Updated interim influenza vaccine effectiveness estimates by age group and vaccine type for the 2014-15 season: Updates from the US Influenza Vaccine Effectiveness (Flu VE) Network

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2014-15 SEASON UPDATE

US Flu VE Network Results

- **4,913 enrolled from Nov 10, 2014–Jan 30, 2015**
- **3,281 (67%) influenza RT-PCR negative**
- **1,632 (33%) influenza RT-PCR positive**
  - 1, 537 (94%) influenza A
    - All subtyped influenza A viruses were A(H3N2)
    - 764 genetically characterized by HA pyrosequencing
    - 85% “Low reactor” genetic groups 3C.2a (n=624), 3C.3a (n=25)
    - 15% “Vaccine-like” groups 3C.3, 3C.3b
  - 95 (6%) influenza B
    - 87 (92%) B-Yamagata lineage (determined by RT-PCR)

Interim adjusted VE against influenza A(H3N2) and B for ≥1 dose of 2014-15 seasonal influenza vaccine

	Influenza-positive	% vaccinated	Influenza-negative	% vaccinated	Adjusted VE	(95% CI)
Influenza A (H3N2)						
All ages	1415	53%	3281	57%	**18%**	**(6 to 29)**
Age group (yrs)						
6 mos–8	335	46%	953	55%	**17%**	**(-9 to 37)**
9–17	237	39%	414	41%	**12%**	**(-27 to 39)**
18–49	399	45%	980	49%	**13%**	**(-13 to 32)**
50-64	223	63%	529	68%	**25%**	**(-7 to 48)**
≥65	221	81%	405	86%	**28%**	**(-17 to 56)**
Influenza B (Yamagata)						
All ages	87	45%	3281	57%	**45%**	**(14 to 65)**

* Vaccine effectiveness was estimated as 100% X (1 – odds ratio [ratio of odds of vaccination among flu-positive cases to odds of vaccination among flu-negative controls]) using logistic regression. Multivariate models adjusted for study site, age, sex, race/Hispanic ethnicity, self-rated health status, days from illness onset to enrollment, and calendar time (biweekly intervals). Models for “all ages” include age as a categorical variable; age-specific models include age in years as a continuous variable.

Interim adjusted VE against vaccine-like vs drifted A(H3N2) among patients aged ≥6 months, for ≥1 dose of 2014-15 seasonal influenza vaccine

	Influenza cases	% vaccinated	Influenza-negative	% vaccinated	Adjusted VE*	(95% CI)
Any influenza A (H3N2)	1415	53%	3281	57%	**18%**	**(6 to 29)**
A(H3N2), vaccine-like (group 3C.3/3C.3b)	115	39%	3281	57%	**49%**	**(18 to 69)**
A(H3N2), low-reactor (group 3C.2a)	624	55%	3281	57%	**15%**	**(-5, 30)**
A(H3N2), low-reactor (group 3C.3a)	25	60%	3281	57%	**-14%**	**(-177, 53)**

* Vaccine effectiveness was estimated as 100% X (1 – odds ratio [ratio of odds of vaccination among flu-positive cases to odds of vaccination among flu-negative controls]) using logistic regression. Multivariate models adjusted for study site, age category, sex, race/Hispanic ethnicity, self-rated health status, days from illness onset to enrollment, and calendar time (biweekly intervals).

VE for LAIV and IIV in children

Interim 2014-15 VE estimates by vaccine type among children and adolescents, US Flu VE Network

- Analysis restricted to those 2–17 yrs of age at enrollment
- Receipt of ≥1 dose at least 14 days prior to illness onset considered vaccinated
- Determination of vaccine type
  - Vaccine type determined from medical record if available
  - Accepted vaccine type (shot or nasal spray) from parental-report if no medical record documentation
  - Excluded 12 children with unknown/unreported vaccine type
- VE for LAIV compared to unvaccinated (excludes IIV)
- VE for IIV compared to unvaccinated (excludes LAIV)

Interim adjusted VE estimates against A(H3N2) for ≥1 dose of 2014-15 seasonal influenza vaccine among children and adolescents, by vaccine type

	Influenza-positive	% vaccinated	Influenza-negative	% vaccinated	Adjusted VE	(95% CI)
Any vaccine						
2–17 years	519	43%	1103	46%	**7%**	**(-16 to 26)**
2–8 yrs	282	45%	691	49%	**6%**	**(-27 to 31)**
9–17 yrs	237	39%	414	41%	**12%**	**(-27 to 39)**
Live-attenuated (LAIV4)						
2–17 years	383	22%	740	20%	**-24%**	**(-74 to 11)**
2–8 yrs	205	25%	451	23%	**-23%**	**(-90 to 21)**
9–17 yrs	178	19%	289	15%	**-20%**	**(-115 to 33)**
Inactivated (IIV3/IIV4)						
2–17 years	434	31%	957	38%	**18%**	**(-7 to 37)**
2–8 yrs	231	33%	589	41%	**15%**	**(-20 to 40)**
9–17 yrs	203	29%	368	33%	**19%**	**(-23 to 46)**

* Vaccine effectiveness was estimated as 100% X (1 – odds ratio [ratio of odds of vaccination among flu-positive cases to odds of vaccination among flu-negative controls]) using logistic regression. Multivariate models adjusted for study site, age, sex, race/Hispanic ethnicity, self-rated health status, days from illness onset to enrollment, and calendar time (biweekly intervals). Models for “all ages” include age as a categorical variable; age-specific models include age in years as a continuous variable.

Adjusted Effectiveness Estimates

	No Vaccination (n=564)		IIV (n=283)		LAIV (n=141)		Effectiveness* (%) [95% confidence interval]		
	Cases	Controls	Cases	Controls	Cases	Controls	Any vaccine	LAIV	IIV
All strains	202	362	69	214	44	97	27 [-1;47]	19 [-28;49]	31 [-1;52]
A/H1N1	0		0		0		-	-	-
A/H3N2	193		65		44		27 [-1;47]	16 [-33;47]	33 [1;54]
B	9		4		0		36 [-148;83]	100 [NE]	-5 [-328;74]

* effectiveness estimates adjusted on site, date of enrollment, age, gender, race, passive smoking, prior vaccination, high risk chronic conditions, days since symptoms onset, health insurance status and number of outpatients visits in the last 6 months.

- For A/H3N2 effectiveness, prior vaccination found to be a significant confounder or effect modifier

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Conclusions and next steps

- **Low interim VE estimates are consistent with predominance of antigenically drifted A(H3N2) viruses**
  - H3N2 accounted for 95% of influenza-positive cases at US Flu VE Network sites; majority (>80%) were drifted H3N2 viruses
  - Low or no vaccine effectiveness against drifted H3N2 viruses
  - Limited circulation of vaccine-like A(H3N2) and influenza B viruses
- **No evidence of better protection for LAIV4 compared to IIV in 2014-15 season against drifted H3N2 viruses**
- **For final season estimates:**
  - Complete genetic characterization of 2014-15 viruses
  - Update VE estimates for LAIV and IIV

US Flu VE Network

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