

# CDC Seasonal Flu Vaccine Effectiveness Studies

### WHAT TO KNOW

CDC conducts studies each flu season to help determine how well flu vaccines are working. These vaccine effectiveness (VE) studies help regularly assess the value of flu vaccination as a public health intervention. The results of vaccine effectiveness studies can vary based on the study design, the outcome(s) measured, the population studied, and the season studied.

## U.S. flu vaccine effectiveness networks

CDC has been working with researchers at universities and hospitals since the 2003-2004 flu season to estimate how well flu vaccines work through observational studies using laboratory-confirmed flu as the outcome. Over the past few years, CDC has conducted VE studies using multiple vaccine effectiveness networks. More information on CDC's vaccine effectiveness networks and studies is available at [CDC's Influenza Vaccine Effectiveness Networks](#).

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## Results from prior flu seasons

The overall, adjusted vaccine effectiveness estimates for flu seasons from 2004-2024 are noted in the chart below. (Estimates are typically adjusted for study site, age, sex, underlying medical conditions, and days from illness onset to enrollment.)

## Effectiveness of Seasonal Flu Vaccines from the 2009-2024 Flu Seasons

The vaccine effectiveness estimates included in the chart and tables below are vaccine effectiveness estimates from the U.S. Flu VE Network.

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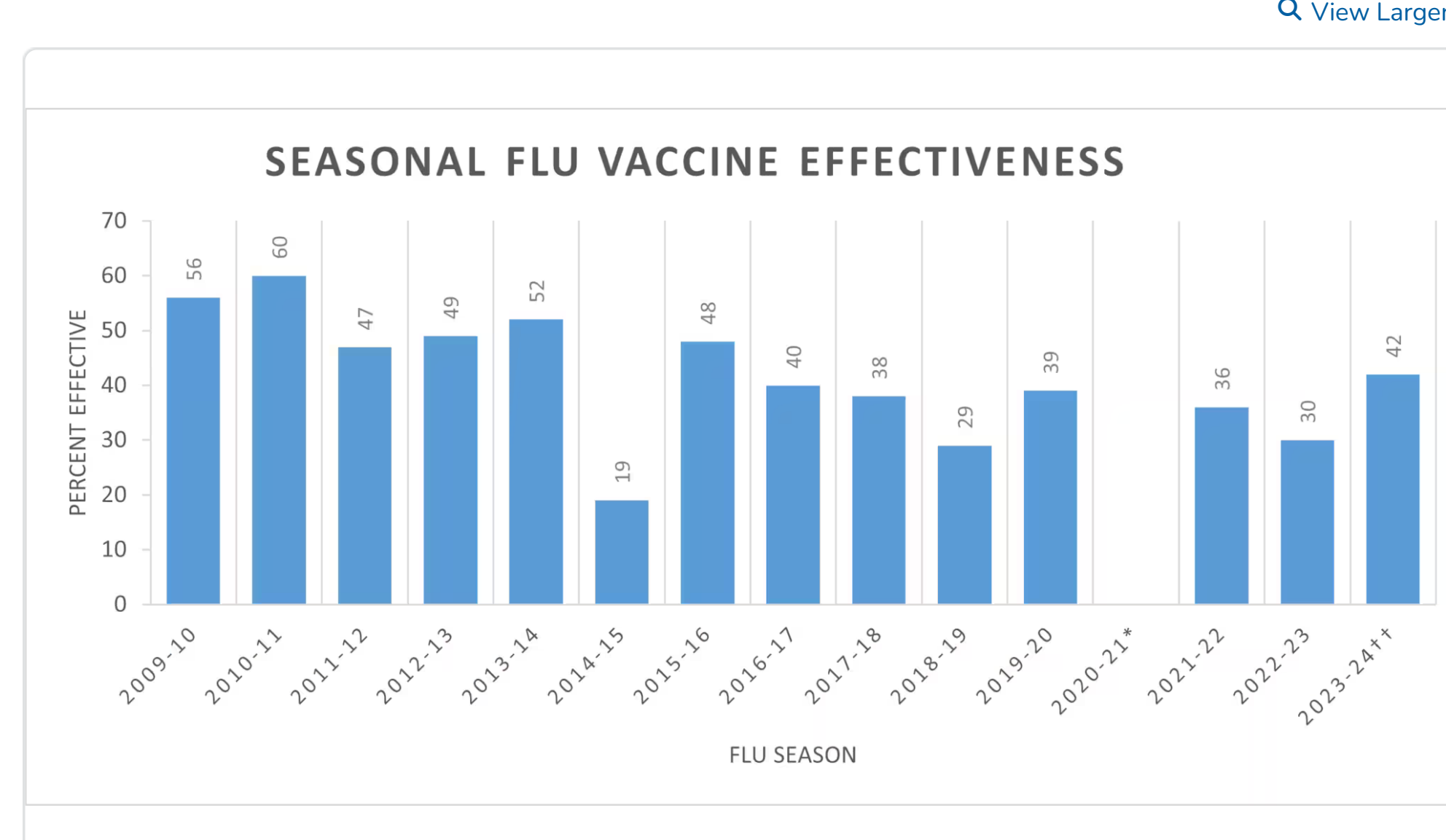


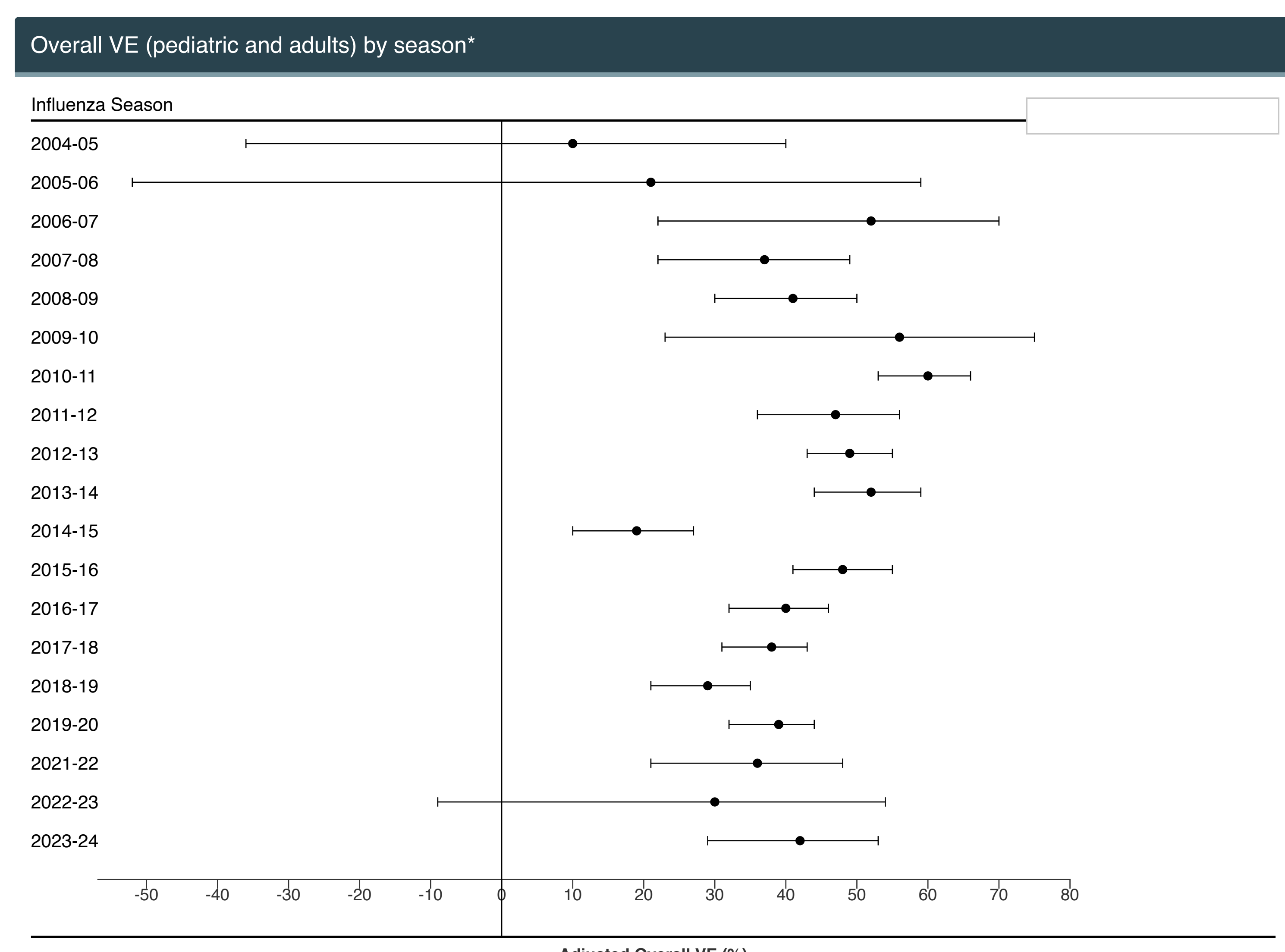
Chart showing the level of seasonal flu vaccine effectiveness 2009 through 2024

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21*	2021-22	2022-23**	2023-24†
Adj. Overall VE (%)	56	60	47	49	52	19	48	40	38	29	39	Not enough data to compute	36	30	42

\*2020-2021 flu vaccine effectiveness was not estimated due to low influenza virus circulation during the 2020-2021 flu season.

A point estimate is a single value that is used to estimate an unknown population parameter. Point estimates are used in statistics to make inferences about population parameters based on sample data. More information is available at [How Flu Vaccine Effectiveness and Efficacy are Measured](#).

## Overall VE



2020-2021 flu vaccine effectiveness was not estimated due to low influenza virus circulation during the 2020-2021 flu season. \*Estimates are from US Flu VE except for 2022-23 which are from a study from WI.

## Adjusted vaccine effectiveness estimates for influenza seasons from 2004-2024

Influenza Season†	Reference	Study Site(s)	No. of Patients‡	Adjusted Overall VE (%)	95% CI
2004-05*	<a href="#">Belongia 2009</a>	WI	762	10	-36, 40
2005-06*	<a href="#">Belongia 2009</a>	WI	346	21	-52, 59
2006-07*	<a href="#">Belongia 2009</a>	WI	871	52	22, 70
2007-08*	<a href="#">Belongia 2011</a>	WI	1,914	37	22, 49
2008-09**†	Unpublished	WI, MI, NY, TN	6,713	41	30, 50
2009-10*	<a href="#">Griffin 2011</a>	WI, MI, NY, TN	6,757	56	23, 75
2010-11*	<a href="#">Teanor 2011</a>	WI, MI, NY, TN	4,757	60	53, 66
<a href="#">2011-12</a>	<a href="#">Ohmit 2014</a>	WI, MI, PA, TX, WA	4,771	47	36, 56
<a href="#">2012-13</a>	<a href="#">McLean 2014</a>	WI, MI, PA, TX, WA	6,452	49	43, 55
<a href="#">2013-14</a>	<a href="#">Gagliani 2016</a>	WI, MI, PA, TX, WA	5,999	52	44, 59
<a href="#">2014-15</a>	<a href="#">Zimmerman 2016</a>	WI, MI, PA, TX, WA	9,311	19	10, 27
<a href="#">2015-16</a>	<a href="#">Jackson 2017</a>	WI, MI, PA, TX, WA	6,879	48	41, 55
<a href="#">2016-17</a>	<a href="#">Flannery 2018</a>	WI, MI, PA, TX, WA	7,410	40	32, 46
<a href="#">2017-18</a>	<a href="#">Bolfes 2018</a>	WI, MI, PA, TX, WA	8,436	38	31, 43
<a href="#">2018-19</a>	<a href="#">Flannery 2019</a>	WI, MI, PA, TX, WA	10,041	29	21, 35
<a href="#">2019-20</a>	<a href="#">Tenforde 2021</a>	WI, MI, PA, TX, WA	8,845	39	32, 44
<a href="#">2020-21**</a>	n/a	n/a	n/a	n/a	
<a href="#">2021-22</a>	<a href="#">Price 2022</a>	CA, MI, PA, TN, TX, WA, WI	4,312	36	21, 48
<a href="#">2022-23</a>	<a href="#">Chung 2024</a>	MI, PA, TX, WA, AZ, MO, OH	2,561	30	-9, 54
<a href="#">2023-2024†††††</a>	<a href="#">ACIP Presentation on February 28, 2024</a> <a href="#">PDF</a>	AZ, MI, MO, PA, OH, TX, WA	3,394	42	29, 53

\*From 2004-2005 through 2010-2011, the Flu VE Network also enrolled inpatients.

\*\*2020-2021 flu vaccine effectiveness was not estimated due to low influenza virus circulation during the 2020-2021 flu season.

†Vaccine effectiveness (VE) estimates for the 2008-2009 flu season have not been published.

‡Number of patients used in VE calculation.

†††††Overall VE was calculated for this table to be consistent with what has been reported historically and is available for comparison with historical estimates. All other 2023-2024 VE estimates are reported by age group.

## Supporting research

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