UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 8-K

CURRENT REPORT

Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

Date of Report (Date of earliest event reported): December 6, 2022

Blue Water Vaccines Inc.
(Exact name of registrant as specified in its charter)

Delaware	**001-41294**	**83-2262816**
(State or other Jurisdiction of Incorporation)	(Commission File Number)	(IRS Employer Identification No.)

201 E. Fifth Street, Suite 1900 Cincinnati, Ohio	**45202**
(Address of Principal Executive Offices)	(Zip Code)

Registrant's telephone number, including area code: **(513) 620-4101**

(Former name or former address, if changed since last report.)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions:

☐ Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)

☐ Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)

☐ Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))

☐ Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Securities registered pursuant to Section 12(b) of the Act:

Title of Each Class	**Trading Symbol(s)**	**Name of Each Exchange on Which Registered**
Common Stock, par value $0.00001 per share	BWV	The Nasdaq Stock Market LLC

Indicate by check mark whether the registrant is an emerging growth company as defined in as defined in Rule 405 of the Securities Act of 1933 (§ 230.405 of this chapter) or Rule 12b-2 of the Securities Exchange Act of 1934 (§ 240.12b-2 of this chapter).

Emerging growth company ☒

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Item 7.01 Regulation FD Disclosure.

Attached as Exhibit 99.1 to this Current Report is the form of presentation that Blue Water Vaccines Inc. (the "Company") intends to present on December 7, 2022 at a key opinion leader event organized by the Company.

The foregoing (including Exhibit 99.1) is being furnished pursuant to Item 7.01 and will not be deemed to be filed for purposes of Section 18 of the Securities and Exchange Act of 1934, as amended (the "Exchange Act"), or otherwise be subject to the liabilities of that section, nor will it be deemed to be incorporated by reference in any filing under the Securities Act of 1933, as amended, or the Exchange Act.

Item 9.01. Financial Statements and Exhibits.

(d) Exhibits

99.1	Presentation dated December 7, 2022
104	Cover Page Interactive Data File (embedded within the Inline XBRL document).

SIGNATURE

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has caused this report to be signed on its behalf by the undersigned hereunto duly authorized.

Blue Water Vaccines Inc.

Date: December 6, 2022

By: /s/ Joseph Hernandez
Joseph Hernandez
Chief Executive Officer

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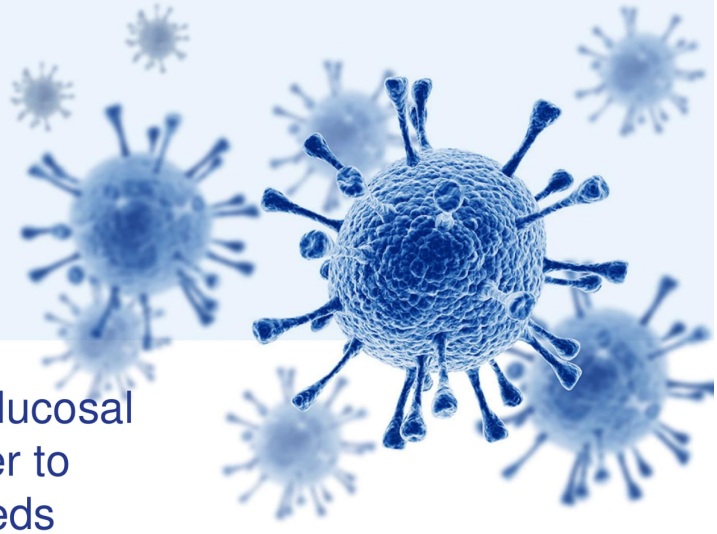

Mucosal Vaccines to Protect Against Mucosal Infections May Be The Right Answer to Address Major Unmet Medical Needs

Ali Fattom and Jason Rosch*
Bluewater Vaccines Inc.
December 7, 2022

NASDAQ: BWV

*Department of Infectious Diseases
St. Jude Children's Research Hospital, Memphis, TN

The Presentation (the "Presentation") has been prepared by Blue Water Vaccines, Inc. (the "Company"). Certain information contained herein has been derived from sources prepared by third parties. While such information is believed to be reliable for the purposes used herein, the Company makes no representation or warranty with respect to the accuracy of such information.

This Presentation does not constitute an offer to sell, or the solicitation of an offer to buy, any securities of the Company in any jurisdiction, domestic of foreign, where the offer, solicitation or sale is not permitted or would be unlawful prior to registration or qualification under the securities laws of any such state or jurisdiction.

FORWARD LOOKING STATEMENTS:

Certain statements in this presentation (the "Presentation") has been prepared by Blue Water Vaccines, Inc. (the "Company"). This presentation contains forward-looking within the meaning of the Private Securities Litigation Reform Act of 1995. These statements may be identified by the use of forward-looking words such as "anticipate," "believe," "forecast," "estimate," "expect," and "intend," among others. These forward-looking statements are based on BWV's current expectations and actual results could differ materially. There are a number of factors that could cause actual events to differ materially from those indicated by such forward-looking statements. These factors include, but are not limited to, risks related to the development of BWV's vaccine candidates, including, but not limited to BWV-301; the failure to obtain FDA clearances or approvals and noncompliance with FDA regulations; delays and uncertainties caused by the global COVID-19 pandemic; risks related to the timing and progress of clinical development of our product candidates; our need for additional financing; uncertainties of patent protection and litigation; uncertainties of government or third party payor reimbursement; limited research and development efforts and dependence upon third parties; and substantial competition. As with any vaccine under development, there are significant risks in the development, regulatory approval and commercialization of new products. BWV does not undertake an obligation to update or revise any forward-looking statement. Investors should read the risk factors set forth in BWV's Registration Statement on Form S-1, filed with the Securities and Exchange Commission (the "SEC") on August 29, 2022 and periodic reports filed with the SEC on or after the date thereof.. All of BWV's forward-looking statements are expressly qualified by all such risk factors and other cautionary statements. The information set forth herein speaks only as of the date thereof.

Today's Agenda

Introductions	Meet the team, including Joseph Hernandez, Chairman and Chief Executive Officer of Blue Water Vaccines, Ali Fattom, Ph.D., Independent Consultant for BWV, and Jason Rosch, Ph.D., inventor of BWV-201 and St. Jude Children's Research Hospital Associate Faculty Member
CEO Welcome & Company Overview	Overview of BWV pipeline and company strategy, introduction to management team, board of directors, and renowned research partners, as well as high level overview of recent execution and key events in recent months
Mucosal Immunity Overview	Review fundamentals of mucosal immunity (what it is and why it is important to protect against disease), the importance of vaccines that elicit mucosal immunity, and the lack of efficacious vaccines within this space with Dr. Fattom
Pneumococcal Vaccine Landscape	Dr. Fattom will provide an overview of the current pneumococcal vaccine landscape, the shortcomings with available vaccines given they do not elicit mucosal immunity, and the need for a serotype independent pneumococcal vaccine
BWV-201 History & Approach	Dr. Rosch will present on the history & development of BWV-201, his initial publication and efficacy/immunogenicity data on this vaccine candidate, and the benefits of this approach vs. currently available pneumococcal vaccines
Anticipated BWV-201 Dev. Timeline	Dr. Fattom will provide an update on current manufacturing progress for BWV-201, as well as provide a high-level overview and timeline for commencement of a Phase I clinical trial and subsequent trials post-Phase I

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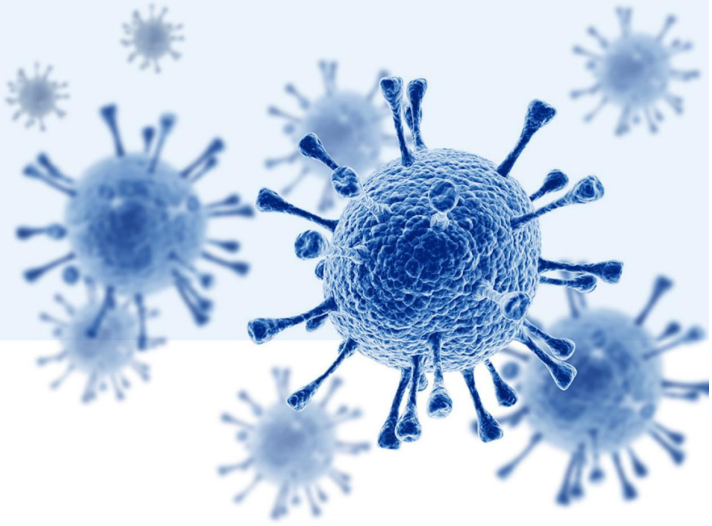
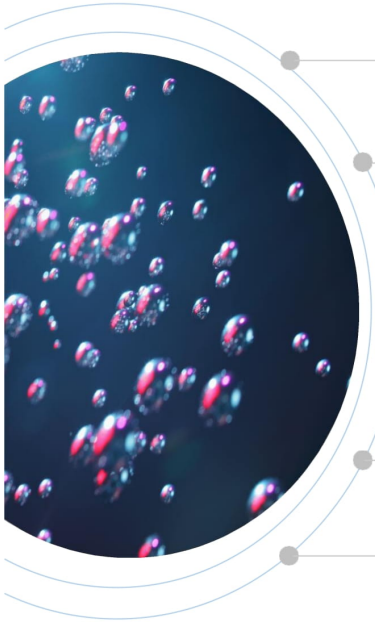


CEO Welcome & Company Overview

Joseph Hernandez, Chairman and CEO of BWV

Blue Water Vaccines Overview



Broad and Diverse Vaccine Pipeline: Novel preclinical vaccine candidates targeting key infectious diseases, including acute otitis media (middle ear infections), influenza, norovirus, rotavirus, and malaria

Accomplished Management Team and Board of Directors: Pipeline development and company success driven by management team and board of directors with extensive and diverse industry experience

Esteemed Research Collaborations: Partnerships with renowned researchers, including The University of Oxford, Cincinnati Children's Hospital Medical Center, & St. Jude Children's Research Hospital

Versatile VLP Vaccine Platform: Novel shell and protrusion (S&P) virus-like particle (VLP) platform with potential to develop multiple vaccine candidates, including influenza, monkeypox, norovirus, and rotavirus

Focus on High Unmet Need: Focused development of vaccine candidates targeting high-burden diseases, such as those impacting children and those without efficacious or cost-effective vaccines available

Opportunistic Business Model: Exclusive licenses of assets & platforms and targeted business development efforts contribute to an opportunistic business model promoting company growth and expansion

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Accomplished Management Team and Board of Directors

Led by experienced entrepreneurs with sustained records of successfully leading innovation and commercialization

Joseph Hernandez

Founder, Chairman & CEO

Andrew Skibo

Head of Biologic Operations

Ronald Cobb, Ph.D.

Head of Science and Discovery

Erin Henderson

Chief Business Officer

Jon Garfield

Chief Financial Officer

Board of Directors

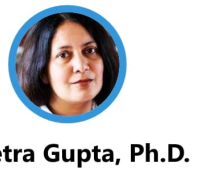
Kimberly Murphy
President & CEO, Oragenics, Inc (NYSE: OGEN)

James Sapirstein
President & CEO, First Wave Biopharma (NASDAQ: FWBI)

Simon Tarsh
Retired Senior Managing Director for Deloitte Consulting

Vuk Jeremić
Previous President of the United Nations

Renowned Research Partners



Sunetra Gupta, Ph.D.

Co-Inventor, Universal Influenza Vaccine (BWV-101)

Dept. of Zoology, University of Oxford

Xi Jason Jiang, Ph.D.

Co-Inventor, S & P Particle VLP Platform, Norovirus-Rotavirus Vaccine (BWV-301)

Ming Tan, Ph.D.

Co-Inventor, S & P Particle VLP Platform, Norovirus-Rotavirus Vaccine (BWV-301)

Assistant Professor, University of Cincinnati, Department of Pediatrics

Jason Rosch, Ph.D.

Inventor, S. pneumoniae *Vaccine (BWV-201)*

Associate Member, St. Jude Faculty

Blue Water Vaccines Pipeline

Infectious Disease Program	Candidate	Preclinical	Phase 1	Phase 2	Phase 3	Collaborator
S. pneumo-Induced Acute Otitis Media & Pneumonia	BWV-201					St. Jude Children's Research Hospital
Universal Flu	BWV-101					University of Oxford
H1 Pre-Pandemic	BWV-102					
Norovirus / Rotavirus	BWV-301					Cincinnati Children's
Norovirus / Malaria	BWV-302					

BWV is also exploring the applicability of monkeypox within the norovirus VLP platform and recently licensed technology for a novel Chlamydia vaccine from the University of Texas Health San Antonio

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Blue Water Vaccines Recent Execution

Apr

World Vaccine Congress

H3 & Influenza B Epitopes of Limited Variability Discovery for BWV-101

May

PIPE Financing

$8m PIPE: Institutional Investors

St. Jude Platform Expansion

Sponsored Research Agreement to Explore Additional AOM-Causing Antigen Expression for BWV-201

Butantan Flu Collaboration

MoA for Development of BWV-101 in Brazil

Jun

CCHMC Platform Research

SRA to Explore Versatility of S&P VLP Platform

Aug

PIPE Financing

$10m PIPE: Institutional Investors

VLP Monkeypox Research

Research Initiative to Explore Potential for VLP Platform Use in Monkeypox

Oct

Pneumonia Indication Expansion

Announced exploration of BWV-201 efficacy in pneumococcal pneumonia in children and adults

Nov

Chlamydia License Agreement

Signed Exclusive, Global License Agreement for Development of Novel Chlamydia Vaccine

As of 9/30/2022, BWV has appx. $29.1 million in cash, expected to fund operations well into Q3 2024

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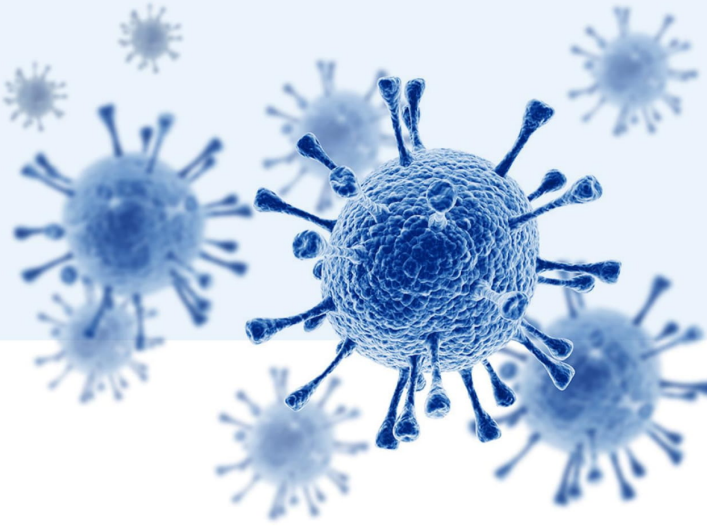


Mucosal Immunity Overview

Ali Fattom, Ph.D.

Mucosal Pathogens with No Vaccines Available And Others with "Partial" Success

No vaccine available

- Genital herpes
- RSV infants and elderly
- GBS
- Chlamydia

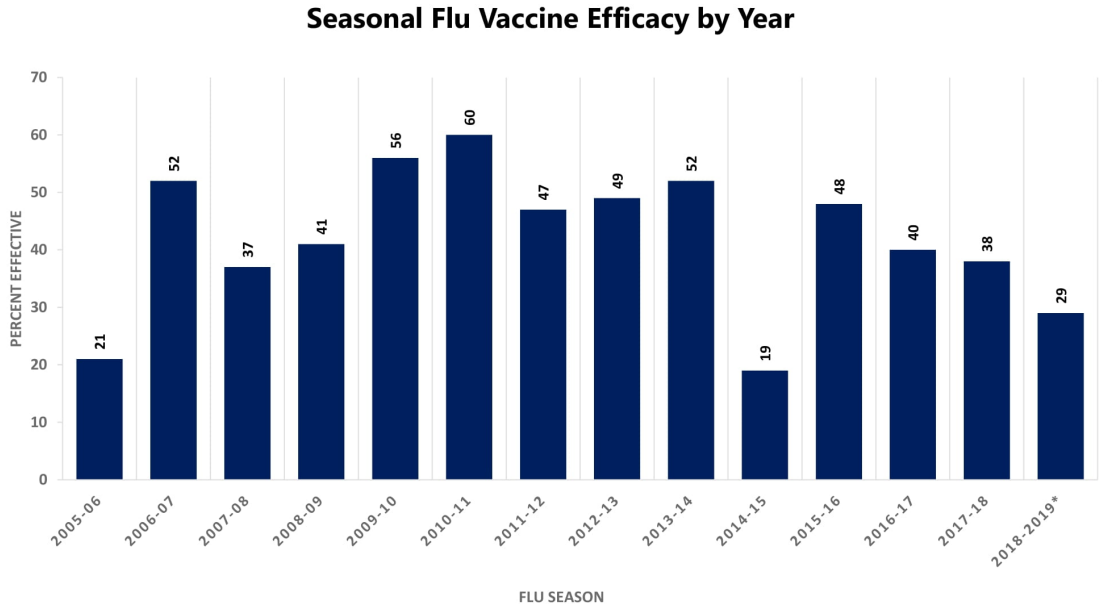
Successful vaccine with shortcomings

- Acute otitis media:
  - *Haemophiles influenzae.*
  - *Pneumococcus*
- Nasopharyngeal carriage
  - *Covid-19*
  - *Flu*
  - *Pertussis*
  - *Pneumococcus*
  - *Meningococcus*

How can we develop cost effective, efficacious, vaccines that elicit mucosal immunity to prevent disease caused by these pathogens?

CDC, "List of Vaccines Used in the United States", https://www.cdc.gov/vaccines/vpd/vaccines-list.html

Suboptimal and Variable Effectiveness of Seasonal Flu Vaccines: 2005 – 2019 Flu Seasons



*Vaccine effectiveness estimates for 2018-2019 were presented to ACIP on June 27, 2019.
Source: https://www.cdc.gov/flu/professionals/vaccination/effectiveness-studies.htm

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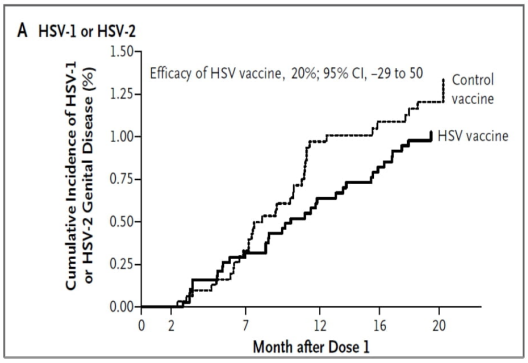
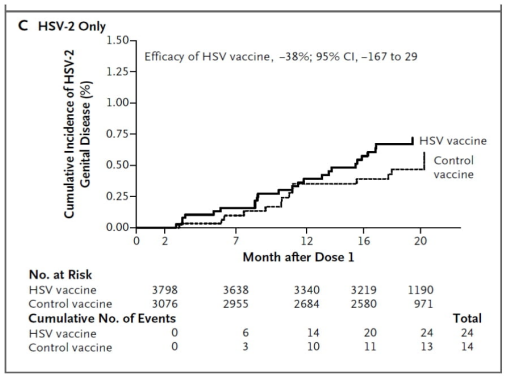
Efficacy Results of a Trial of a Herpes Simplex Vaccine (Neg/Neg Women)



- 18-30 Yrs women neg to HSV1 and HSV2 antibodies
- Vaccination: gD2/ASO4 at 0, 1, and 6 months
- 1º end point: Either HSV1 or 2 from month2-20



No. at Risk						
HSV vaccine	3798	3638	3340	3219	1190	
Control vaccine	3076	2955	2684	2580	971	
Cumulative No. of Events						**Total**
HSV vaccine	0	6	14	20	24	24
Control vaccine	0	3	10	11	13	14

Robert B. Belshe, Thomas C. Heineman, David I. Bernstein, Abbie R. Bellamy, Marian Ewell, Robbert van der Most, Carolyn D. Deal, Correlate of Immune Protection Against HSV-1 Genital Disease in Vaccinated Women, *The Journal of Infectious Diseases*, Volume 209, Issue 6, 15 March 2014, Pages 828–836, https://doi.org/10.1093/infdis/jit651

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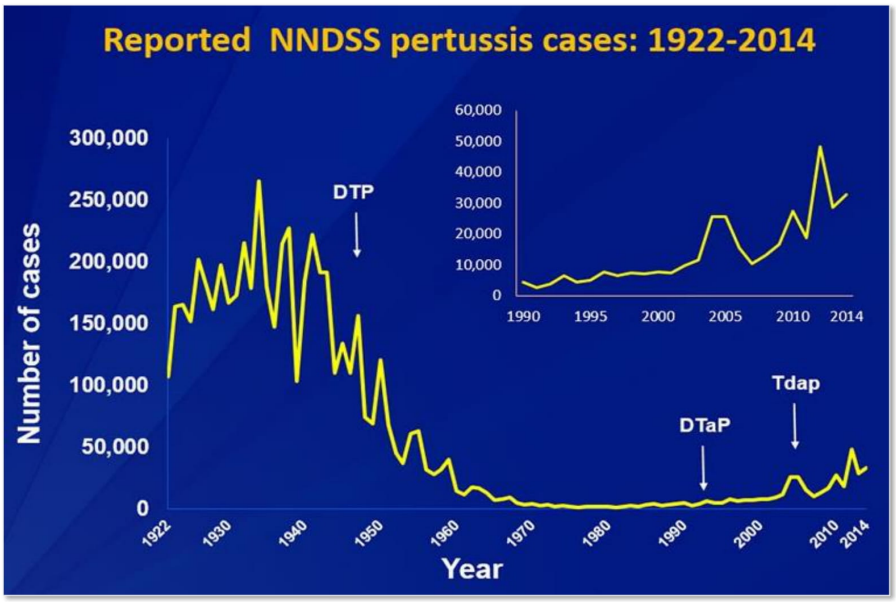
Reemergence Despite of an Efficacious Vaccine: Pertussis



Skoff, T. H., Baumbach, J., & Cieslak, P. R. (2015). Tracking Pertussis and Evaluating Control Measures through Enhanced Pertussis Surveillance, Emerging Infections Program, United States. Emerging infectious diseases, 21(9), 1568–1573. https://doi.org/10.3201/eid2109.150023

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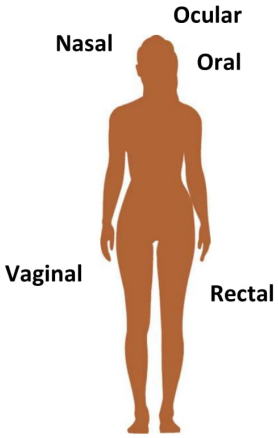
What We're Missing

- *Adenovirus*
- *Bordetella pertussis*
- *Calymmatobacterium granulomatis*
- *Campylobacter*
- *Chlamydia trachomatis*
- *CMV*
- *Coronavirus*
- *Corynebacterium diphtheria*
- *Group B streptococci*
- *Haemophilus influenzae*
- *Haemophilus ducreyi*
- *Hepatitis B*
- *HIV*
- *HPV*



- *HSV 1/2*
- *Legionella pneumophila*
- *Mycobacterium tuberculosis*
- *Mycoplasma hominis*
- *Mycoplasma pneumoniae*
- *Neisseria gonorrhoeae*
- *Rhinovirus*
- *Rubeola*
- *Seasonal & pandemic influenza*
- *Shigella*
- *Salmonella*
- *Streptococcus pneumoniae*
- *Staphylococcus aureus*
- *Streptococcus pyogenes*
- *Treponema pallidum*

CDC, "List of Vaccines Used in the United States", https://www.cdc.gov/vaccines/vpd/vaccines-list.html

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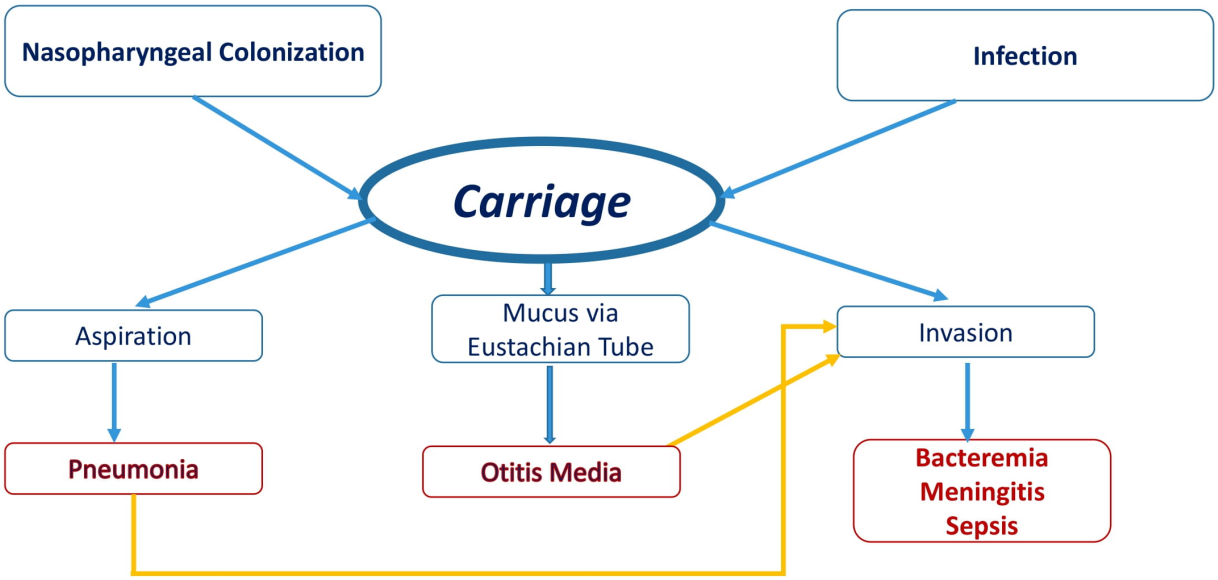
Natural History of Infections Caused by Streptococcus pneumoniae



Malley, R., Lipsitch, M., Stack, A., Saladino, R., Fleisher, G., Pelton, S., Thompson, C., Briles, D., & Anderson, P. (2001). Intranasal immunization with killed unencapsulated whole cells prevents colonization and invasive disease by capsulated pneumococci. Infection and immunity, 69(8), 4870–4873. https://doi.org/10.1128/IAI.69.8.4870-4873.2001

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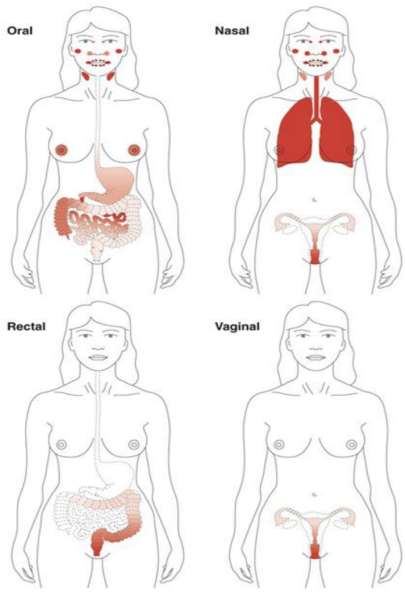
Mucosal Immunity: Homing Immunity to Mucosal Tissues



How can we create efficacious vaccines that elicit mucosal immunity to combat infectious diseases?

Holmgren, J., & Czerkinsky, C. (2005). Mucosal immunity and vaccines. Nature medicine, 11(4 Suppl), S45–S53. https://doi.org/10.1038/nm1213

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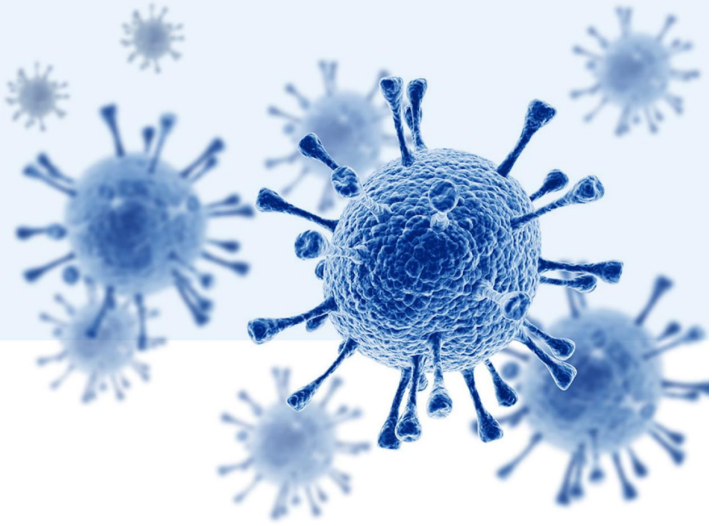

Pneumococcal Vaccine Landscape

Ali Fattom, Ph.D.

Pneumococcal Vaccines: Success

Problem: Pneumococcus causes both mucosal diseases (e.g., acute otitis media, sinusitis, pneumonia) as well as invasive infection (bacteremia, sepsis, and meningitis) predominantly in children and elderly

Success

- ✓ Introduction of the highly efficacious polysaccharide-conjugate vaccines (e.g., Prevnar series, Synflorix, etc.) reduced invasive pneumococcal infections rapidly and dramatically following introduction across all age groups

Daniels, C. C., Rogers, P. D., & Shelton, C. M. (2016). A Review of Pneumococcal Vaccines: Current Polysaccharide Vaccine Recommendations and Future Protein Antigens. The journal of pediatric pharmacology and therapeutics : JPPT : the official journal of PPAG, 21(1), 27–35. https://doi.org/10.5863/1551-6776-21.1.27

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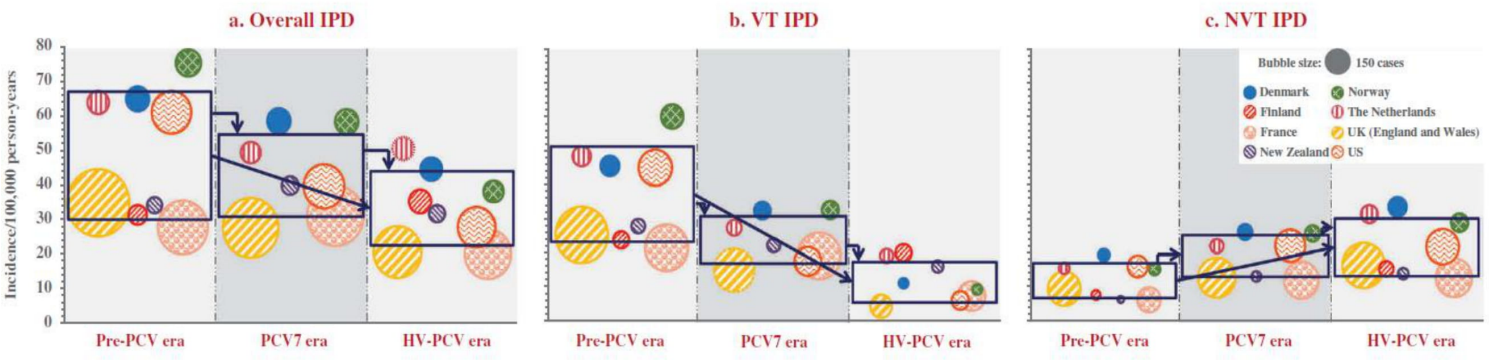
Invasive Pneumococcal Disease Distribution Across Countries or Regions by PCV Era

Invasive Pneumococcal Disease Incidence Post PCV-7



NOTE: VT = Vaccine Serotype, NVT = Non-Vaccine Serotype

Although invasive disease within serotypes included in PCV-7 decreased post-introduction, incidence of invasive disease from non-vaccine serotypes increased post-introduction, indicating need for serotype-independent vaccines

Izurieta, P., Bahety, P., Adegbola, R., Clarke, C., & Hoet, B. (2018). Public health impact of pneumococcal conjugate vaccine infant immunization programs: assessment of invasive pneumococcal disease burden and serotype distribution. Expert review of vaccines, 17(6), 479–493. https://doi.org/10.1080/14760584.2018.1413354

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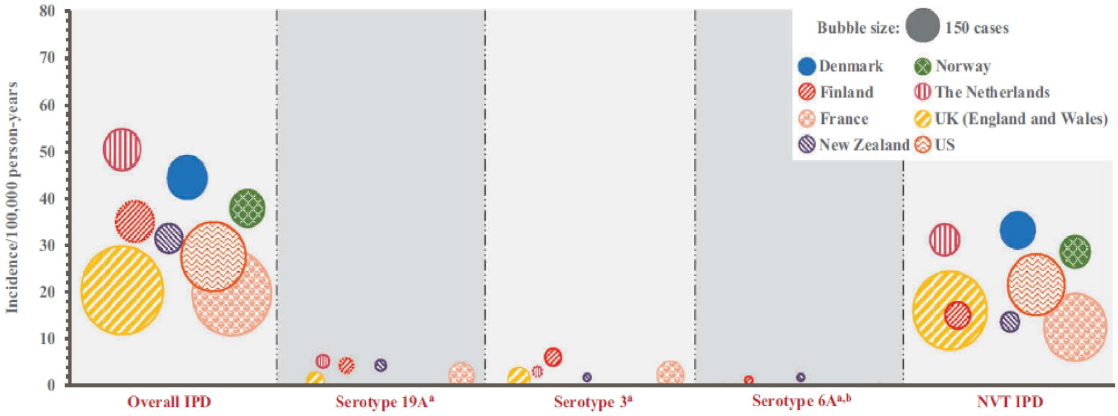
Serotype-Specific Invasive Pneumococcal Disease Incidence and Case Counts in the Higher-Valent PCV Era

Invasive Pneumococcal Disease Incidence Post-High Valent PCV



NOTE: VT = Vaccine Serotype, NVT = Non-Vaccine Serotype

Infection from non-vaccine serotypes persist while vaccines are serotype-dependent, despite efforts to increase the number of serotypes included in new vaccines

Izurieta, P., Bahety, P., Adegbola, R., Clarke, C., & Hoet, B. (2018). Public health impact of pneumococcal conjugate vaccine infant immunization programs: assessment of invasive pneumococcal disease burden and serotype distribution. Expert review of vaccines, 17(6), 479–493. https://doi.org/10.1080/14760584.2018.1413354

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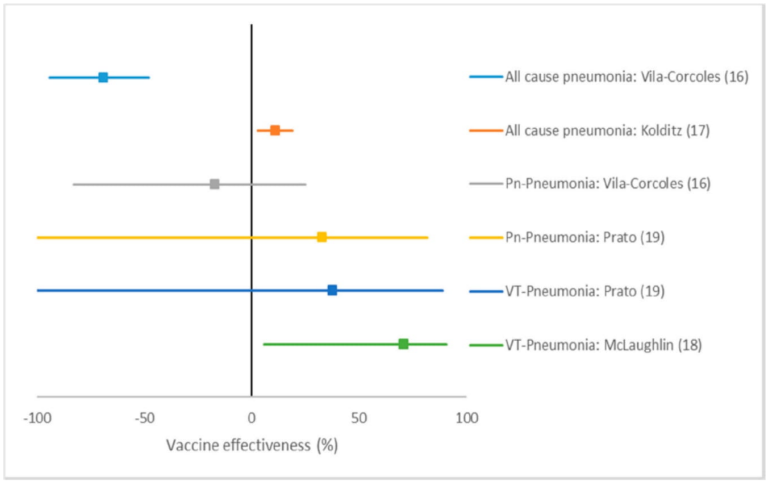
PCV-13 Vaccine Effectiveness Against Pneumococcal Pneumonia in Different Studies

PCV13 Pneumococcal Pneumonia Efficacy Rates



Historical protection against pneumococcal pneumonia with current vaccines is low, indicating significant unmet need and opportunity for novel vaccines

NOTE: VT = Vaccine Type, PCV-13 = Prevnar13

Berild, J. D., Winje, B. A., Vestrheim, D. F., Slotved, H. C., Valentiner-Branth, P., Roth, A., & Storsäter, J. (2020). A Systematic Review of Studies Published between 2016 and 2019 on the Effectiveness and Efficacy of Pneumococcal Vaccination on Pneumonia and Invasive Pneumococcal Disease in an Elderly Population. Pathogens (Basel, Switzerland), 9(4), 259. https://doi.org/10.3390/pathogens9040259

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Efficacy of PCV-13 Against Community Acquired Pneumonia in Older Adults

Outcome	PCV13 (N-=2240)	Placebo (N=42256)	Efficacy
Vaccine-type CAP	49	90	45.6%
Non-bacteremic/Non-invasive CAP	33	60	45%
Invasive Pneumococcus infections	7	28	75%
Infection with any pneumococcal strain	100	144	31%
ITT CAP	747	787	5%

(N = 84496, Duration = 3.97Y, >65Y)*

Bonten, M. J., Huijts, S. M., Bolkenbaas, M., Webber, C., Patterson, S., Gault, S., van Werkhoven, C. H., van Deursen, A. M., Sanders, E. A., Verheij, T. J., Patton, M., McDonough, A., Moradoghli-Haftvani, A., Smith, H., Mellelieu, T., Pride, M. W., Crowther, G., Schmoele-Thoma, B., Scott, D. A., Jansen, K. U., ... Grobbee, D. E. (2015). Polysaccharide conjugate vaccine against pneumococcal pneumonia in adults. The New England journal of medicine, 372(12), 1114–1125. https://doi.org/10.1056/NEJMoa1408544

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Pneumococcal Vaccines: Limitations

Problem: Pneumococcus causes both mucosal diseases (e.g., acute otitis media, sinusitis, pneumonia) as well as invasive infection (bacteremia, sepsis, and meningitis) predominantly in children and elderly

Limitations

- × Protection is serotype specific
- × Efficacy was almost exclusive to invasive diseases including bacteremia, sepsis, and meningitis
- × Emergence of non-vaccine type in the community
- × Cost and availability in resource limited setting
- × Poor protection against mucosal disease: Pneumonia, acute otitis media, and nasopharyngeal colonization

Daniels, C. C., Rogers, P. D., & Shelton, C. M. (2016). A Review of Pneumococcal Vaccines: Current Polysaccharide Vaccine Recommendations and Future Protein Antigens. The journal of pediatric pharmacology and therapeutics : JPPT : the official journal of PPAG, 21(1), 27–35. https://doi.org/10.5863/1551-6776-21.1.27

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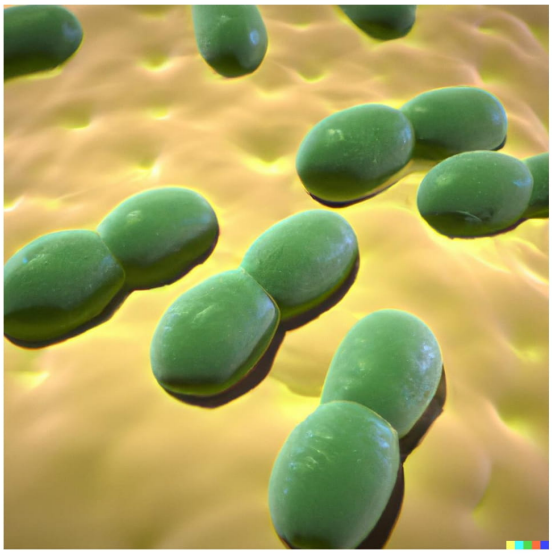
Characteristics of an Ideal, Safe, & Effective Vaccine

- ✓ Highly cross-reactive and serotype independent (Conserved surface proteins)
- ✓ Highly immunogenic and elicits:
  - ✓ Mucosal Immunity: IgA, Th17, Homed B and T-cells
  - ✓ Systemic Immunity: Opsonic IgG, balanced Th1/Th2
- ✓ Efficacious against nasopharyngeal colonization, AOM, and pneumonia in addition to invasive disease
- ✓ Low cost (e.g., to ensure utilization in resource limited settings)
- ✓ Easily delivered
- ✓ Longevity of immune response
- ✓ Localized long-term memory



Berild, J. D., Winje, B. A., Vestrheim, D. F., Slotved, H. C., Valentiner-Branth, P., Roth, A., & Storsäter, J. (2020). A Systematic Review of Studies Published between 2016 and 2019 on the Effectiveness and Efficacy of Pneumococcal Vaccination on Pneumonia and Invasive Pneumococcal Disease in an Elderly Population. Pathogens (Basel, Switzerland), 9(4), 259. https://doi.org/10.3390/pathogens9040259

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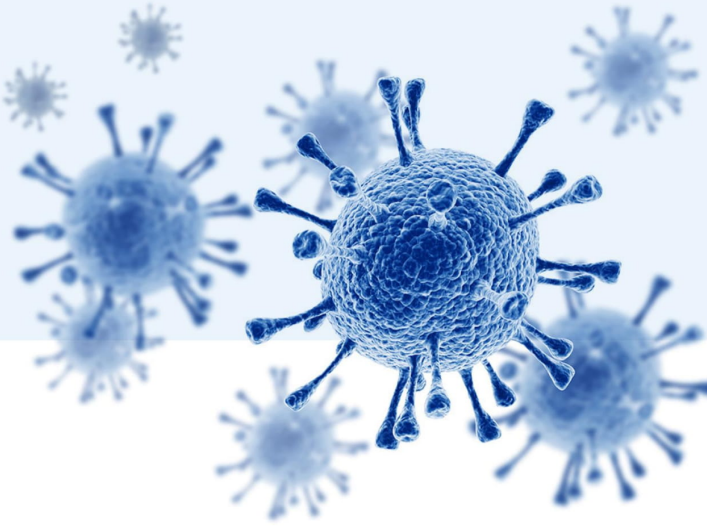
vaccines



BWV-201 History & Approach

Jason Rosch, Ph.D.

Challenges with Live Attenuated Vaccines

- × Deletion of key virulence genes for attenuation also loses key antigens to engender protection
- × Threshold for colonization duration to engender maximal responses – if cleared too rapidly may not induce potent responses
- × Ideal candidate would retain all known virulence factors, colonize for a brief duration, and lack invasive capacity

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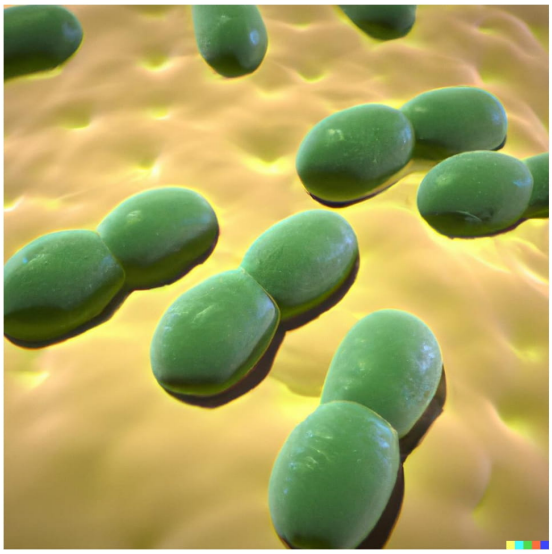
BWV-201: A Live Attenuated Vaccine Candidate

- Noninvasive serotype 19F strain BHN97 which is restricted to mucosal disease
- Deleted *ftsY,* a component *of* the signal recognition particle pathway (SRP) pathway (responsible for delivering membrane and secretory proteins to proper cellular destination), essential in many species
- Vaccine strain BHN97ΔftsY (BWV-201)
  - Attenuated for invasive disease
  - Surface protein content is similar to parental
  - Colonizes murine nasal passages for 3-7 days
  - Induced serotype-independent immune responses



Rosch JW, Iverson AR, Humann J, Mann B, Gao G, Vogel P, Mina M, Murrah KA, Perez AC, Edward Swords W, Tuomanen EI, McCullers JA. A live-attenuated pneumococcal vaccine elicits CD4+ T-cell dependent class switching and provides serotype independent protection against acute otitis media. EMBO Mol Med. 2014 Jan;6(1):141-54. doi: 10.1002/emmm.201202150. PMID: 24408968; PMCID: PMC3936495.

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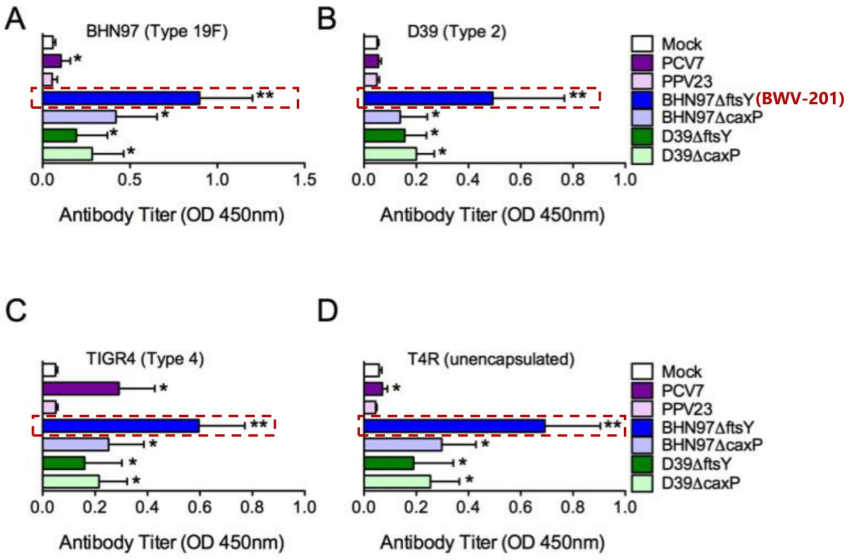
BWV-201: Highly Immunogenic against Homologous and Heterologous Serotypes

Live vaccines induce a potent serotype independent antibody responses



- ELISA against whole bacterial lysates following standard intranasal vaccination schedules in mice
- BHN97 Δ*ftsY* consistently gave the strongest serotype independent responses in a strain and serotype independent manner
- Antibody responses correlated with duration of nasal carriage (BWV-201 colonized longest at 5-7 days)

Rosch JW, Iverson AR, Humann J, Mann B, Gao G, Vogel P, Mina M, Murrah KA, Perez AC, Edward Swords W, Tuomanen EI, McCullers JA. A live-attenuated pneumococcal vaccine elicits CD4+ T-cell dependent class switching and provides serotype independent protection against acute otitis media. EMBO Mol Med. 2014 Jan;6(1):141-54. doi: 10.1002/emmm.201202150. PMID: 24408968; PMCID: PMC3936495.

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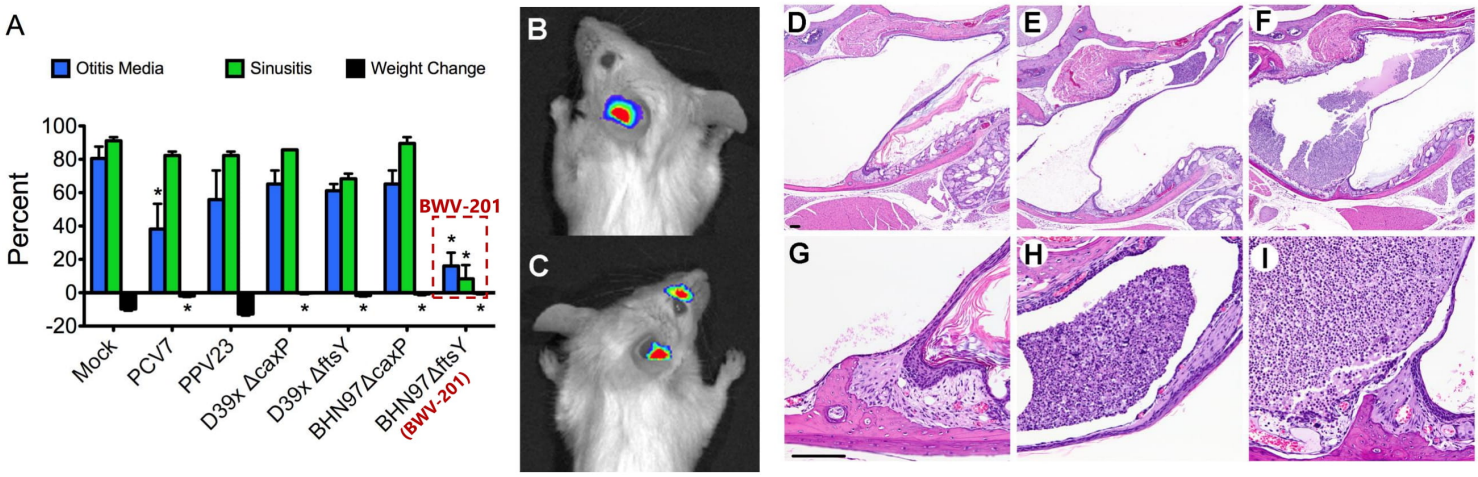
BWV-201: Protected against AOM Caused by Homologous Serotype 19F Challenge



1. ***Incidence of otitis media and sinusitis was significantly lower in BWV-201 vaccinated mice vs. mock group after challenge with 19F strain***

2. ***Other hypothesized vaccine candidates & PPV23 did not demonstrate significant differences in otitis media or sinusitis vs. mock group after challenge with 19F strain***

Rosch JW, Iverson AR, Humann J, Mann B, Gao G, Vogel P, Mina M, Murrah KA, Perez AC, Edward Swords W, Tuomanen EI, McCullers JA. A live-attenuated pneumococcal vaccine elicits CD4+ T-cell dependent class switching and provides serotype independent protection against acute otitis media. EMBO Mol Med. 2014 Jan;6(1):141-54. doi: 10.1002/emmm.201202150. PMID: 24408968; PMCID: PMC3936495.

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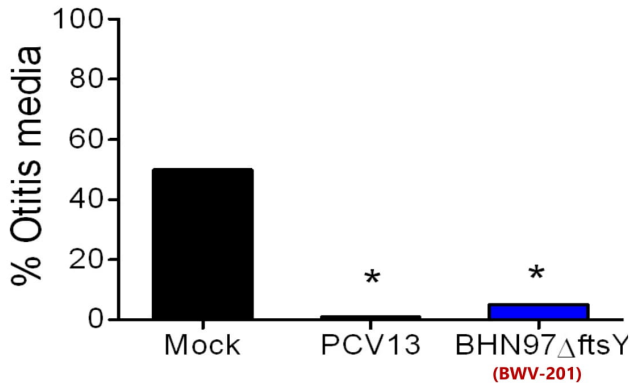
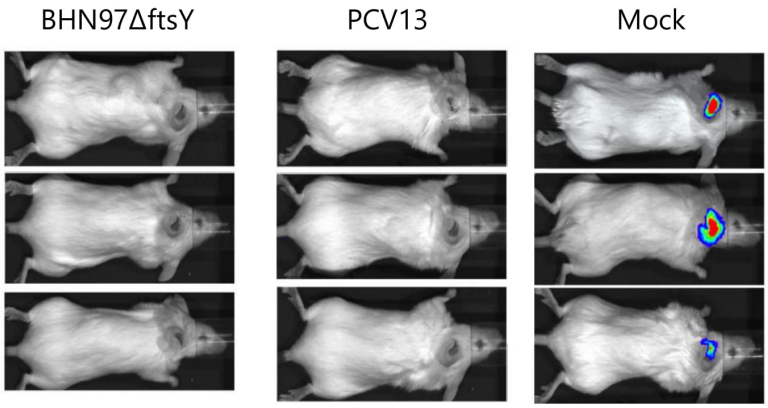
BWV-201: Protected against AOM Caused by Heterologous Serotype 7F Challenge





Incidence of otitis media after serotype 7F challenge was significantly lower in mice vaccinated with BWV-201, indicating the potential to prevent disease caused by another S. pnuemo serotype

Rosch JW, Iverson AR, Humann J, Mann B, Gao G, Vogel P, Mina M, Murrah KA, Perez AC, Edward Swords W, Tuomanen EI, McCullers JA. A live-attenuated pneumococcal vaccine elicits CD4+ T-cell dependent class switching and provides serotype independent protection against acute otitis media. EMBO Mol Med. 2014 Jan;6(1):141-54. doi: 10.1002/emmm.201202150. PMID: 24408968; PMCID: PMC3936495.

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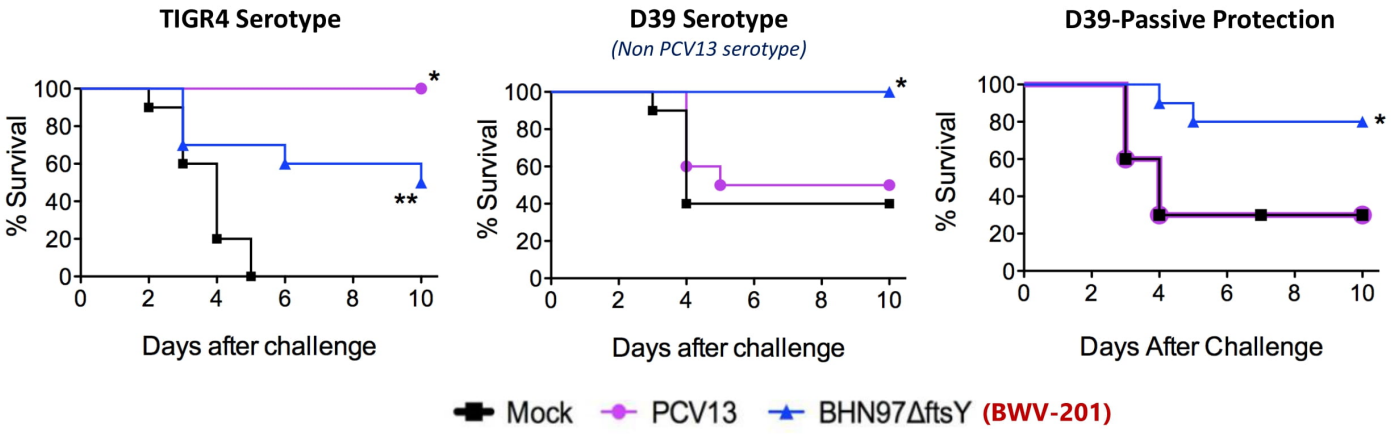
BWV-201: Protected Against IP Challenge (Sepsis/Bacteremia) with Heterologous Serotypes - 4 and 2*



What about the impact of PCV-13 vaccination or prior colonization? Do you dampen the response?

Rosch JW, Iverson AR, Humann J, Mann B, Gao G, Vogel P, Mina M, Murrah KA, Perez AC, Edward Swords W, Tuomanen EI, McCullers JA. A live-attenuated pneumococcal vaccine elicits CD4+ T-cell dependent class switching and provides serotype independent protection against acute otitis media. EMBO Mol Med. 2014 Jan;6(1):141-54. doi: 10.1002/emmm.201202150. PMID: 24408968; PMCID: PMC3936495.

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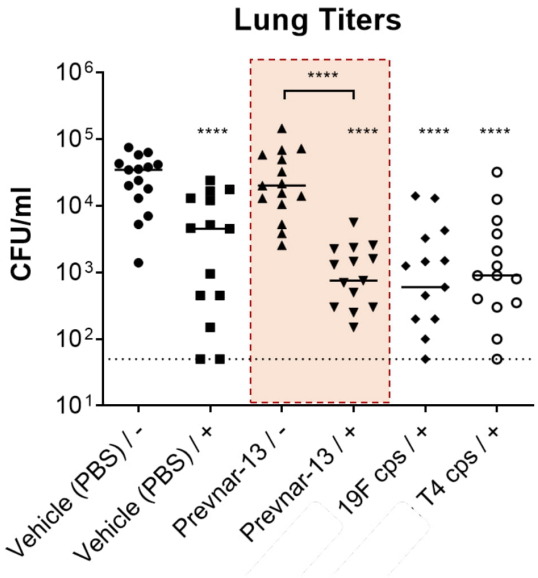
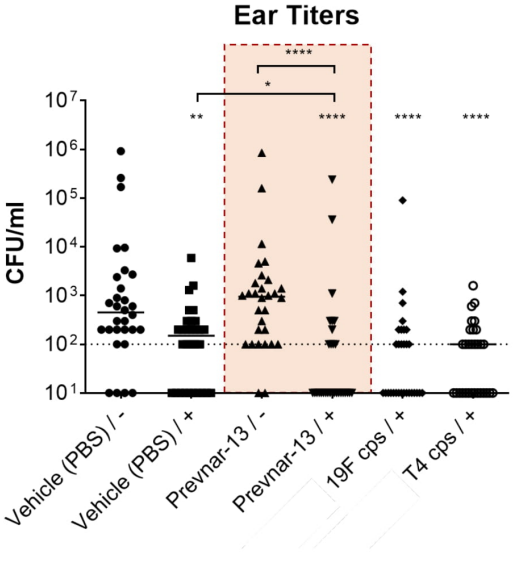
BWV-201: Previous Exposure to Heterologous Infections or PCV Vaccination Enhanced Efficacy (Lungs and Ears)





\+ indicates LAV vaccine
\- No LAV vaccine

* = p<0.05, ** = p<0.01, ***p<0.001, **** p<0.0001

33 Rosch JW, Iverson AR, Humann J, Mann B, Gao G, Vogel P, Mina M, Murrah KA, Perez AC, Edward Swords W, Tuomanen EI, McCullers JA. A live-attenuated pneumococcal vaccine elicits CD4+ T-cell dependent class switching and provides serotype independent protection against acute otitis media. EMBO Mol Med. 2014 Jan;6(1):141-54. doi: 10.1002/emmm.201202150. PMID: 24408968; PMCID: PMC3936495.

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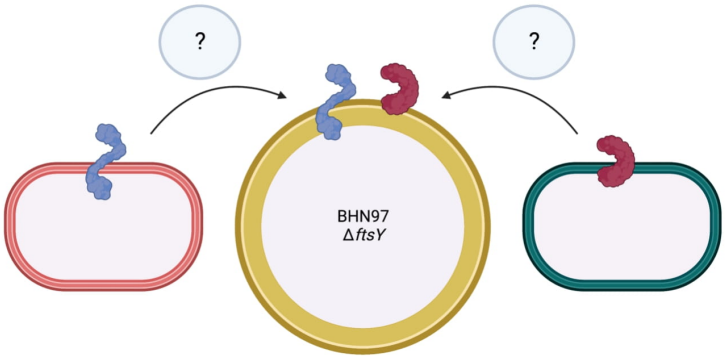
BWV-201: A Combinatorial Live Attenuated Vaccine Strategy Against Otitis Media

But there are multiple otopathogens (*Haemophilus influenzae & Moraxella catarrhalis*)…can BWV-201 be modified to confer cross-species protective responses?



Multiple Challenges:

1) Codon optimization and regulation strategies vary dramatically between species

2) Different strategies and mechanisms for protein sorting and localization between different bacterial species, particularly Gram-positive and Gram-negatives

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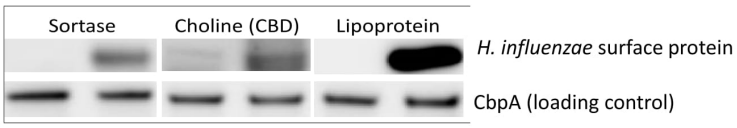
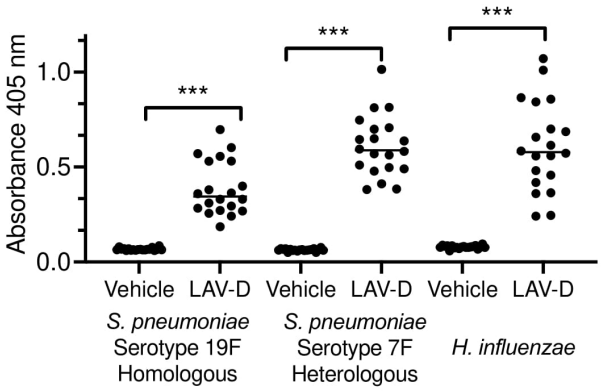
Haemophilus influenzae Epitopes Successfully Expressed and Anchored to BWV-201 Cell Surface via Multiple Mechanisms





Engineered a strategy by which Gram-negative epitopes can be successfully expressed, sorted, and anchored to the cell surface of vaccine strain via all three predominant mechanisms of surface anchoring in *S. pneumoniae*

*Newly generated data, not yet published

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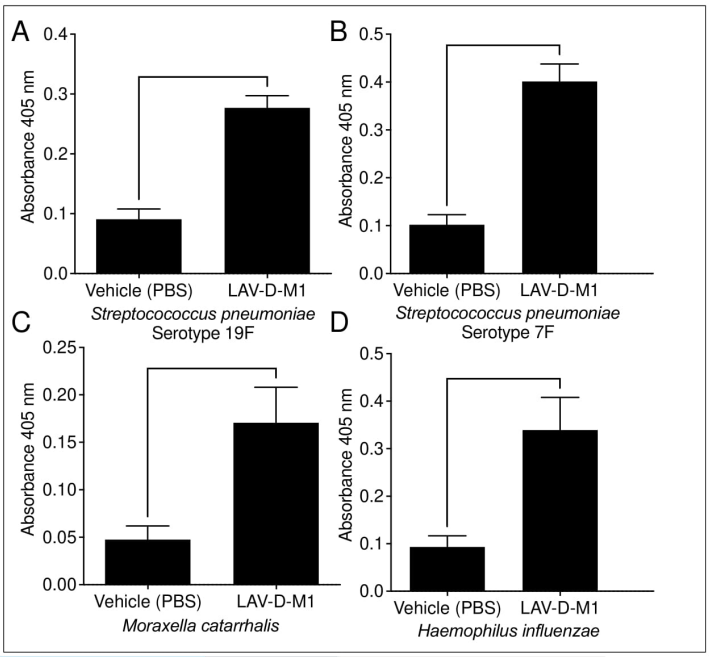
Can this platform be used to deliver multiple antigens from different species to the mucosal surface?



Multiple foreign epitopes can be expressed & are immunogenic *in vivo*

- Engineered live vaccine to express protective epitopes of *Haemophilus influenzae* and *Moraxella catarrhalis* on the cell surface of BWV-201
- Vaccine construct raised antibodies following intranasal vaccination against all three pathogens by ELISA

*Newly generated data, not yet published

BWV-201 Conclusions

- ✓Live attenuated pneumococcal vaccine BWV-201 elicited **robust protection** against both **invasive** (sepsis/bacteremia) and **not invasive** infections (AOM/pneumonia) media
- ✓Protection across **heterologous serotypes**
- ✓**Existing immunity** (vaccination or colonization) is **synergistic** and enhanced protection
- ✓ BWV-201 may serve as a **platform** to include other proteins from multiple bacterial species
- ✓Potential for **combination vaccine** with disease-specific indication AOM or pneumonia caused by different pathogens

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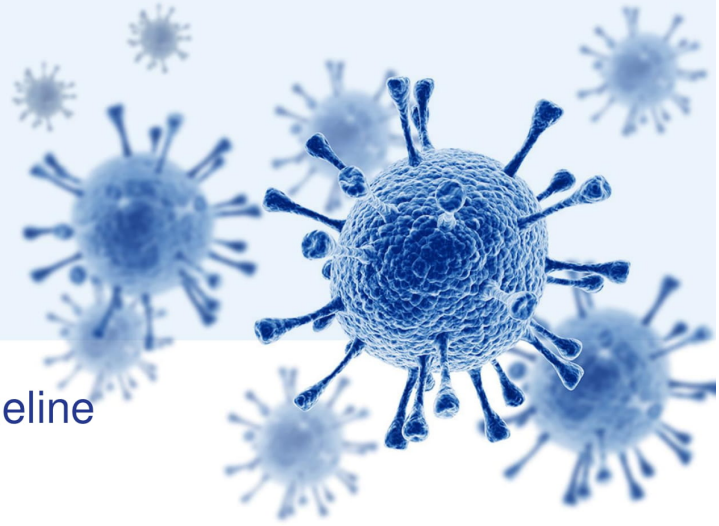
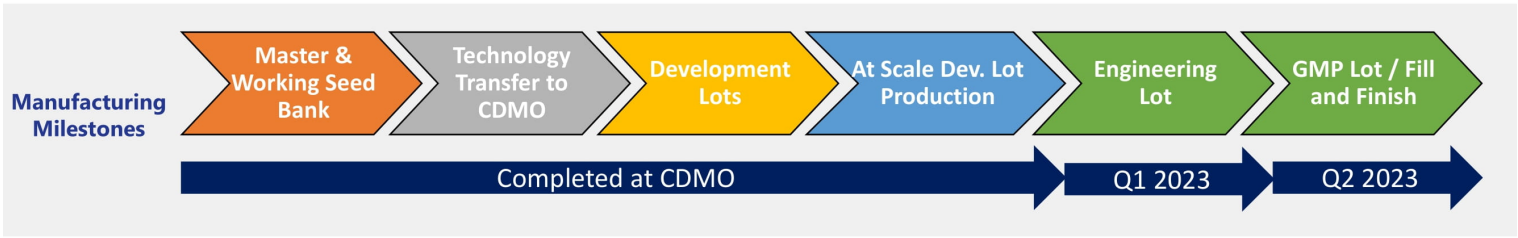
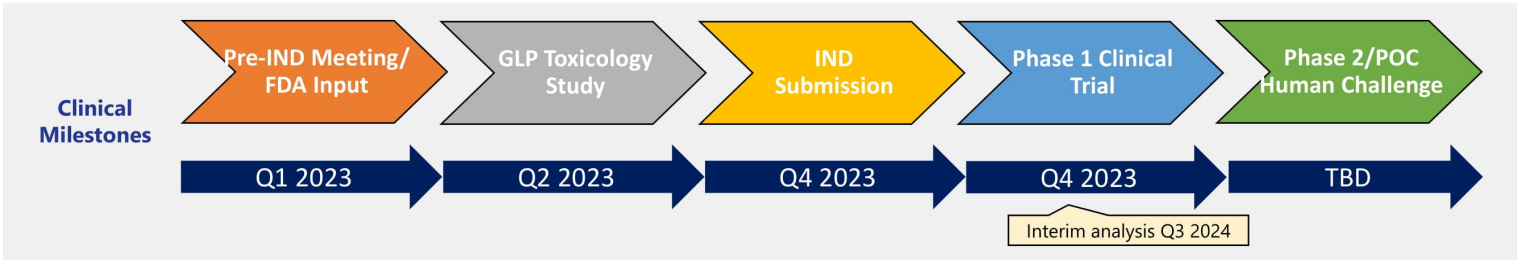


BWV-201 Anticipated Development Timeline

Ali Fattom, Ph.D.

Anticipated BWV-201 Development Through Phase II Clinical Trial





NOTE: All dates are anticipated based on current projections and project milestones, see Forward Looking Statements for additional details

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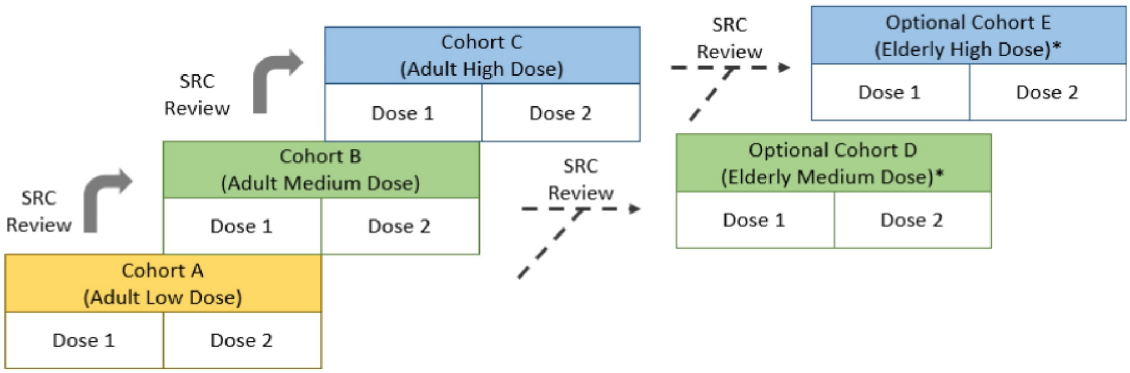
Phase 1 Clinical Trial Design

This is a Phase 1, first-in-human, randomized, double-blind, placebo-controlled, multiple-dose, dose-escalation study in healthy subjects to evaluate the tolerability, safety, and reactogenicity of BWV201



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Anticipated Phase 1 Clinical Trial Outcomes

- ✓ Safety of the vaccine at all doses
- ✓ Pneumococcus colonization and clearance
- ✓ Blood samples for testing:
  - ✓ Efficiency of colonization across the three doses of the vaccine
  - ✓ Compare colonization following the first and the second immunization
  - ✓ Immunogenicity (serum IgG and IgA) against the prototype and at least three other serotypes
  - ✓ Evaluate nasal washes for specific IgG and IgA
  - ✓ Evaluate opsonophagocytosis against homologous and heterologous serotypes
  - ✓ Collect PBMC's for further analysis

NOTE: Outcomes pending FDA review of the pre-Investigational New Drug and Investigational New Drug Applications

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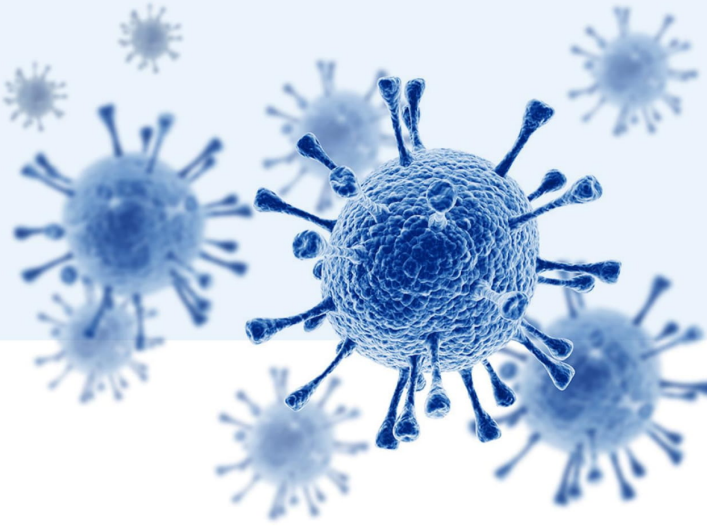

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