

**Influenza vaccine effectiveness in the prevention of
influenza-related hospitalization in Canadian adults
over the 2011/12 through 2013/14 seasons:
A pooled analysis from the Serious Outcomes Surveillance
(SOS) Network of the Canadian Immunization Research
Network (CIRN)**

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on behalf of the SOS Network of the
Canadian Immunization Research Network (CIRN)

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Disclosure of Relationship	Company/Organization
I am a member of an Advisory Board or equivalent with a commercial organization.	Pfizer, Merck
I am a member of a Speaker Bureau.	
I have received payment from a commercial organization (including gifts or other consideration or 'in kind' compensation).	
I have received a grant(s) or an honorarium from a commercial organization.	GSK, Pfizer, Sanofi
I hold a patent for a product referred to in the CME/CPD program or that is marketing by a commercial organization	
I hold investments in a pharmaceutical organization, medical devices company or communications firms.	
I am currently participating in or have participated in a clinical trial within the past two years.).	GSK, Pfizer, Sanofi, Merck

Disclosures

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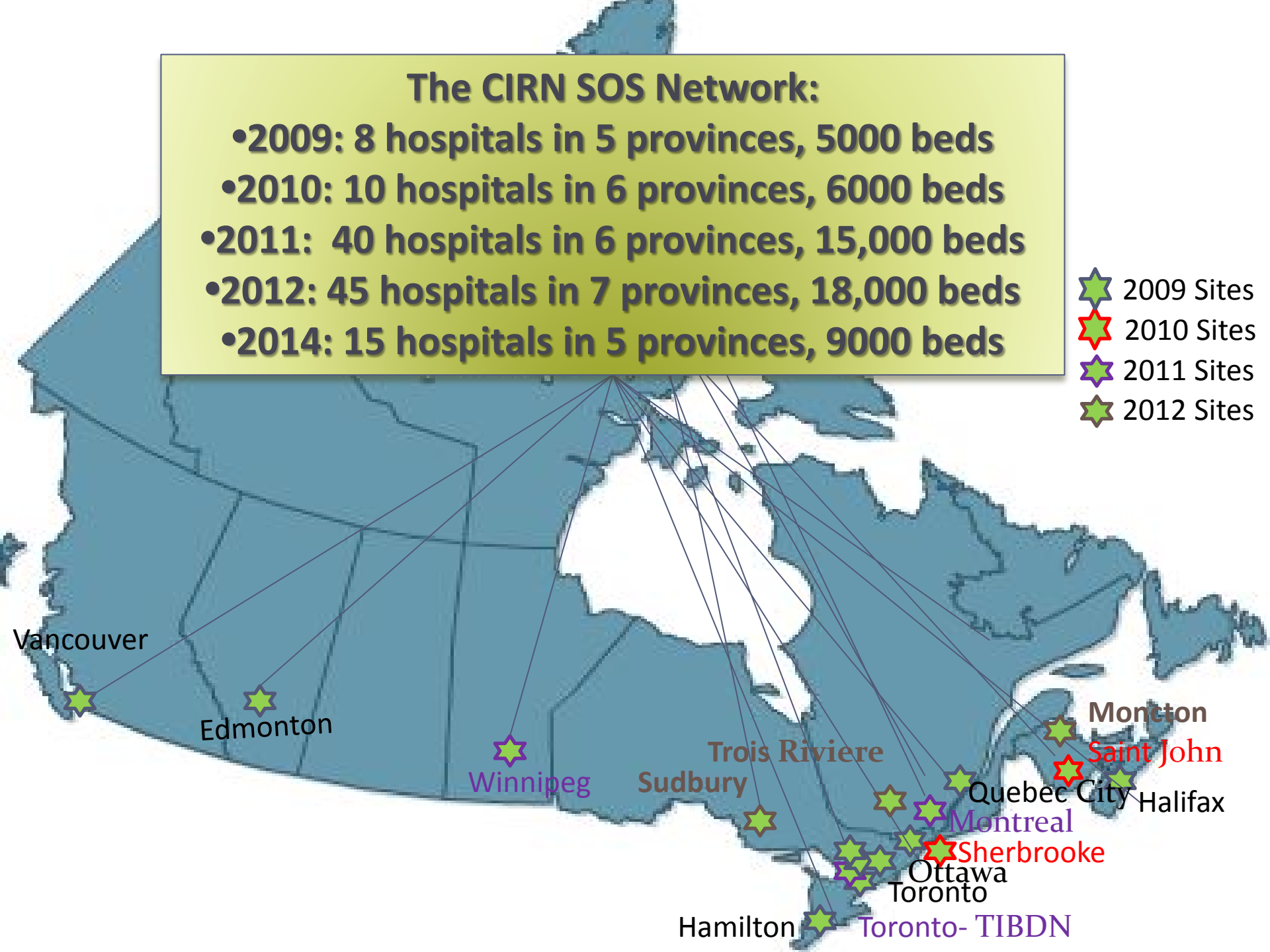
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The CIRN SOS Network:

- 2009: 8 hospitals in 5 provinces, 5000 beds
- 2010: 10 hospitals in 6 provinces, 6000 beds
- 2011: 40 hospitals in 6 provinces, 15,000 beds
- 2012: 45 hospitals in 7 provinces, 18,000 beds
- 2014: 15 hospitals in 5 provinces, 9000 beds

- ★ 2009 Sites
- ★ 2010 Sites
- ★ 2011 Sites
- ★ 2012 Sites



Methods

- 15-45 academic and community hospitals across Canada
- active surveillance for influenza infection in adults (≥ 16 years of age) (Nov. 15)
 - NP swab obtained from all patients with an admitting diagnosis of CAP, exacerbation of COPD/asthma, unexplained sepsis, any respiratory diagnosis or symptom
 - All NP swabs tested for influenza A & B by PCR
 - Influenza typing and B lineage characterization performed at CIRN SOS Central Lab, CCfV

Methods

- **Case:**
 - Adult patients with positive test for influenza whose admission is attributable to influenza or a complication of influenza
- **Control:**
 - consenting adult patients at same site with:
 - diagnosis compatible with influenza (i.e. eligible for NP swab at admission)
 - NP swab obtained within 7 days of onset of symptoms, and test negative for influenza
 - Admission date within 14d of DOA of case
 - Same age strata as case ($\geq 65y$ or $<65y$)
- Subjects were enrolled without consent if waiver of consent was granted by local REB.

Vaccine Effectiveness

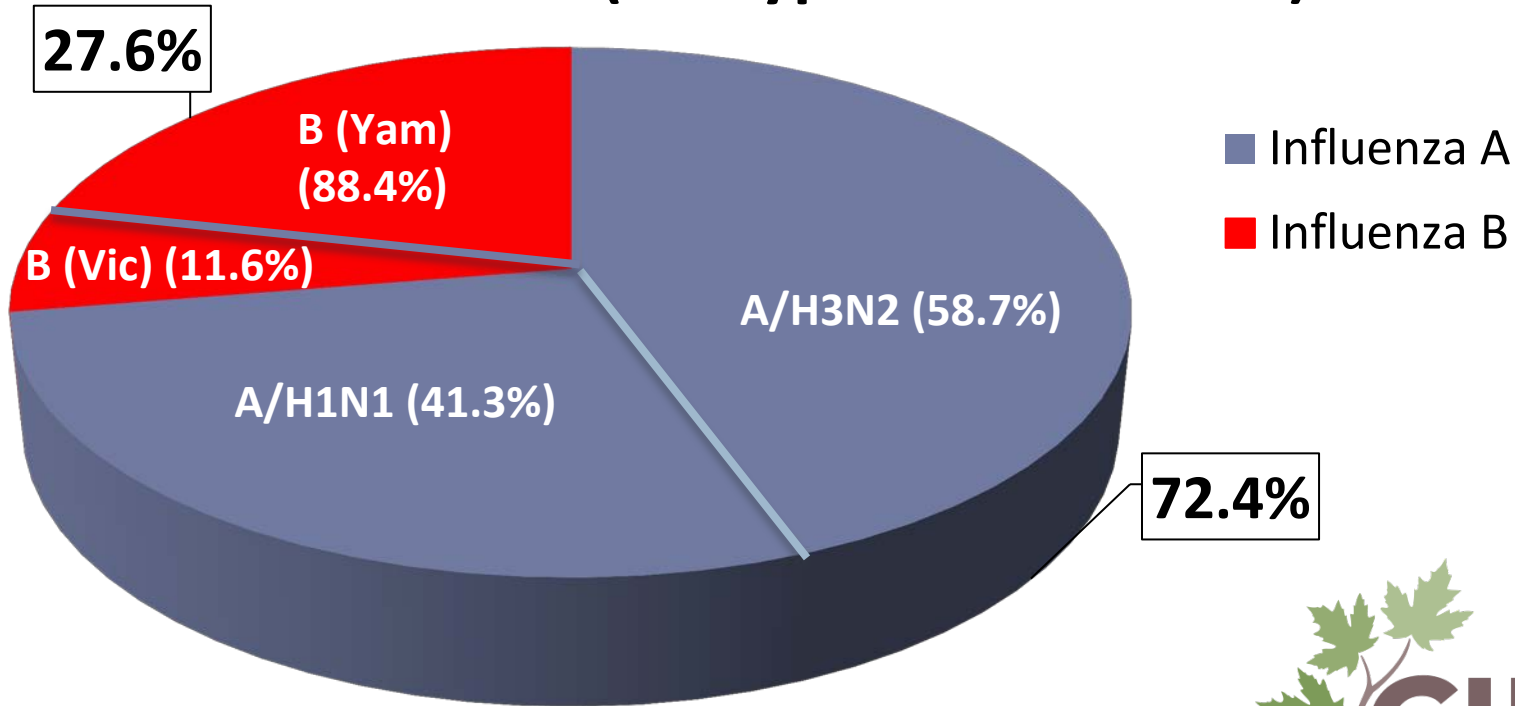
- VE estimated as $(1 - \text{matched OR of influenza in vaccinated vs unvaccinated}) * 100$
 - assuming protection from vaccine from 14 days post vaccination
 - Unadjusted & Adjusted (conditional logistic regression with backward stepwise selection; $p \leq 0.1$)
 - VE point estimates and 95% CI presented
 - Overall VE and VE in age subgroups ($< 65y$, $\geq 65y$) assessed
 - For the assessment of VE against death or need for mechanical ventilation or intensive care unit admission, only matched sets in which the case experienced the outcome were considered for the analysis
 - VE by influenza type/subtype assessed

Clinical characteristics of cases and controls (11/12, 12/13, 13/14 pooled)

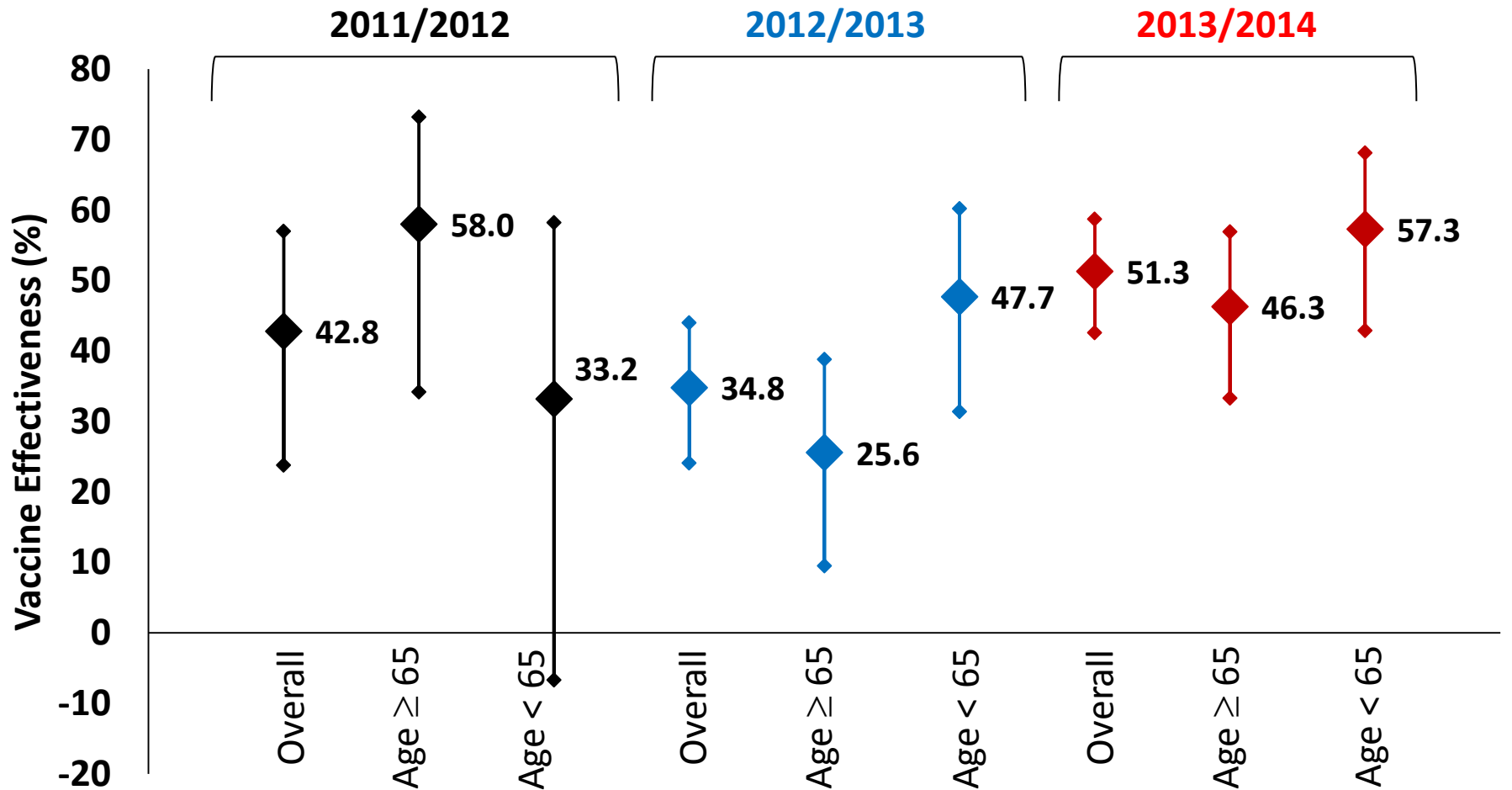
Characteristics	Cases (n=3394) n (%)	Controls (n=4560) n (%)	p value
Age mean (range)	67.6 (16-105)	68.8 (16-104)	0.193
16-49y	611 (18.0)	626 (13.7)	
50-64y	705 (20.8)	995 (21.8)	
65-75y	674 (19.9)	1063 (23.3)	
>75 y	1404 (41.4)	1876 (41.1)	
Female	1805 (53.2)	2436 (53.4)	0.94
≥1 comorbidities	3025 (89.1)	4234 (92.9)	0.00
Pregnant	87 (2.6)	13 (0.3)	0.00
Smoker	1669 (49.2)	2702 (59.3)	0.00
Antiviral use PTA	33 (1.0)	32 (0.7)	0.33
Current season vaccine	1585 (46.7)	2806 (61.5)	0.00
Prior season vaccine	1588/2957 (53.7)	2360/3758 (62.8)	0.00

Overall strain distribution (11/12, 12/13, 13/14 pooled)

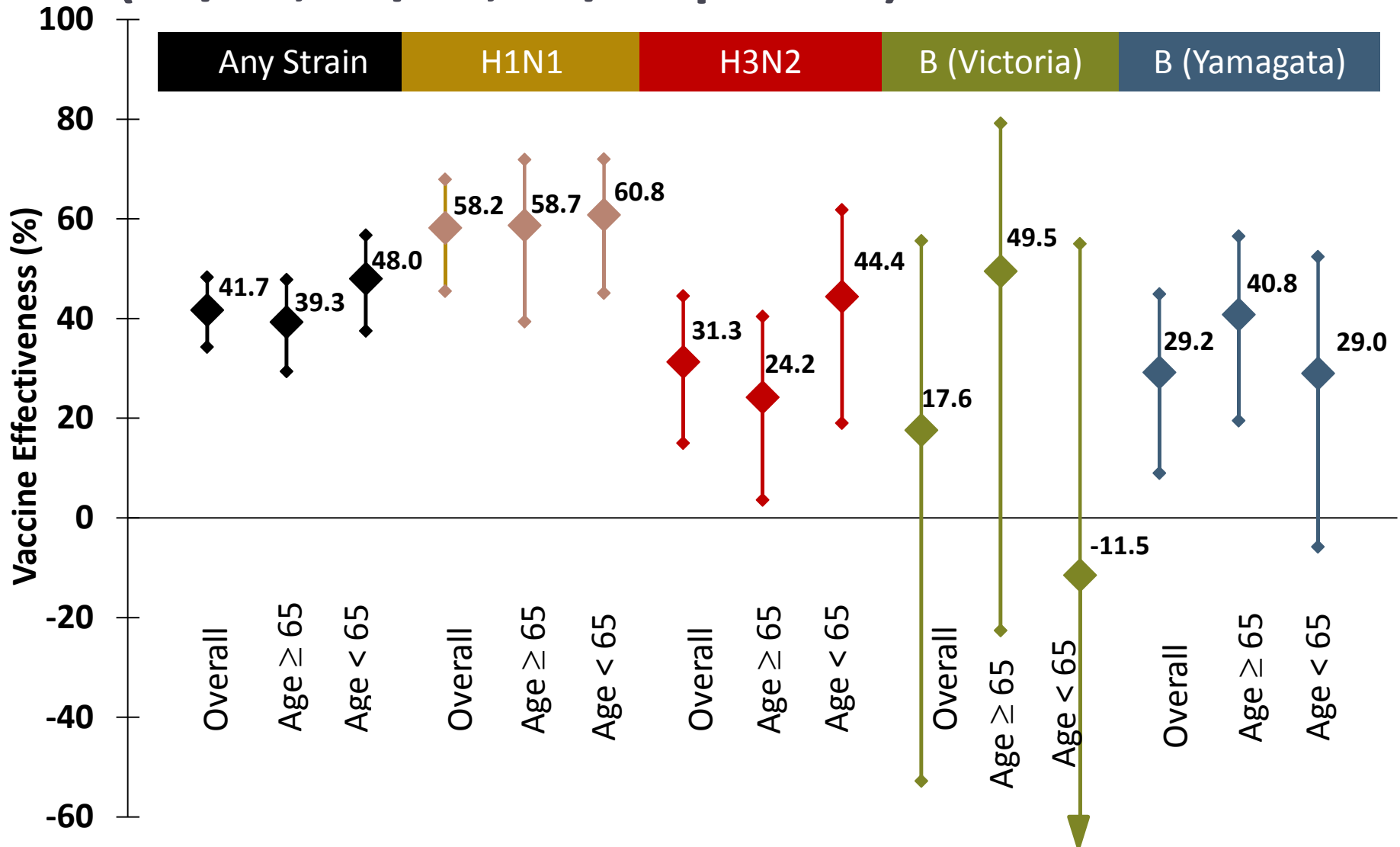
% total (subtype known=3489)



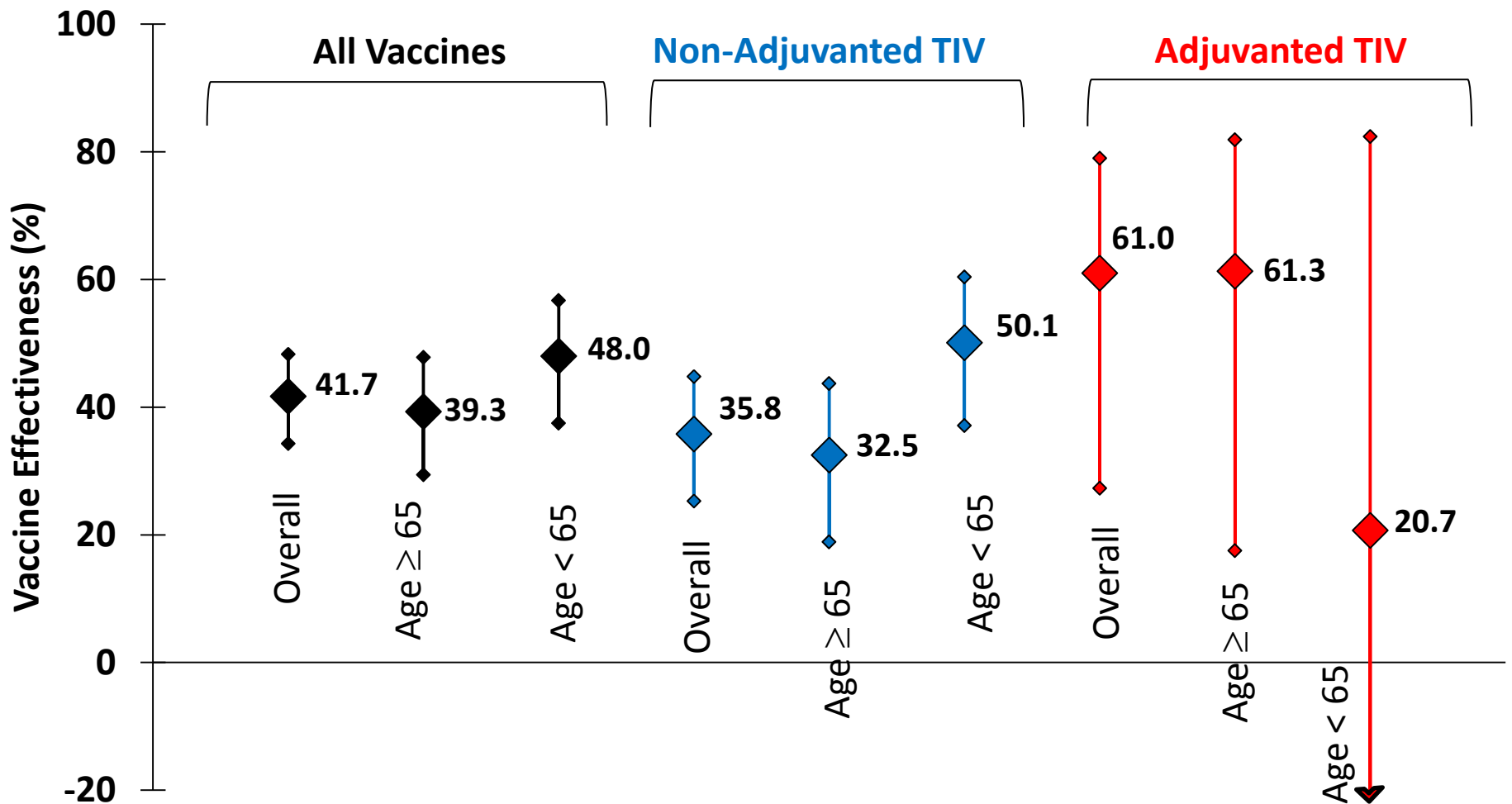
Adjusted VE estimate by influenza season



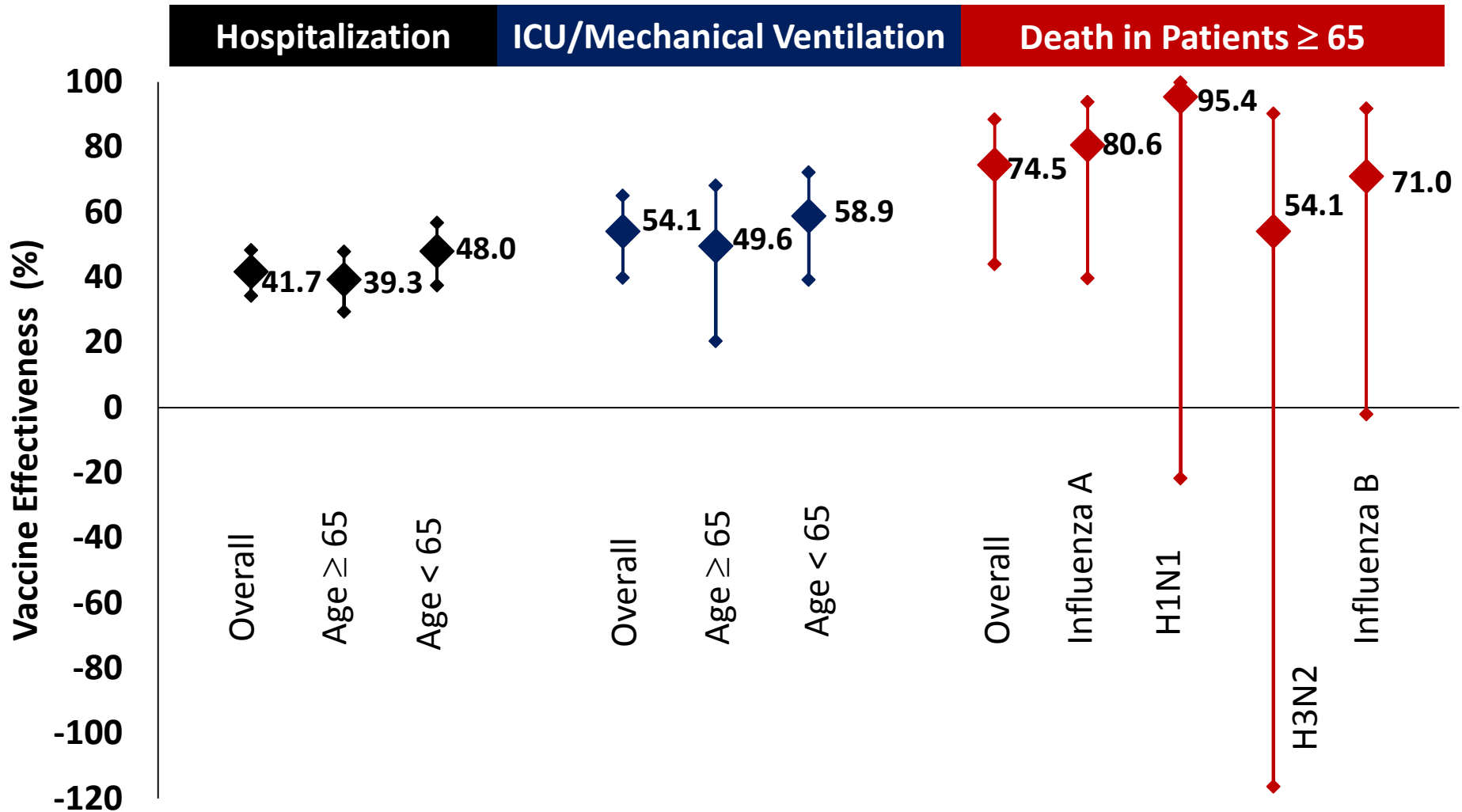
Adjusted VE estimate by influenza subtype (11/12, 12/13, 13/14 pooled)



Adjusted VE estimate by vaccine type (11/12, 12/13, 13/14 pooled)



Adjusted VE estimate by severity (11/12, 12/13, 13/14 pooled)



Summary

- While influenza vaccine effectiveness varies year-to-year due to factors such as virulence of the circulating strain and match between circulating and vaccine strains, we demonstrate a statistically and clinically important benefit of vaccination in adults spanning three influenza seasons (overall VE 42%)
- Over 3 seasons, TIV effectiveness for the prevention of hospitalization due to influenza A(H3N2) was 24% in older adults
- Statistically significant protection against severe outcomes including need for ICU admission or mechanical ventilation and death was demonstrated in older adults (VE estimate 54% and 75%, respectively), and this protection increased with the severity of the outcome

Conclusion

- The individual and public health benefits of influenza vaccines should not be understated and public messaging should address overall benefits over time while acknowledging year-to-year variability

Thanks!

