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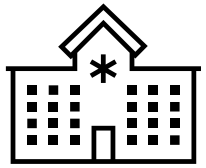
California Department of Public Health

Interim Influenza Vaccine Effectiveness Against Laboratory-Confirmed Influenza, California, October 2024 – January 2025

Sophie Zhu, PhD and Joshua Quint, PhD
California Department of Public Health

Advisory Committee on Immunization Practices Meeting
April 15, 2025

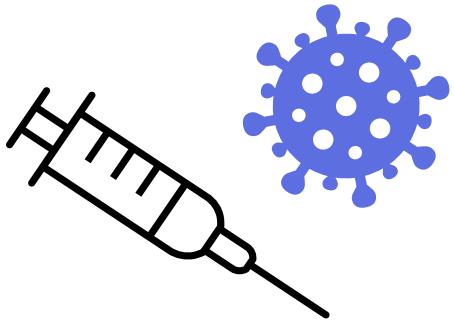
Considerations for calculating vaccine effectiveness



Setting:
Inpatient
Outpatient

Data Sources:
Hospital networks
Public health surveillance

Population:
Pediatric
Adult



Data Type:
Electronic records
Patient interviews

Influenza VE

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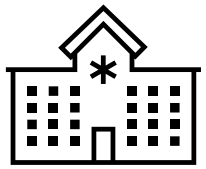
Considerations for calculating vaccine effectiveness



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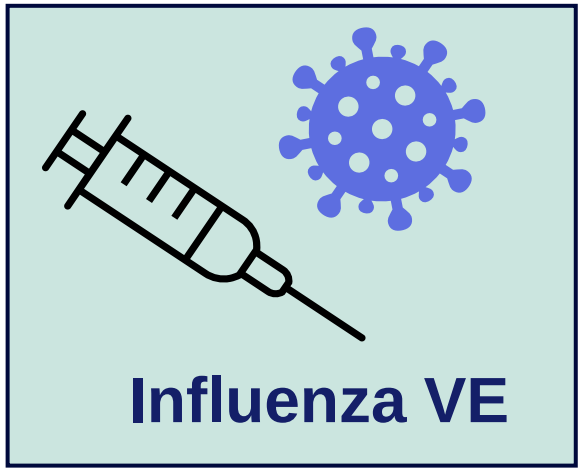

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New California Data Reporting Requirements

- January 1, 2023
  - **All vaccination records** must be reported to the California Immunization Registry (CAIR)
  - Previously, only certain types of providers were required to report

- June 15, 2023:
  - **All influenza test results** must be reported to California Reportable Disease Information Exchange (CalREDIE)
  - Previously, only positive results were reported

CAIR California Immunization Registry

CalREDIE California Reportable Disease Information Exchange

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Morbidity and Mortality Weekly Report

Interim Influenza Vaccine Effectiveness Against Laboratory-Confirmed Influenza — California, October 2023–January 2024

Sophie Zhu, PhD[1,2]; Joshua Quint, PhD[2]; Tomás M. León, PhD[2]; Monica Sun, MPH[2]; Nancy J. Li, MS[2]; Mark W. Tenforde, MD, PhD[3]; Seema Jain, MD[2]; Robert Schechter, MD[2]; Cora Hoover, MD[2]; Erin L. Murray, PhD[2]

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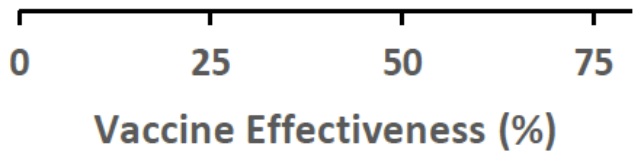
2023–2024 CA estimates similar to other VE platforms

Pediatric: 6 mo–18 yrs

	Adjusted† VE % (95% CI)
California VE Estimates	
Influenza A and B	56 (54, 57)
CDC Vision VE Estimates	
NVSN (outpatient)	59 (48, 67)
US Flu VE (outpatient)	67 (48, 80)
VISION (outpatient)	60 (57, 64)
NVSN (inpatient)	61 (40, 75)
VISION (inpatient)	52 (16, 72)



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Methods

Case control study (unmatched)

- **Dates:** October 1, 2024 - January 31, 2025
- **Eligibility/inclusion criteria:** California residents aged ≥6 months with a test result reported through the state electronic laboratory reporting (ELR) system
- **Outcome (test result):** molecular (NAAT) or culture test results for influenza (A/B)
- **Exposure (vaccination status):** documented dose of seasonal influenza vaccine at least 14 days prior to test date
- **Exclusions:** duplicate test results for persons with multiple records, laboratories with greater than 50% weekly positive results
- **Analysis:** VE = (1 – adjusted OR) x 100%
  - Mixed-effects logistic regression model
  - Adjusted for continuous age (natural cubic spline), categorical race and ethnicity; testing week and county as random effects

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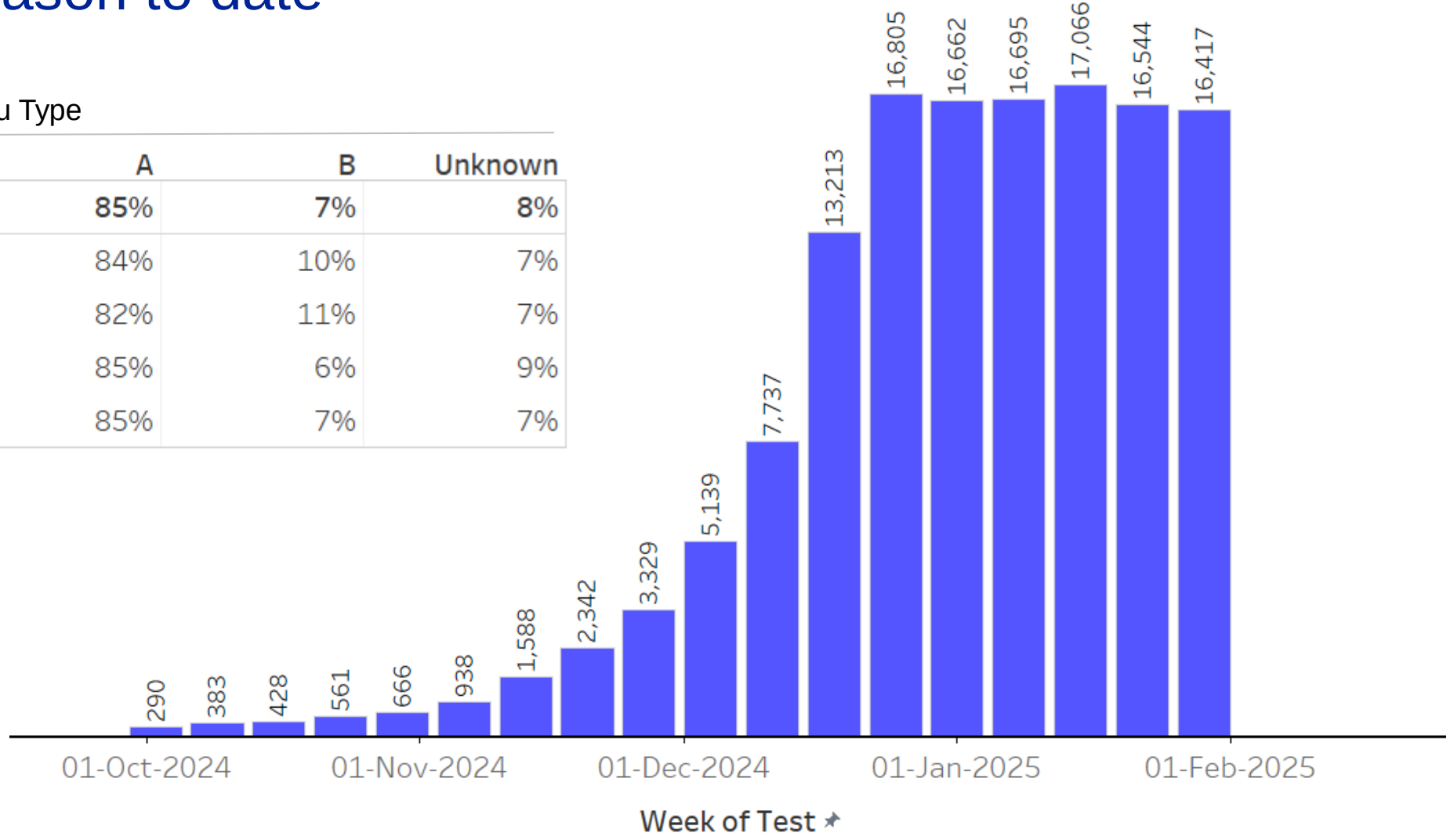
Number of positive influenza detections by laboratories

2024-2025 season to date

Flu Type	A	B	Unknown
Total	85%	7%	8%
October 2024	84%	10%	7%
November 2024	82%	11%	7%
December 2024	85%	6%	9%
January 2025	85%	7%	7%



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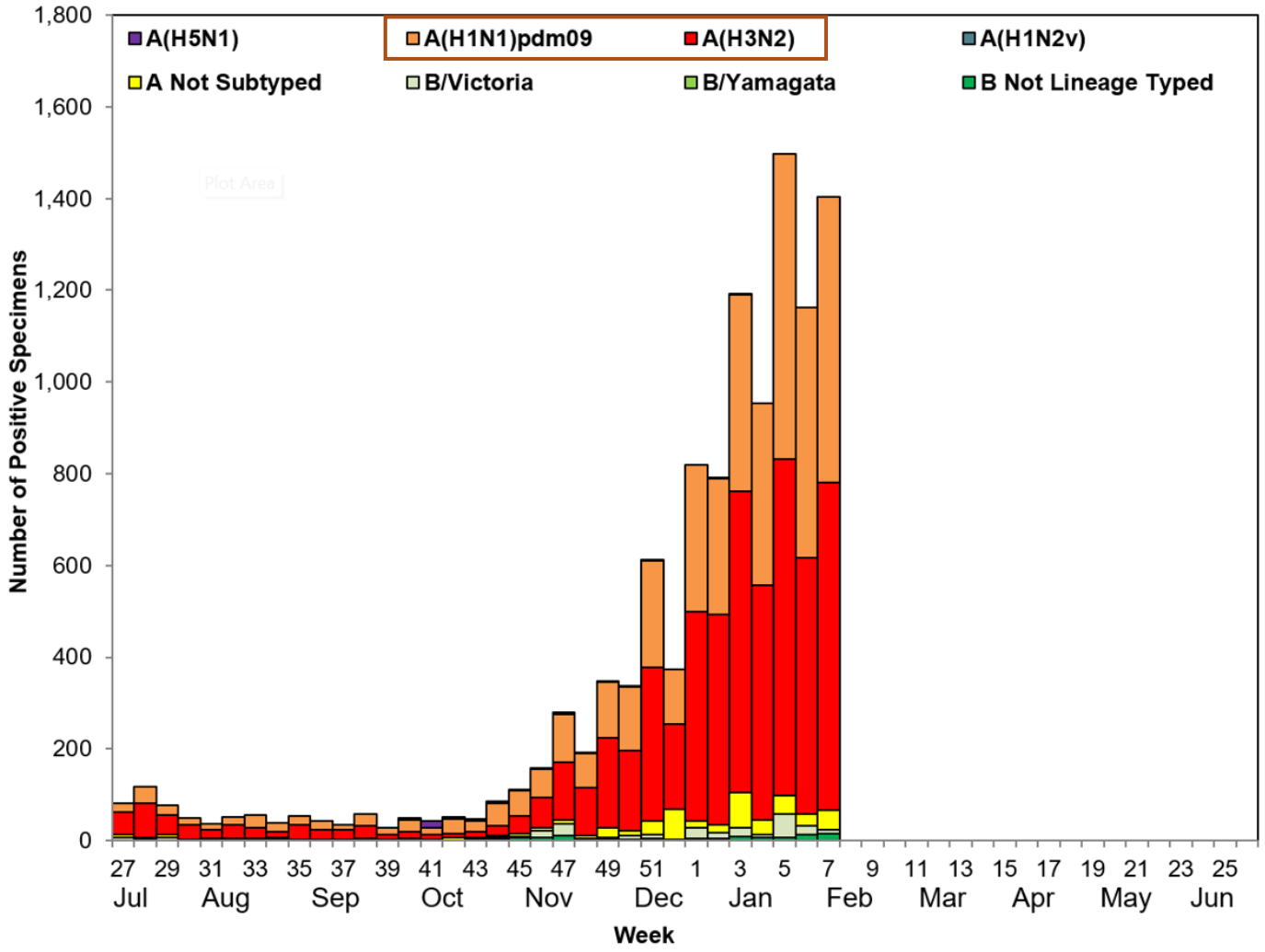
Influenza subtyping

- About 5% of influenza positive tests are subtyped, mostly from public health laboratories
- Influenza A
  - 53% A(H3)
  - 43% A(H1)
  - 4% A not subtyped
- Only ~300 influenza B samples lineage typed this season
- Persons with severe disease may be more likely to have results subtyped



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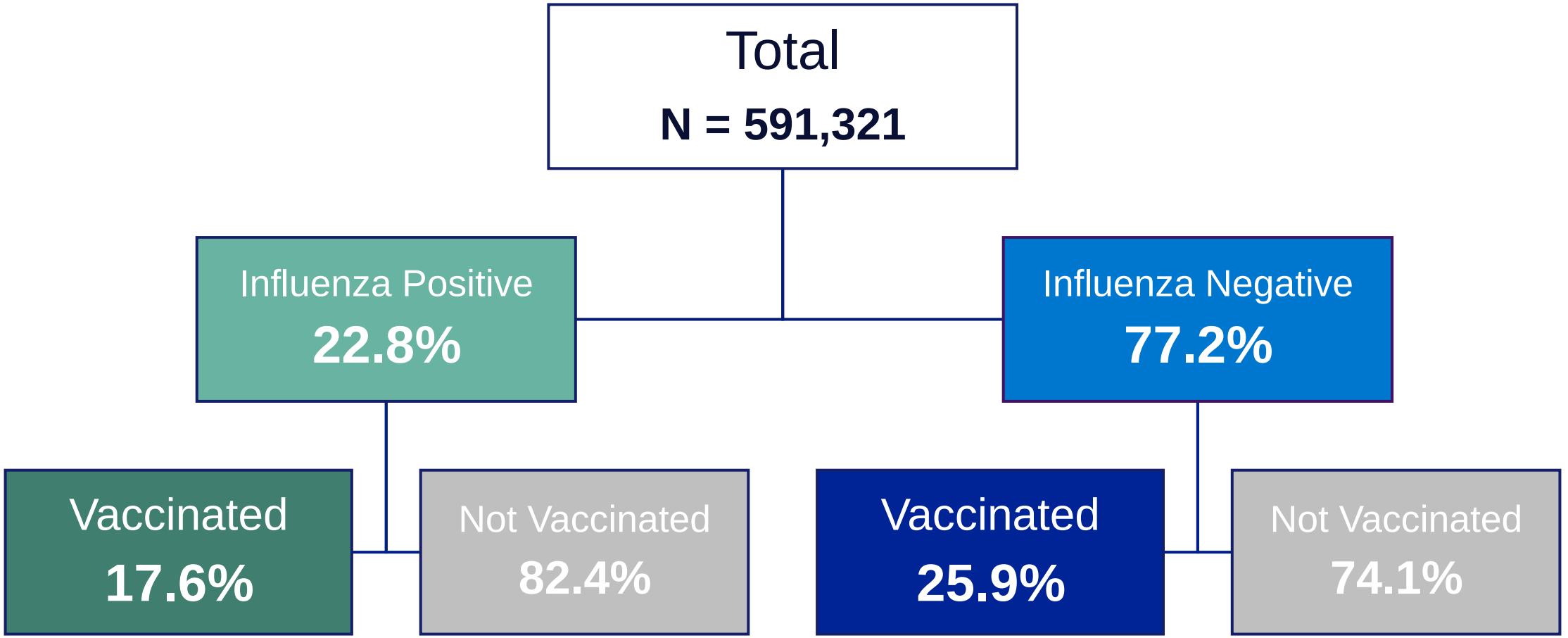
Study Population

Test Positivity and Vaccination Status



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Study Population

Demographics

	Test Negative	Test Positive
Total No.	456,437	134,884
Median Age	**43 yrs**	**30 yrs**
25th percentile	20 yrs	11 yrs
75th percentile	67 yrs	55 yrs
Ethnicity - Hispanic or Latino	24%	29%
Race		
White	46%	39%
Unknown	20%	22%
Other	19%	23%
Asian	8%	8%
Black	6%	6%
NHPI, AI/AN, or Multiple	<1%*	<1%*

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NHPI = Native Hawaiian or Pacific Islander; AI/AN = American Indian or Alaska Native; * <1% each

Vaccine effectiveness estimates

- Age group by Type (A/B)
- Influenza A subtype (H1N1/H3N2)
- Mode of administration (LAIV/non-LAIV)
- Weekly cumulative
- Month-specific by Type (A/B)

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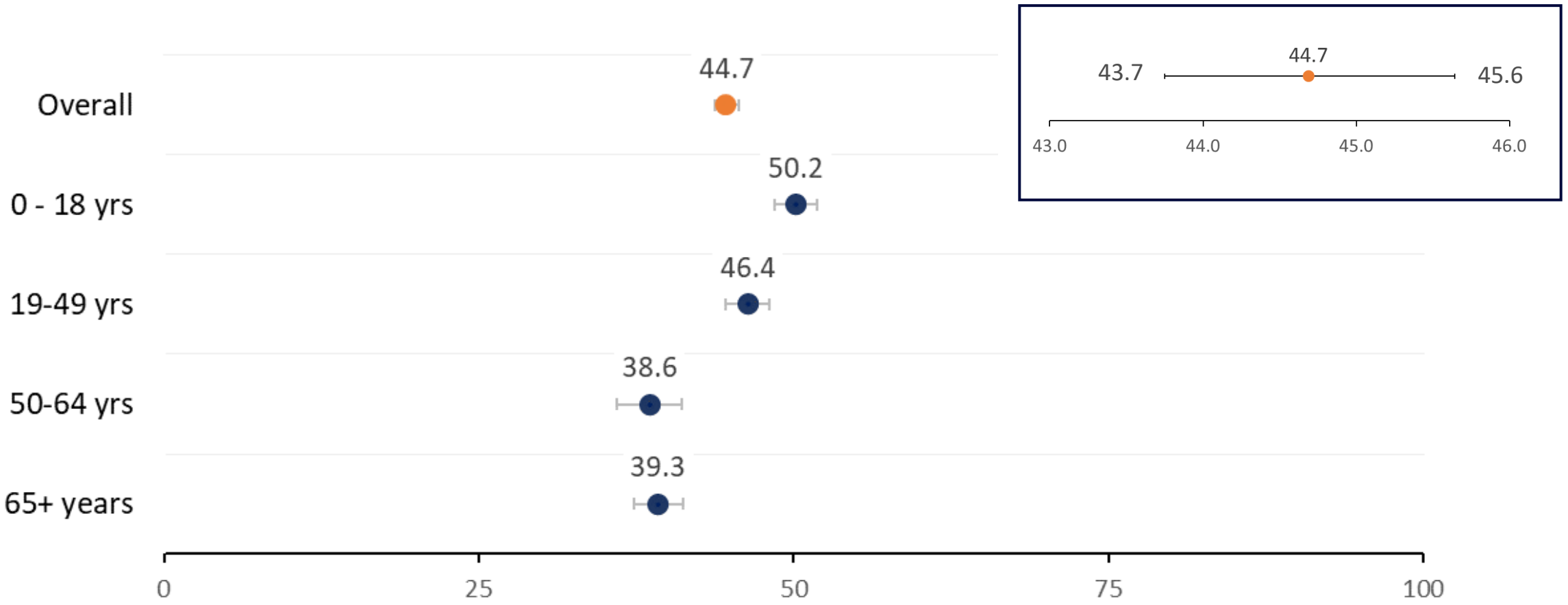
Vaccine effectiveness by age group
California 2024–2025



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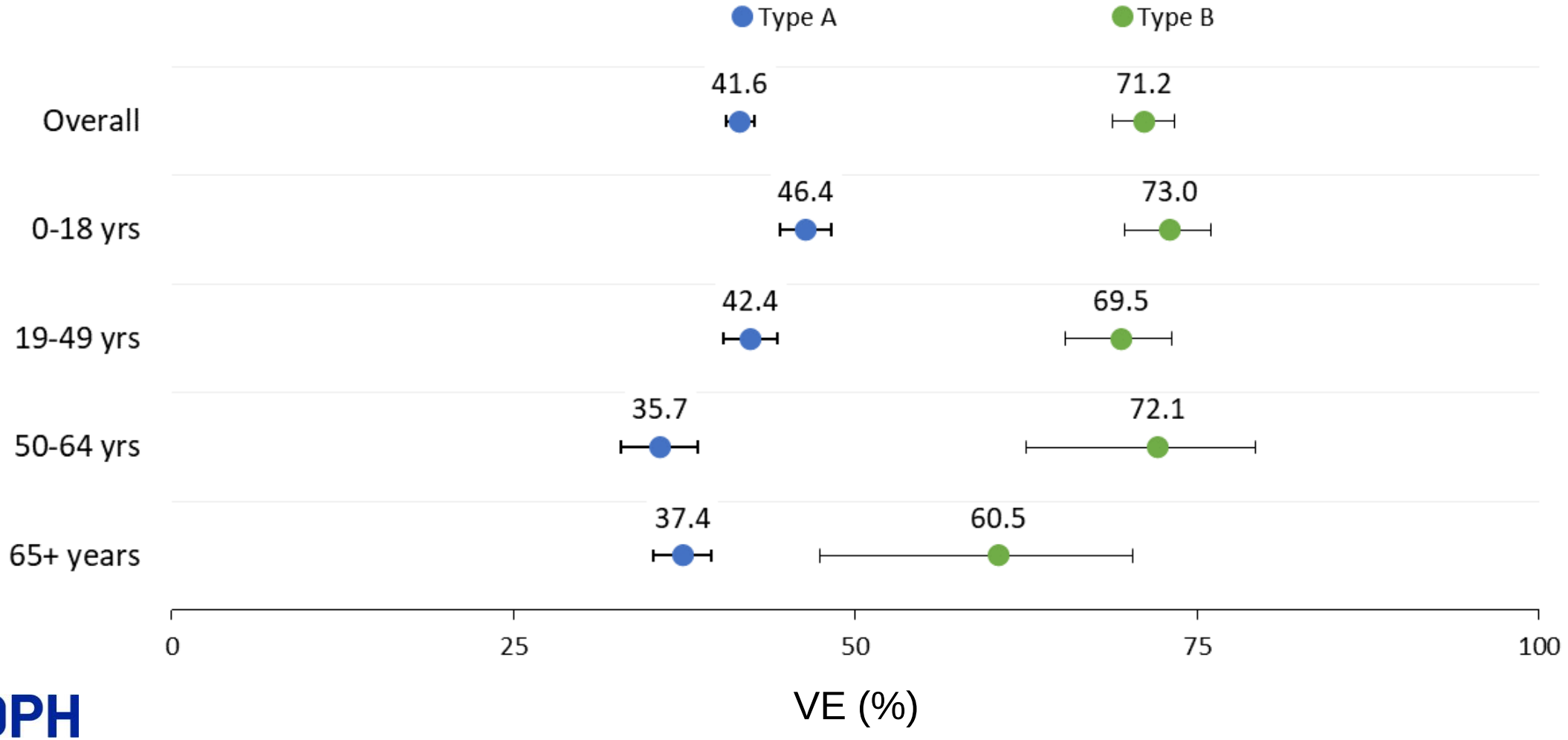
Vaccine effectiveness by type and age group
California 2024–2025



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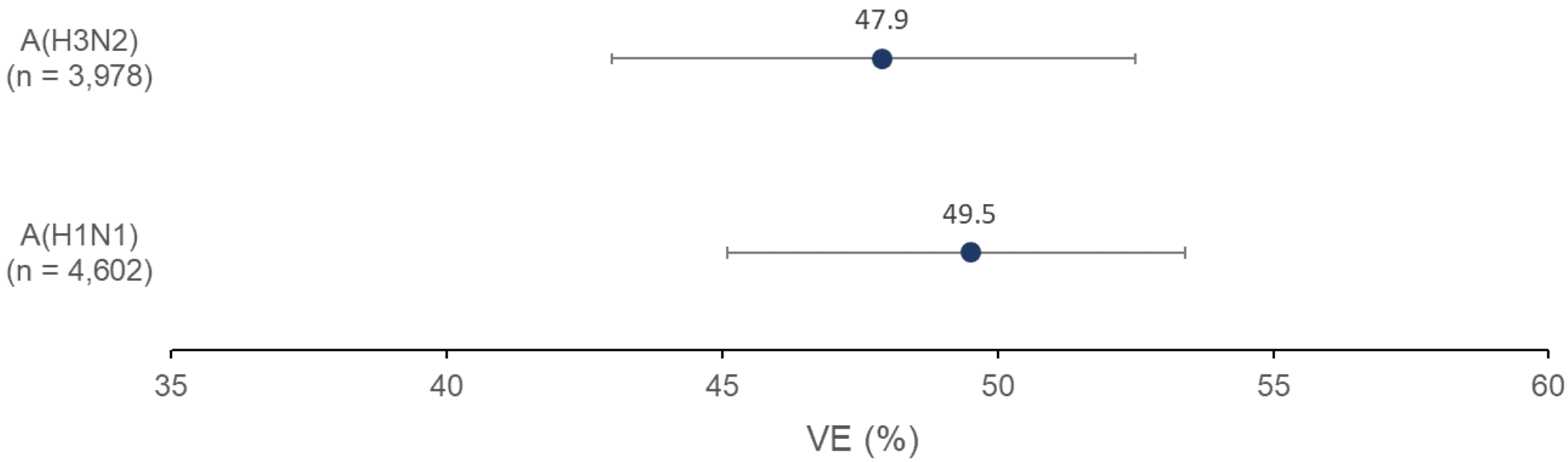
Vaccine effectiveness by influenza A subtype
California 2024–2025



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Live Attenuated Influenza Vaccine (LAIV) estimates among children ages 2–17

Year	Vaccine Type	VE (95% CI)	Count	Median Age (IQR)
2024	LAIV	61 (51, 69)	455	7.3 (4.9–10.4)
2024	Not LAIV	48 (46, 50)	21,980	7.8 (4.4–12.4)
2023	LAIV	45 (35, 54)	1,387	7.9 (5.3–10.9)
2023	Not LAIV	52 (51, 54)	66,088	7.3 (4.2–11.9)

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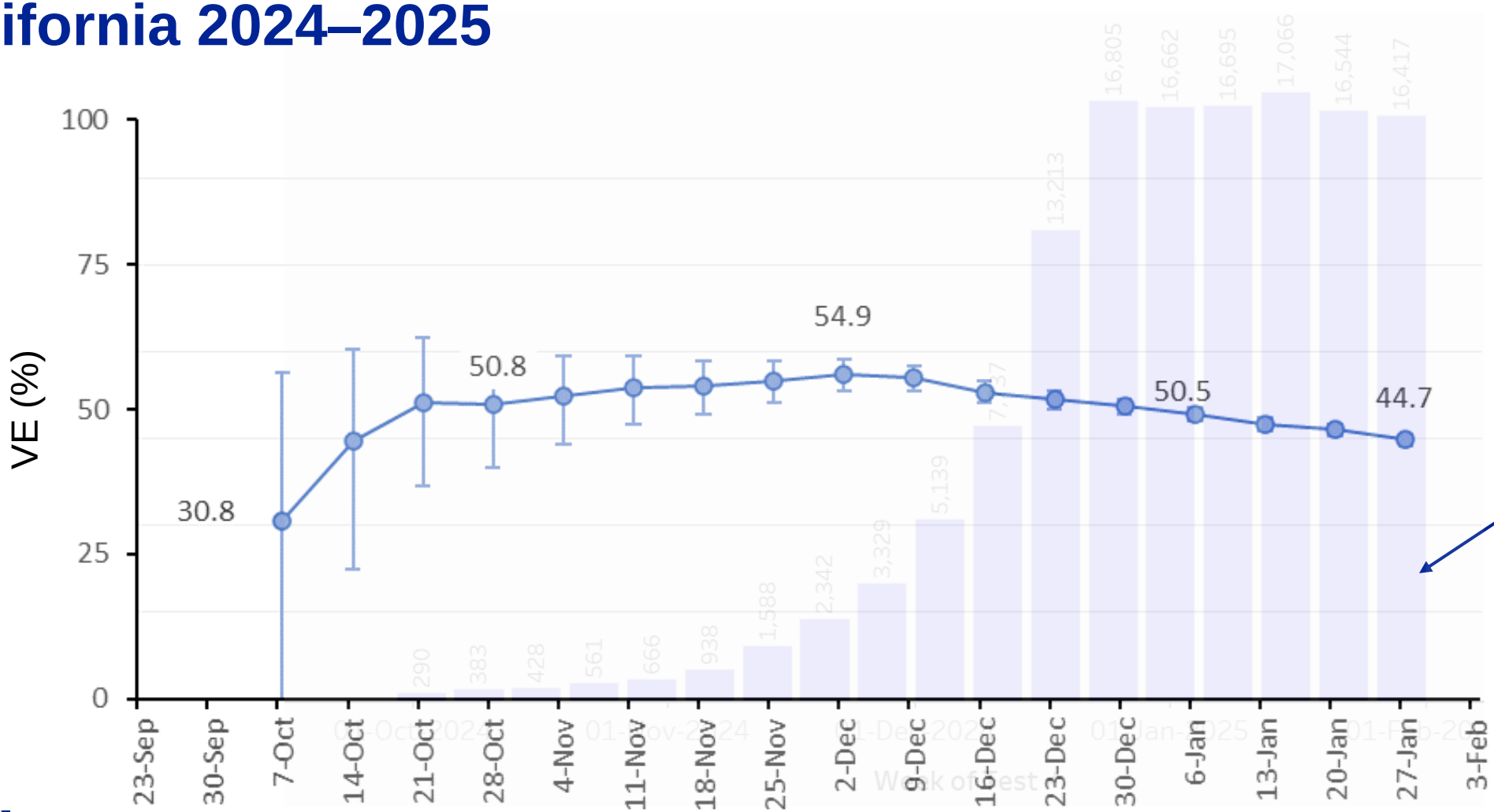
Cumulative Influenza vaccine effectiveness
California 2024–2025



Positive Test Results

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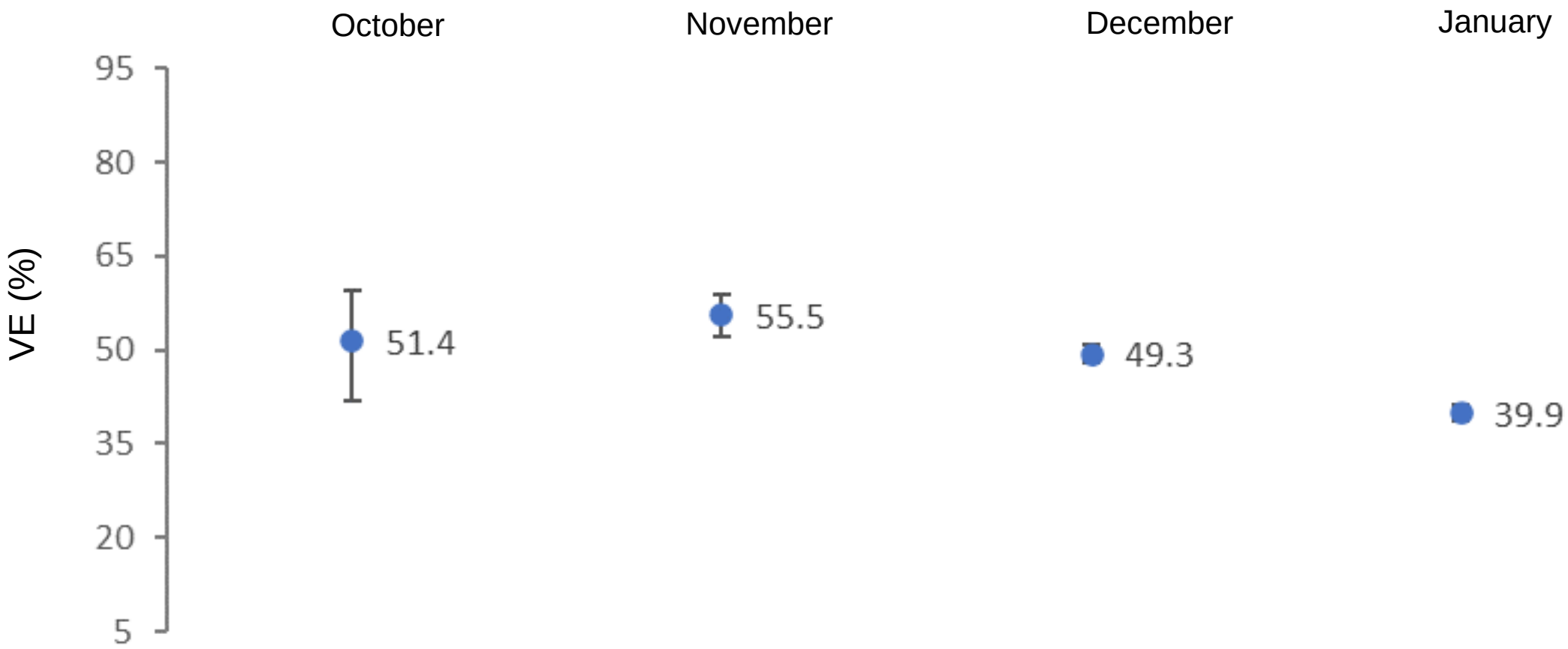
Vaccine effectiveness by month of influenza test
California 2024–2025



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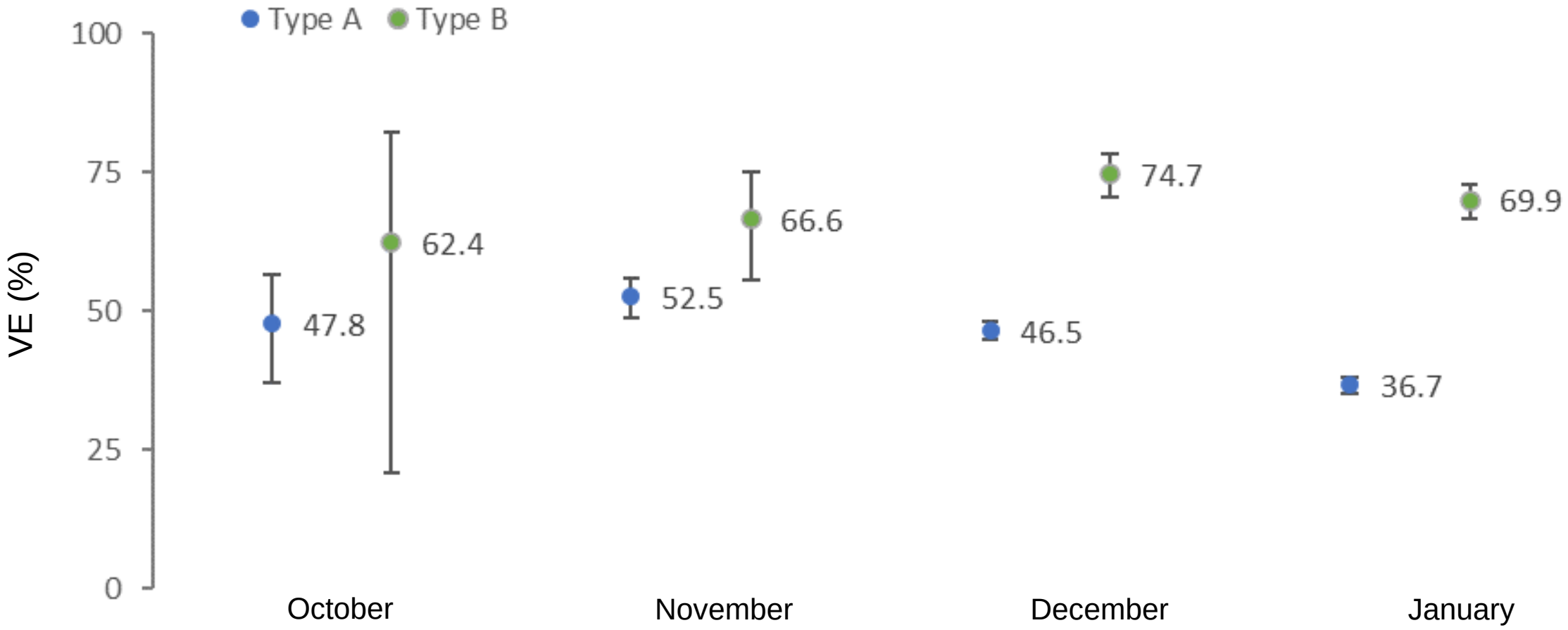
Vaccine effectiveness by month and type

California 2024–2025



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Limitations

1. Incomplete documentation and reporting of vaccination and testing
2. Inability to assess partial/full vaccination status for children aged <9 years
3. Lack of symptom information, test setting, and outcome status (illness, hospitalization, or death)
4. Incomplete and potentially biased reporting for influenza subtypes
5. Lack of control for other confounders (health seeking behavior, pre-existing conditions)

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Summary

1. Current seasonal influenza vaccines provide protection against laboratory-confirmed influenza for persons aged ≥6 months
    - Higher VE for influenza B & younger age groups (<18 years, 18-49 years)
2. Expanded and improved public health data can be leveraged to calculate timely in-season influenza effectiveness
    - Useful to promote additional prevention measures prior to peak
    - Prepare for increased hospital capacity

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Acknowledgements

California Local Health Departments

CDPH Division of Communicable Disease Control

- Tomás León
- Monica Sun
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- Cynthia Yen
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- Sascha Ellington
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