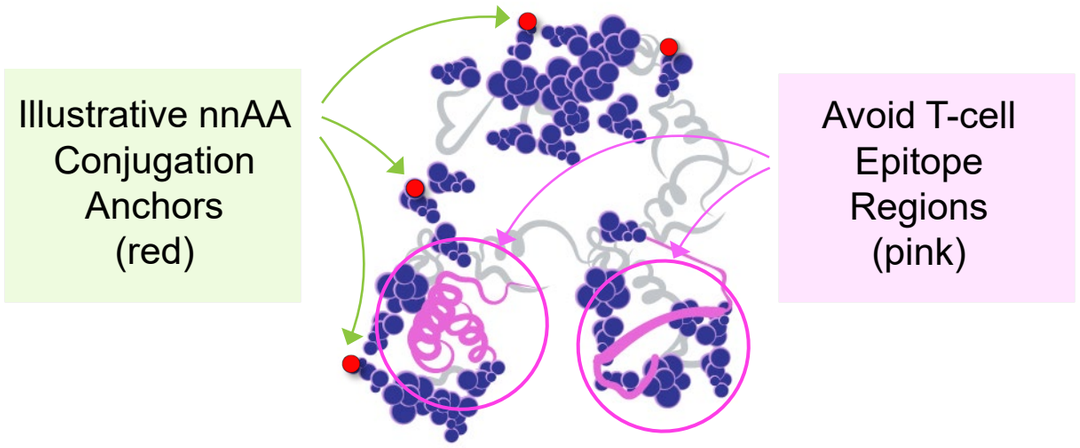
Differentiated PCV Franchise
Led by VAX-24



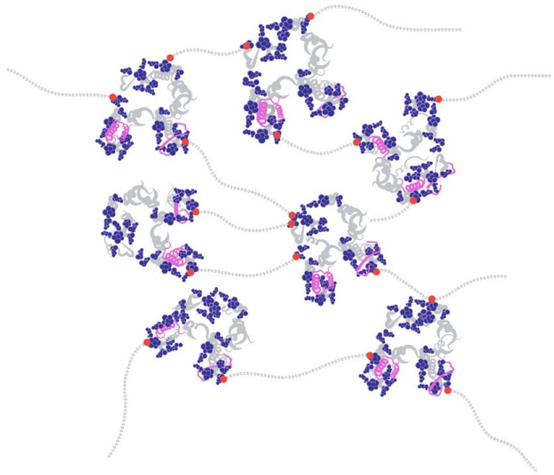
VAX-24 Employs Carrier-Sparing Conjugates

XpressCF Enables Precise Conjugation to Enhance Potency of Standard Protein Carrier

Precise, Site-Specific Conjugation Sites on Proprietary eCRM® Protein Carrier



Final VAX-24 Conjugates in Customary Matrix Form



eCRM: Enhanced Potency Potential

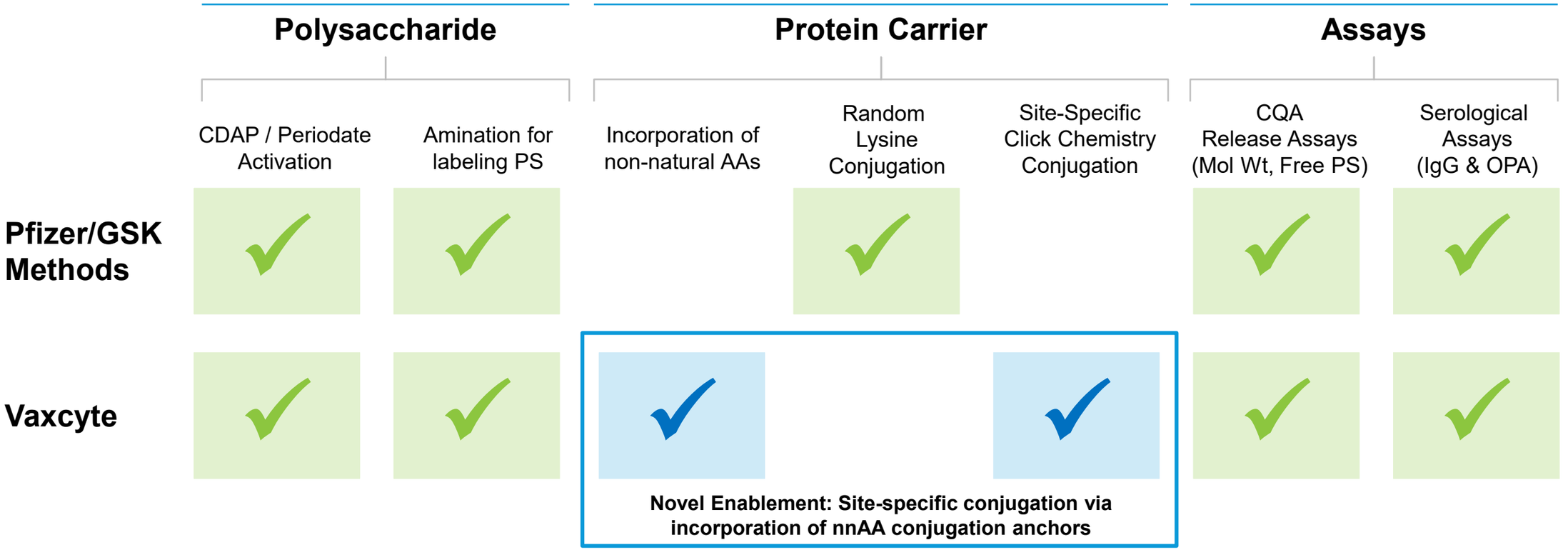
- Avoids masking sites on CRM_{197} carrier responsible for T-cell help
- Optimized sites for conjugation using copper-free click chemistry
- More consistent antigenic presentation

Carrier-Sparing Conjugates

- Less protein carrier / conjugate may allow addition of more serotypes while minimizing carrier suppression and maintaining immunogenicity
- VAX-24 and VAX-XP conjugates form standard PCV interstrand crosslinked matrices
  - Perceived as foreign by the host
  - Allows use of standard critical quality attribute & serological assays

VAX-24 Design Leverages Many Standard PCV Conventions

Utilizes Proven Components, Chemistries and Assays to Reduce Risk and Uncertainty



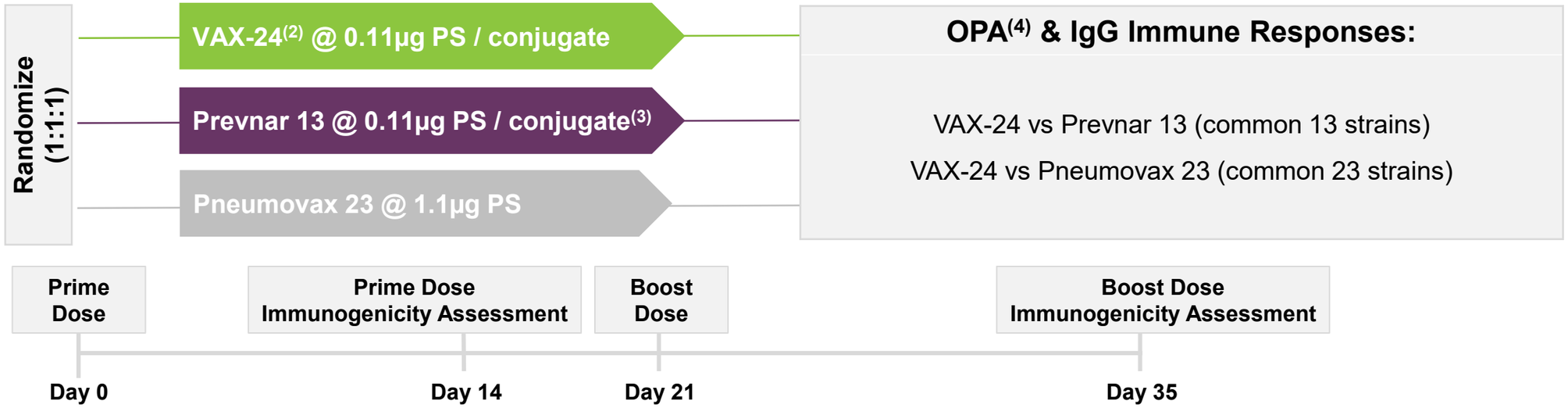
- Where appropriate, we expect to capitalize on the efficiencies of well-established clinical, manufacturing & regulatory precedents by leveraging conventional methods for the development of VAX-24
- Vaxcyte has leveraged the same animal models utilized in the development of both approved PCVs (Prevnar and Synflorix)

VAX-24 Preclinical POC Study

Designed to Assess Conjugate-Like Immune Responses vs Standard of Care

Study Design: Vaccination of rabbits(1) with doses matching weight-to-weight allometric scaling to marketed human dose

Preclinical POC Study: Rabbits (n=10/cohort) Dosed at Day 0 & Day 21



Key Objectives:

Demonstrate conjugate-like responses vs SOC on all 24 serotypes

- OPA Responses: Primary surrogate endpoint for full approval in adults
- IgG Responses: Co-Primary surrogate endpoint for full approval in infants

Key Endpoints:

Immunogenicity (OPA & IgG)

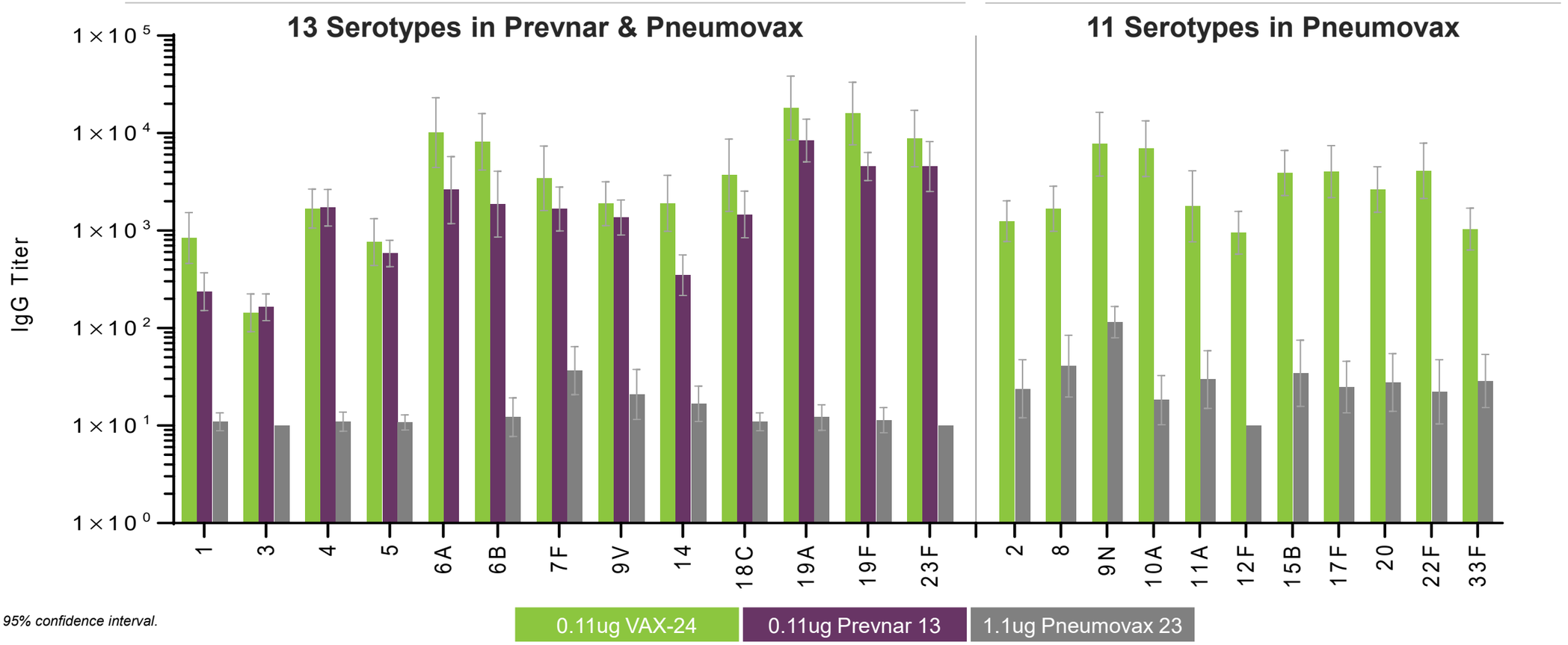
- VAX-24 vs Prevnar 13 common serotypes (Day 35)
- VAX-24 vs Pneumovax 23 for 11 incremental serotypes (Day 35)

(1) Represents same rabbit model as utilized in the development of approved PCVs (Prevnar, Prevnar 13, Synflorix).
(2) VAX-24 conjugates produced with all Lonza-produced materials (eCRM & 24 polysaccharides)
(3) Prevnar 13 dose of 6B is 2x the amount relative to the other conjugates, so equates to 0.22ug in this study.
(4) Opsonophagocytic activity assay (OPA) measures the functional capacities of vaccine-candidate-raised antibodies.

VAX-24 Preclinical POC Study Supports Potential to Deliver Broader-Spectrum PCV

IgG Antibody Titer Comparisons (Current Standard for Approval in Pediatrics)

- Comparable or better immune responses for VAX-24 relative to Prevnar 13 and Pneumovax 23 across common strains.
- Potential for approval in pediatrics based on non-inferiority relative to standard of care (≥ 50% of IgG titers one month post-boost).

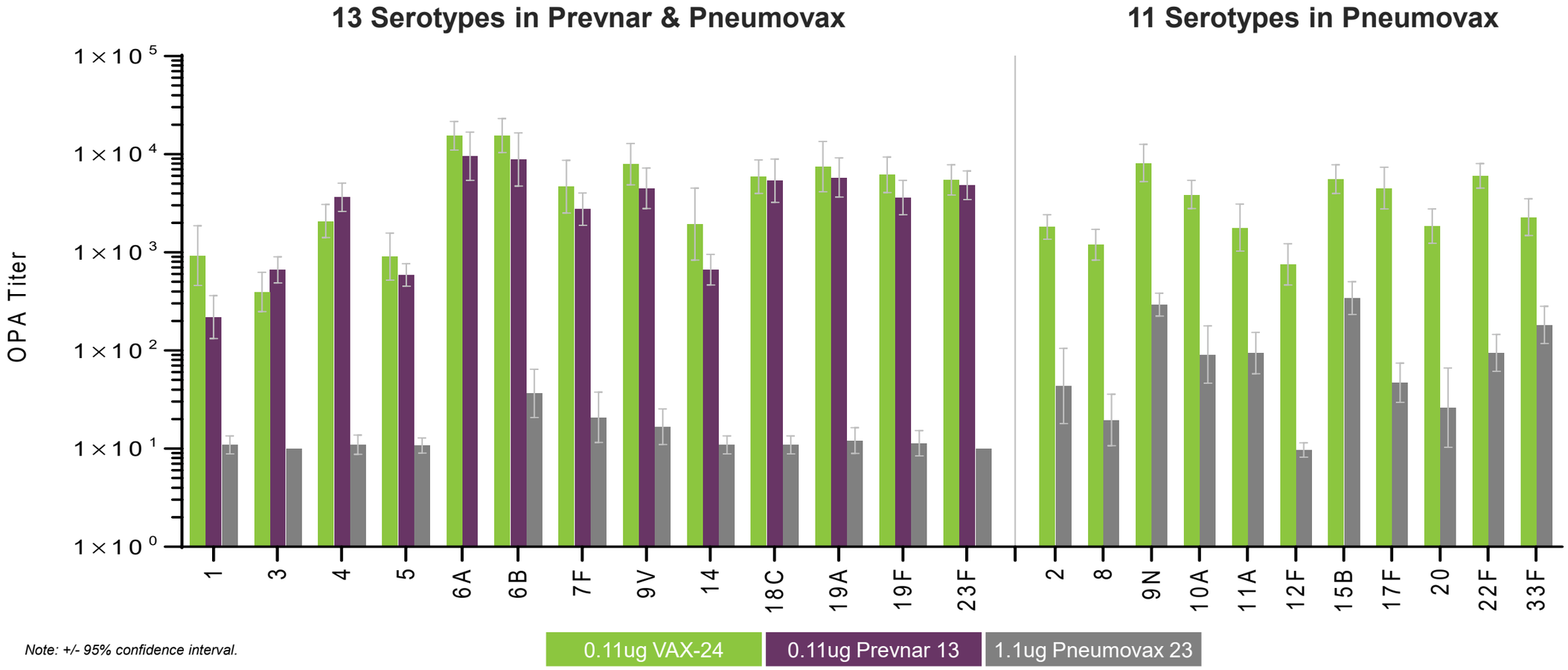


Note: +/- 95% confidence interval.

VAX-24 Preclinical POC Study Supports Potential to Deliver Broader-Spectrum PCV

Functional Antibody (OPA) Responses (Current Standard for Approval in Adults)

- Comparable or better immune responses for VAX-24 relative to Prevnar 13 and Pneumovax 23 across all common strains.
- Potential for approval in adults based on non-inferiority relative to standard of care (≥ 50% of OPA titers one month post-vaccination).

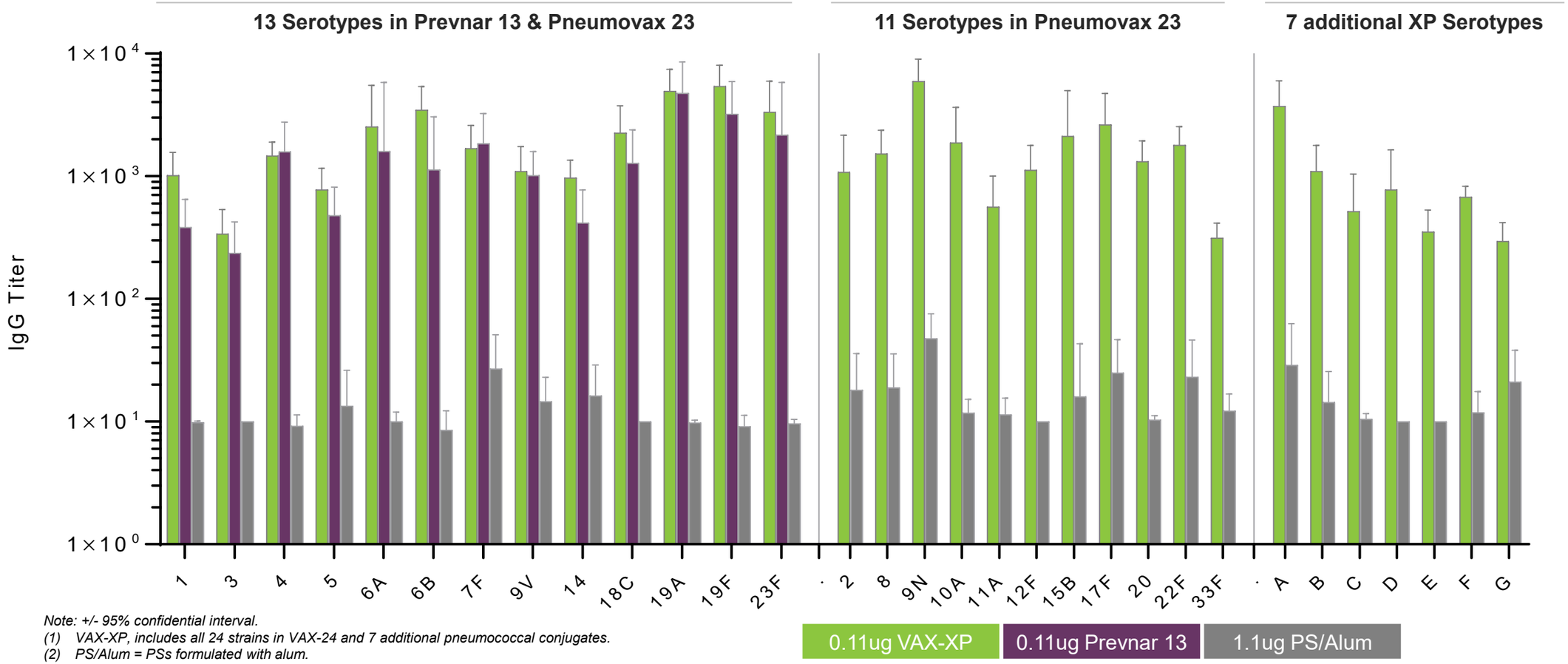


Note: +/- 95% confidence interval.

VAX-XP: Further Evidence of Potential for Platform Scalability

IgG Responses for VAX-XP Comparable to Prevnar 13 & Superior to Polysaccharide-only Serotypes

- VAX-XP incorporates VAX-24 strains plus emerging serotypes responsible for significant IPD & antibiotic resistance.
- Demonstrates spectra scalability of platform and reproducibility of VAX-XP POC data with conjugates produced at larger scale.

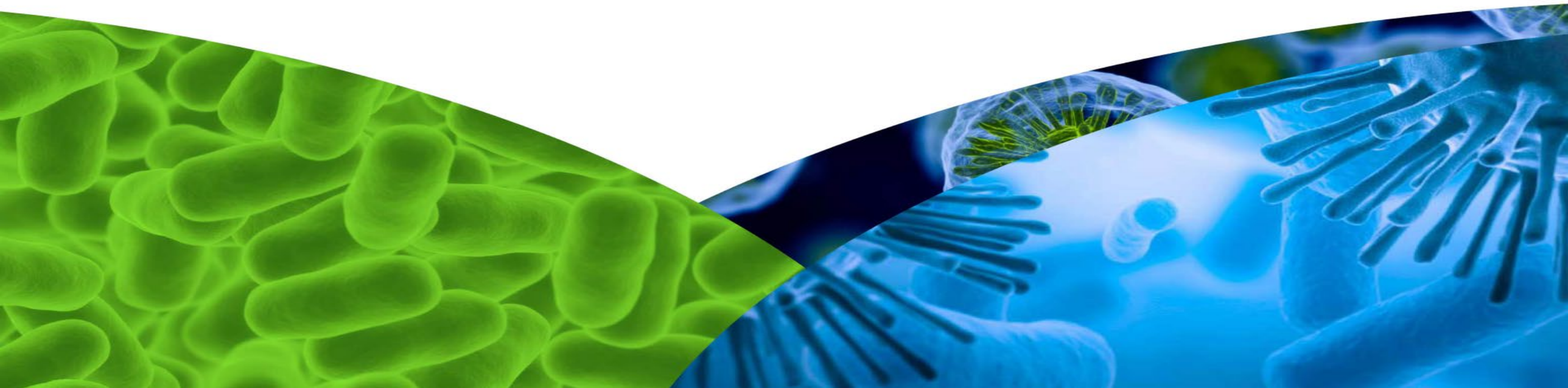


Note: +/- 95% confidential interval.

(1) VAX-XP, includes all 24 strains in VAX-24 and 7 additional pneumococcal conjugates.

(2) PS/Alum = PSs formulated with alum.

VAX-24 – Development Plan



PCV Franchise Leverages Established Regulatory Pathway

Potential FDA Approval Path Supported by Current WHO Guidance & Precedent PCVs

Well-defined, validated surrogate immune endpoints = no anticipated requirement for field efficacy trials

Demonstration of non-inferior (≥ 50%)[1] immune responses vs. SOC consistent with Merck (V114) and Pfizer (PCV20) BLA filings[2][3]

Surrogate immune endpoints[4][5][6] have been consistent between Ph 2 POC and Ph 3 pivotal studies for adult and infant programs

Vaxcyte's Approach for VAX-24

Anticipate VAX-24 IND filing in Jan-Jun '22 with Phase 1/2 clinical topline data readout in late '22-early '23[7]

Pre-IND FDA meeting completed (Dec 2019)

Ph 2 clinical POC study to include ~1,000 healthy adults aged 50 to 75

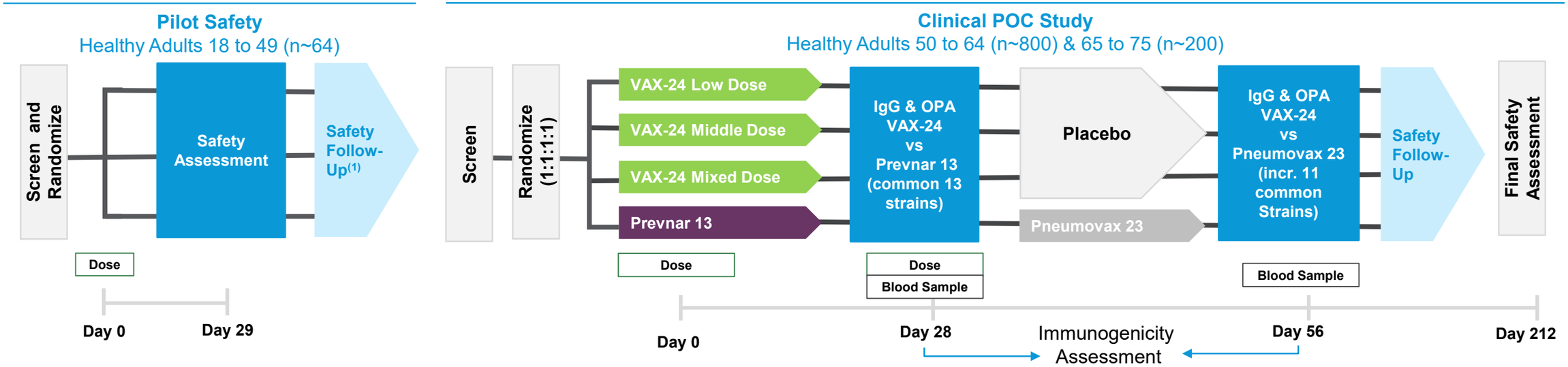
Potential for Fast Track, Priority Review and Breakthrough Designation

(1) *95% CI lower limit of the OPA GMT ratio ≥0.5 for each serotype comparison.*
(2) *Clinicaltrials.gov: Pfizer clinical studies for 20vPnC NCT03512288, NCT03550313, NCT03313050, NCT03313037, NCT03760146, NCT03835975, and NCT03828617.*
(3) *Clinicaltrials.gov: Merck clinical studies for V114 (PCV15) NCT02987972, NCT03620162, NCT03692871, NCT03731182, NCT03480763, NCT03615482, NCT03547167, NCT03480802, and NCT03565900.*
(4) *WHO. Recommendations to assure the quality, safety and efficacy of pneumococcal conjugate vaccines, in WHO Expert Committee on Biological Standardization, 60th report. Geneva, Switzerland: WHO; 2013:91-521.*
(5) *Prevenar 13 FDA Summary Basis for Regulatory Action. BLA/STN: 125324, 2010. ttps://www.fda.gov/downloads/BiologicsBloodVaccines/Vaccines/ApprovedProducts/UCM206140.pdf. Accessed January 10, 2020.*
(6) *Guidelines on clinical evaluation of vaccines. EMEA/CHMP/VWP/164653/05, April 2018. https://www.ema.europa.eu/en/documents/scientific-guideline/draft-guideline-clinical-evaluation-vaccines-revision-1_en.pdf, Accessed Feb 11, 2020.*
(7) *Guidance provided as of August 11, 2021.*

VAX-24 Phase 1/2 Clinical Proof-of-Concept Study

Designed to Demonstrate Non-Inferiority to SOC on Approvable Endpoint in Adults (OPA)

Study Design: Randomized, Observer-Blind, Dose-Finding, Controlled Study to Evaluate Safety & Immunogenicity of VAX-24 in Adults



Key Objectives:

- Evaluate safety & tolerability of single injection of VAX-24 in healthy adults 18 to 49 yrs (n~64)
- Comparative safety & tolerability of single injection of VAX-24 (3 doses) in healthy adults 50 to 75 yrs vs Prevnar 13 & Pneumovax 23

Key Endpoints:

- Immunogenicity (OPA & IgG)
  - VAX-24 vs Prevnar 13 common serotypes (Week 4 vs 4)
  - VAX-24 vs Pneumovax 23 for 11 incremental serotypes (Week 4 vs 8)
- 50 to 64 yr old cohort powered at >85% to detect OPA response of ≥50% across treatment groups & dose cohorts on a per serotype basis
- Older cohort enrolled in parallel to extrapolate immune responses in adults 65+ yrs

(1) Pilot Safety Follow-up will continue thru Day 212 in parallel upon initiation of Clinical POC Study after Day 29 safety observation.

Critical Manufacturing Foundation Established for PCV Franchise

Designed to Provide Robust & Scalable Capacity to Independently Supply Market

Strategic Alignment with Best-in-Class CDMO

Lonza

Overview / Structure:

- End-to-end “turnkey” supply established at marquee Swiss facility
- Fee-for-service relationship with risk sharing to align the parties

Status:

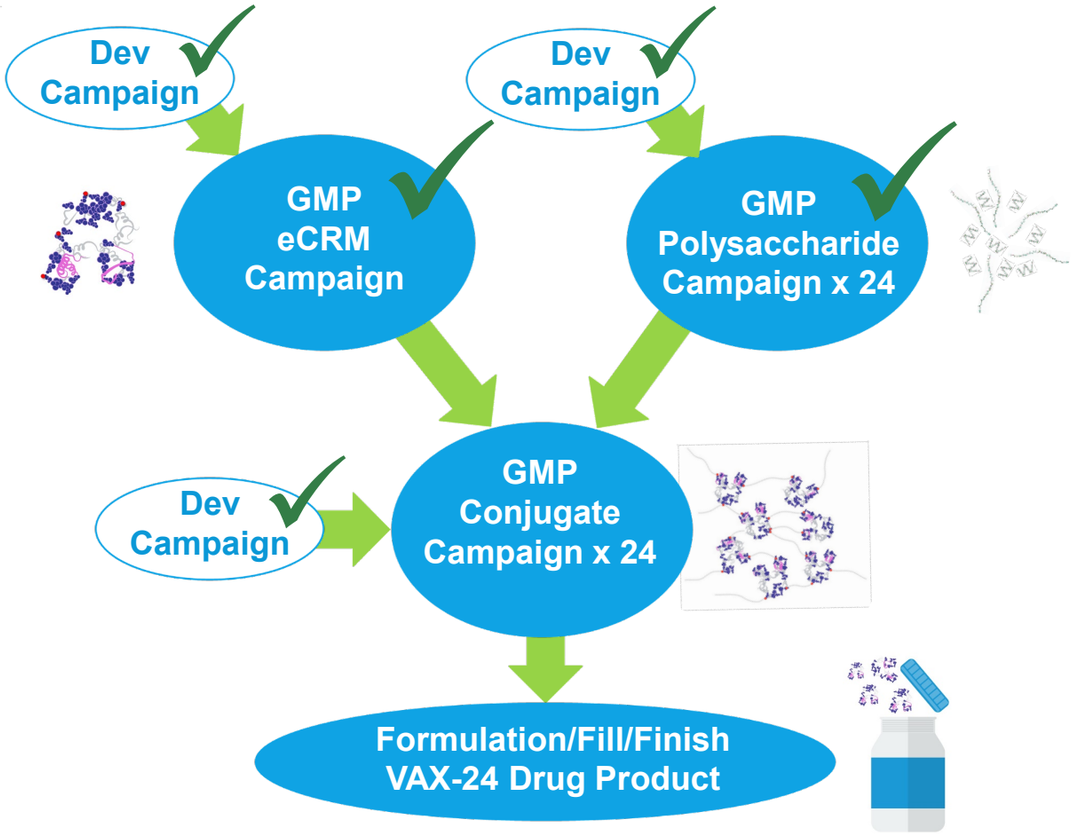
- Manufactured, tested and released GMP critical raw materials (eCRM® & 24 polysaccharides)
- Manufactured and tested the 24 GMP conjugated drug substances (DS); now completing the final steps prior to release
- DS progress has enabled initiation of final GMP drug product formulation, fill and finish phase leading to the anticipated IND filing and supply for VAX-24 Phase 1/2 clinical development
- Commercial production capacity available at same site using existing infrastructure or Ibex capacity coming on-line

Exclusive License to Cell-Free Protein Synthesis Platform

SUTRO BIOPHARMA

- Exclusive, worldwide, royalty-bearing, sub-licensable license for field of vaccines to treat or prevent infectious disease (4% royalty)
- Sutro Biopharma source of cell-free extract and custom reagents

VAX-24 Manufacturing Process / Status



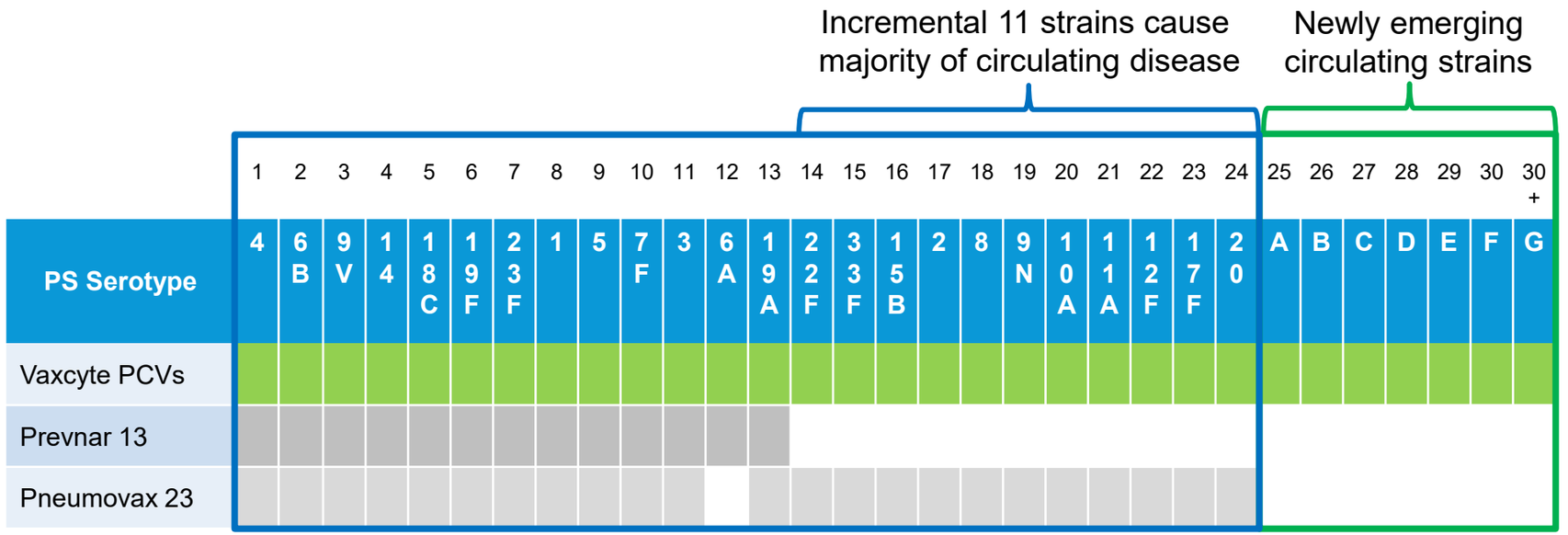
Vaxcyte PCV Franchise

Positioning for Sustained Leadership in the Established >$7B Pneumococcal Vaccine Market

VAX-24: Category leading 24-valent PCV incorporating carrier-sparing conjugates

VAX-XP: Next-generation >30-valent PCV showcases franchise approach and scalability of carrier-sparing conjugates

Spectrum of coverage drives adoption



The Pneumococcal Vaccine Landscape

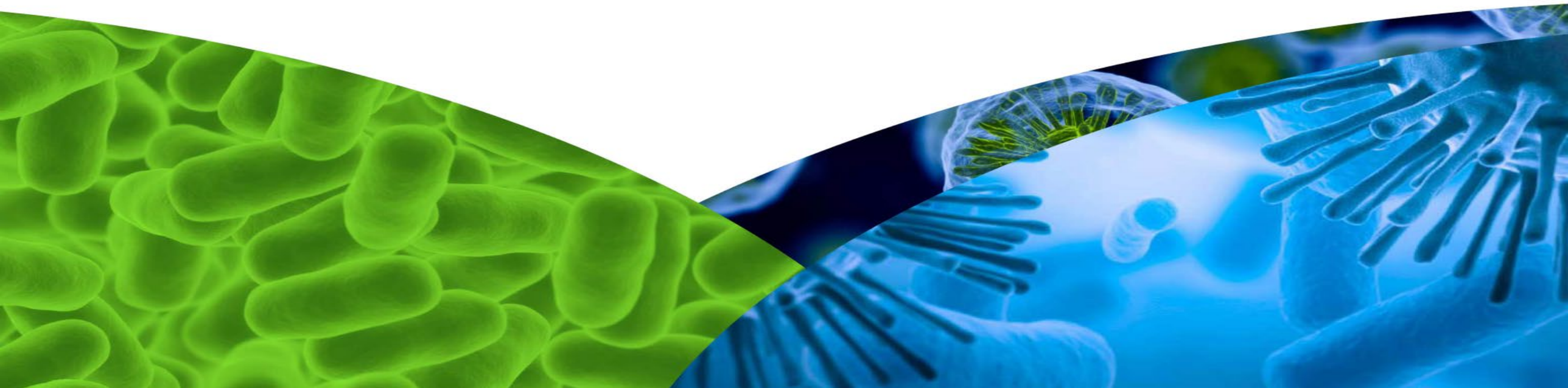
Vaxcyte PCV Franchise Designed to Offer Broadest Spectrum of Coverage

	DEVELOPER	VACCINE NAME	SPECTRUM OF COVERAGE	STATUS	TARGET POPULATION: INFANTS	ADULTS
PCV Approaches	GSK	Synflorix	10-valent	• Approved ex-US	✓	
	Merck	Vaxneuvance	15-valent	• FDA Approved in Adults • Phase 3 in Infants	✓	✓
		Merck V116	21-valent	• Preclinical		✓
		Merck V117	Unknown	• Preclinical	✓	
	Pfizer	Prevnar 13	13-valent	• SOC in Infants and Adults	✓	✓
		Prevnar 20	20-valent	• FDA Approved in Adults • Phase 3 in Infants	✓	✓
	SK Bioscience / Sanofi-Pasteur	TBD	TBD	• Ph 1/2 in Adults	✓	✓
	Vaxcyte	VAX-24 (site-specific conjugation)	24-valent	• IND-enabling	✓	✓
		VAX-XP (site-specific conjugation)	30 plus-valent	• Preclinical POC	✓	✓
Non-PCV Approaches	Merck	Pneumovax 23 (PS only)	23-valent	• SOC in Adults Post-PCV13		✓
	Affinivax / Astellas	ASP3772 (Affinity-Bound PSs to Novel Pneumo Proteins)	24-valent	• Phase 1/2 in Adults	✓	✓

SOC = standard of care; PS = polysaccharides,

Vaxcyte

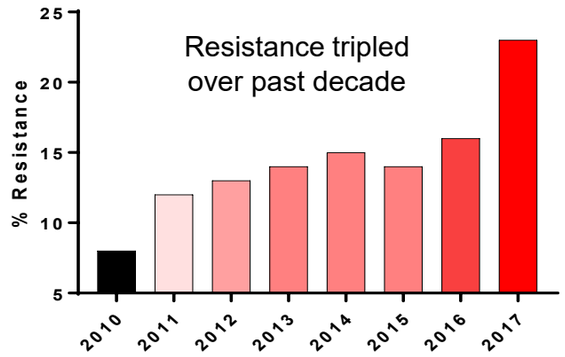
Non-PCV Pipeline

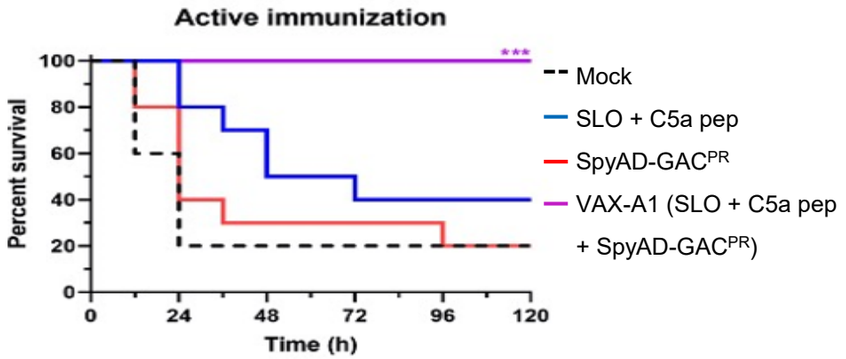


VAX-A1: Group A Strep Conjugate Vaccine Program

Monovalent Conjugate Vaccine Designed to Provide Universal Protection

Unmet Need	• Group A Strep causes 700M global annual cases of pharyngitis (strep throat) and increases risk of severe invasive infections such as sepsis, necrotizing fasciitis and toxic shock syndrome • Upgraded CDC threat given significant source of antibiotic Rxs driving resistance which has nearly tripled in past decade • Responsible for post-infectious immune-mediated rheumatic heart disease leading to over 300K deaths in 2015 • Highly prevalent in children and rate of invasive disease in adults > 65 has more than doubled (exceeding IPD rate in adults)
VAX-A1: Broad-spectrum, Monovalent Conjugate Vx	• Designed to confer robust, boostable and durable protection against a broad spectrum of subtypes of Group A Strep • Leverages site-specific conjugation to disease-specific carrier to expose mapped T- and B-cell epitopes • Proprietary conserved antigen – Polyrhamnose – conjugated to an immunogenic disease-specific carrier along with two conserved virulence factors
Program Status	• Partially funded by grant from CARB-X (consortium of BMGF, Wellcome Trust, US Biodefense Agency (BARDA)); add'l August 2021 award of $3.2M toward IND-enabling activities; total potential funding of up to $29.7M inclusive of grants to date • Nominated final vaccine candidate in 1Q 2021 • Next milestone: Initiate IND-enabling activities in 2H 2021(1)
Key Data	





(1) Guidance provided as of August 11, 2021.

CDC. Antibiotic Resistance Threats in the United States, 2019. Atlanta, GA: US Department of Health and Human Services, CDC; 2019.

BMGF = Bill & Melinda Gates Foundation.

VAX-PG: Periodontitis Vaccine Program

Therapeutic Vaccine Targeting Gingipains to Address Large, Underserved Market

Unmet Need

- Periodontal disease is a chronic oral inflammatory disease leading to destruction of soft & hard tissues supporting the teeth
- Highly prevalent: 65 million US adults afflicted
- Significant morbidity and lost productivity: >$50B in lost productivity in 2010
- Associated with increased risk of heart attack, stroke, cardiovascular disease, and Alzheimer's Disease

VAX-PG: Multivalent Therapeutic Vaccine

- Incorporates proprietary combination of known virulence factors of keystone pathogen
- Preclinical model demonstrated protein-specific IgG response following immunization and protected mice from P. gingivalis-elicited oral bone loss
- Initial goal to develop therapeutic vaccine that slows or stops disease progression

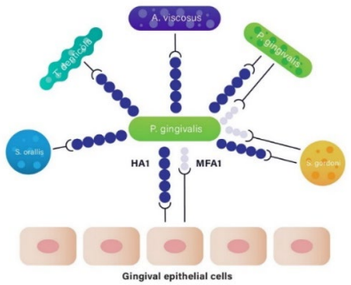
Program Status

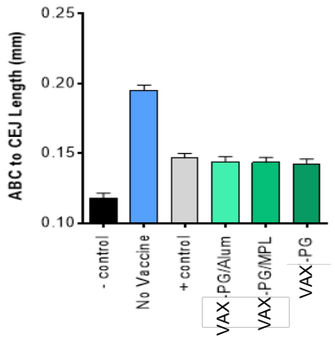
- Preclinical proof of concept published in Journal of Clinical Periodontology
- Next milestone: Nominate final vaccine candidate in 1H 2022(1)

MOA & Key Data

- Restoration of balanced microbiota by interrupting underlying inflammatory condition







Challenge Study Results

Immunization with all formulations of VAX-PG provided significant protection against oral bone loss compared to the unvaccinated control ($p<0.01$)

(1) Guidance provided as of August 11, 2021.

Huang et.al. J Clin Periodontol. 2019 Feb;46(2):197-205

Key Corporate Highlights

Next-Generation Vaccine Company

- **Large Market Opportunity for Lead PCV Franchise**
- **Cell-Free Protein Synthesis Platform**
- **Disciplined Target Selection**
- **Robust Pipeline with Multiple Novel Vaccines**
- **Aligned Critical Resources**