

Vaccine effectiveness against laboratory-confirmed influenza hospitalizations among young children during the 2010-11 to 2013-14 influenza seasons in Ontario

Sarah Buchan, MSc, PhD (c)  
Dalla Lana School of Public Health  
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# Disclosure Statement

- I have no affiliation (financial or otherwise) with a pharmaceutical, medical device or communications organization.

# Study team

Jeff Kwong  
Jonathan Gubbay  
Tim Karnauchow  
Kevin Katz  
Allison McGeer  
Dayre McNally  
David Richardson  
Susan Richardson

Hannah Chung  
Michael Campitelli  
Natasha Crowcroft  
Laura Rosella  
Marek Smieja  
George Zahariadis  
Andrew Simor  
Kevin Schwartz  
Dat Tran

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# Background

- Children are at high risk of influenza infection and subsequent complications
- NACI recommendation for children aged 6-59 months to receive influenza vaccine
  - 24-59 months included in high risk group for 2012-13 season
- Cochrane review cited little evidence of impact of vaccines on pediatric hospital admissions
  - Few studies focusing on this setting and age group in Canada

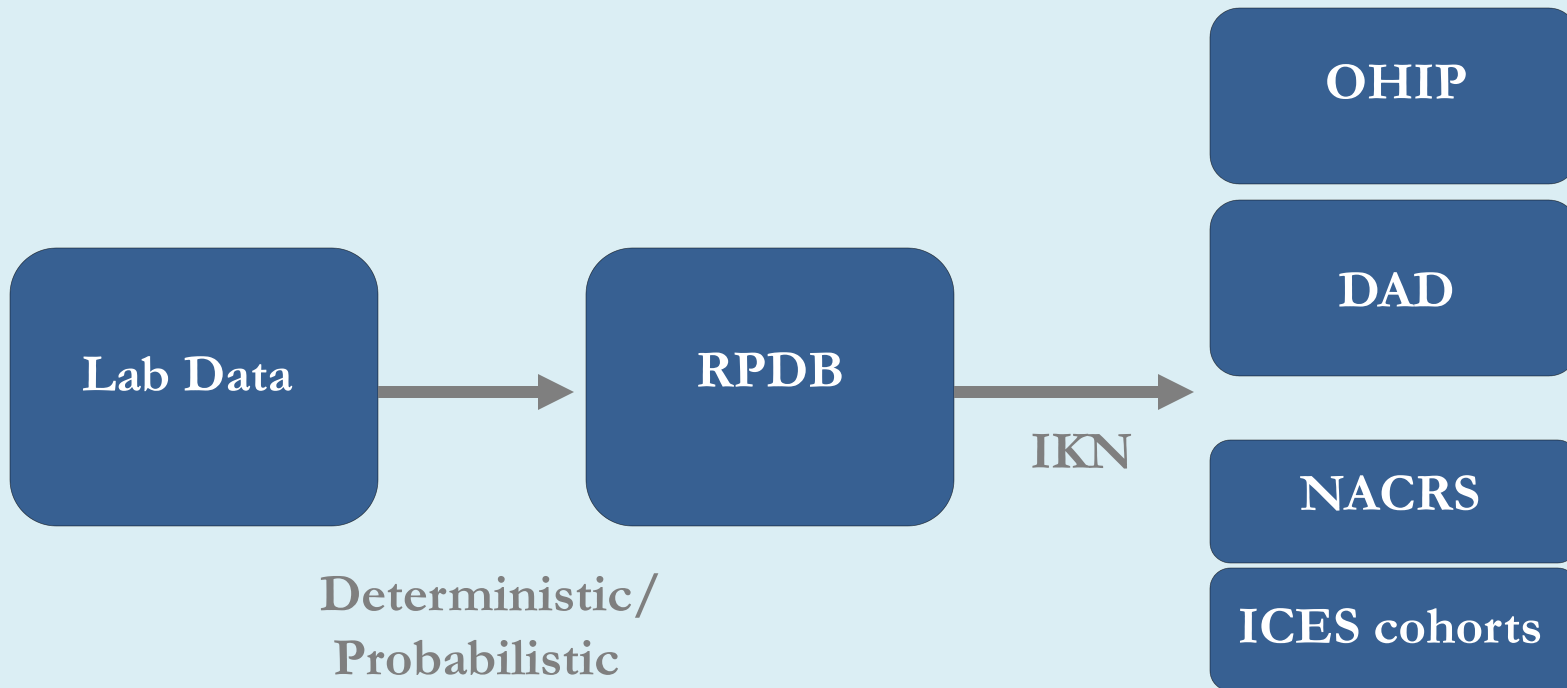
# Objectives

- To estimate VE against laboratory-confirmed influenza hospitalizations for children aged 6-59 months over the 2010-11 to 2013-14 seasons
- Investigate impact of repeat immunization by comparing VE in those vaccinated in:
  - Current season only
  - Prior season only
  - Both seasons

# Study design

- Test negative study design
- Children aged 6-59 months tested for influenza in an acute care hospital in Ontario
  - September 2010 to May 2014
- Linked laboratory results from Public Health Ontario and 4 hospital laboratories to administrative data at ICES

# Data Linkage



# Data

- Outcome
  - Lab-confirmed influenza infection
    - PCR, viral culture, DFA, EIA
- Exposure
  - Receipt of seasonal influenza vaccine
    - OHIP physician billing claims
      - Defined as partially or fully immunized
- Covariates
  - Chronic conditions, age, sex, SES, rurality



# Analysis

- $VE = (1 - \text{adjusted OR}) \times 100\%$ 
  - Logistic regression comparing odds of vaccination among cases to odds of vaccination among controls
- Adjusted for age, influenza season and time within season, based *a priori* on literature
  - No other covariates included through model building strategy

# Results

- 10,169 specimens included over 4 seasons
  - 11.3% classified as fully/partially immunized
    - Range across seasons: 9.8%-13.5%
  - 12.7% tested positive for influenza
    - Range across seasons: 11.6%-14.3%
- 88% hospitalized with an ARI-coded encounter
- 95% tested for other respiratory virus(es)

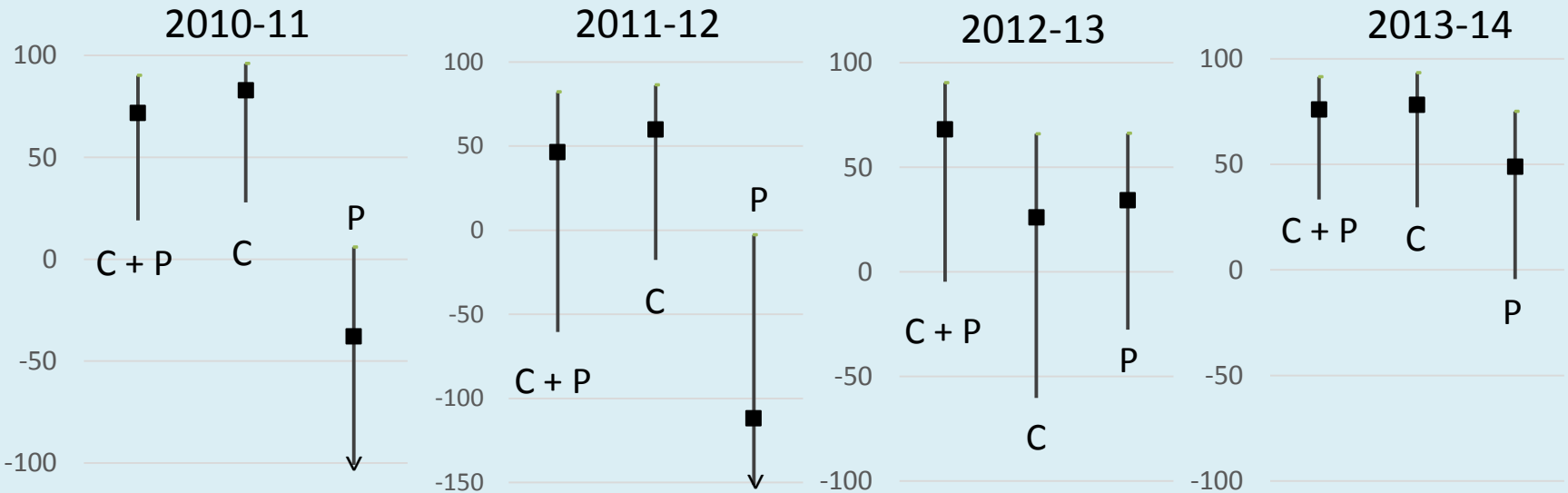
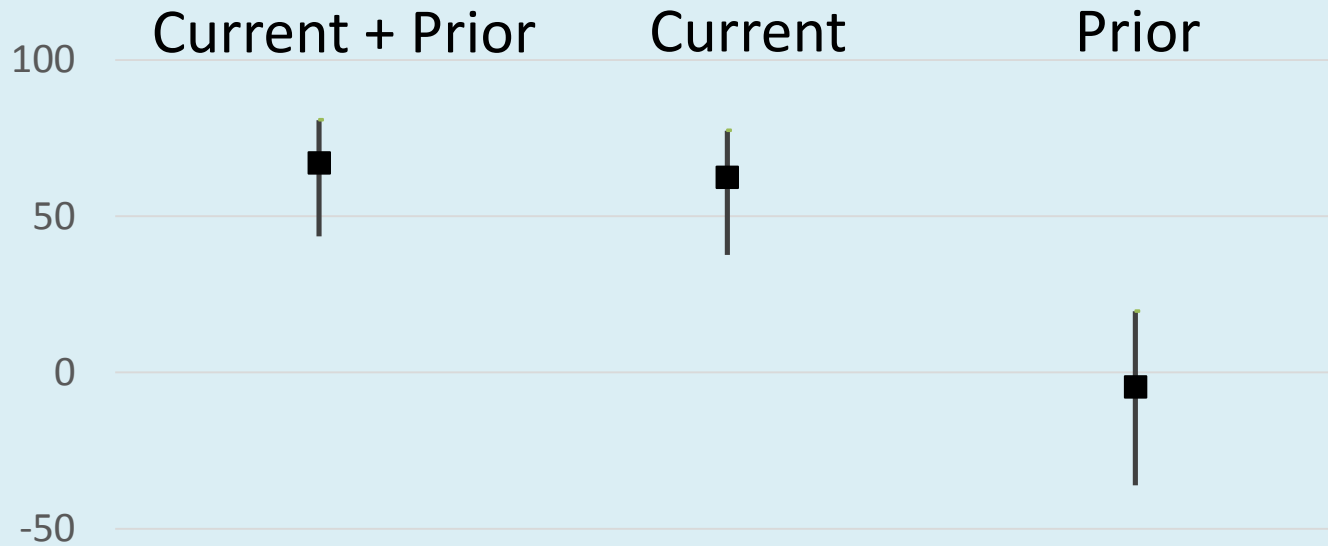
# Vaccine Effectiveness by season

Influenza season	Test-positive	Test-negative	VE full / partial (95% CI)	
<b>2010-11</b> (H3N2)	368	2,212	<b>77.0</b> (46.5, 90.1)	<b>68.4</b> (30.8, 85.5)
<b>2011-12</b> (B)	226	1,364	<b>58.3</b> (11.3, 80.4)	45.6 (-21.6, 75.7)
<b>2012-13</b> (H3N2)	365	2,735	33.3 (-18.0, 62.3)	-16.7 (-95.8, 30.5)
<b>2013-14</b> (H1N1/B)	336	2,563	<b>72.3</b> (42.8, 86.6)	<b>47.3</b> (5.7, 70.5)
<b>Combined</b>	<b>1,295</b>	<b>8,874</b>	<b>60.5</b> (44.1, 72.1)	<b>39.0</b> (16.4, 55.5)

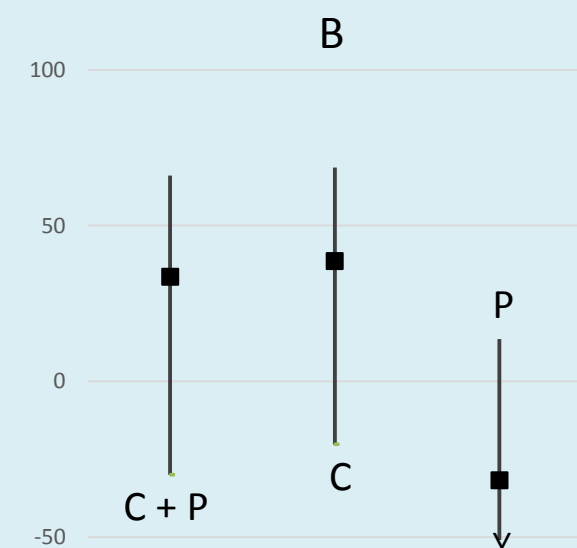
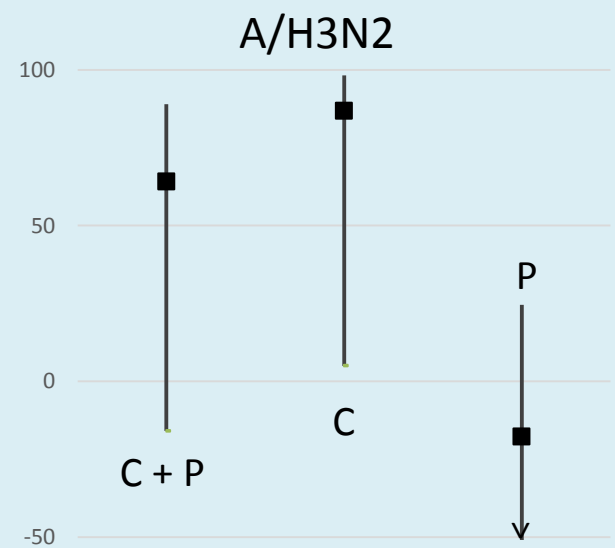
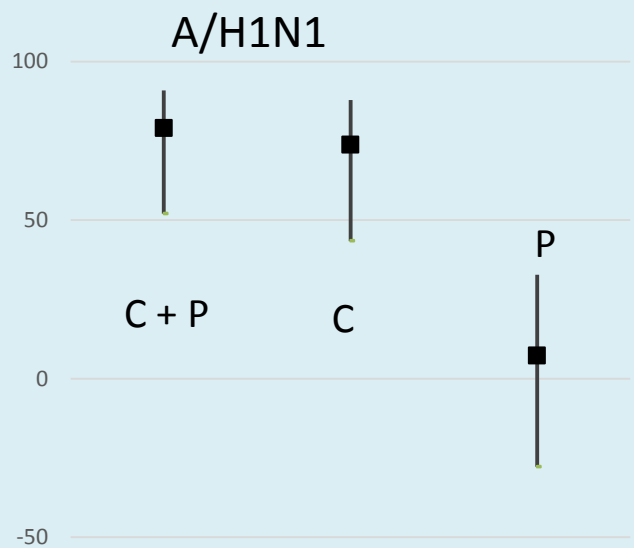
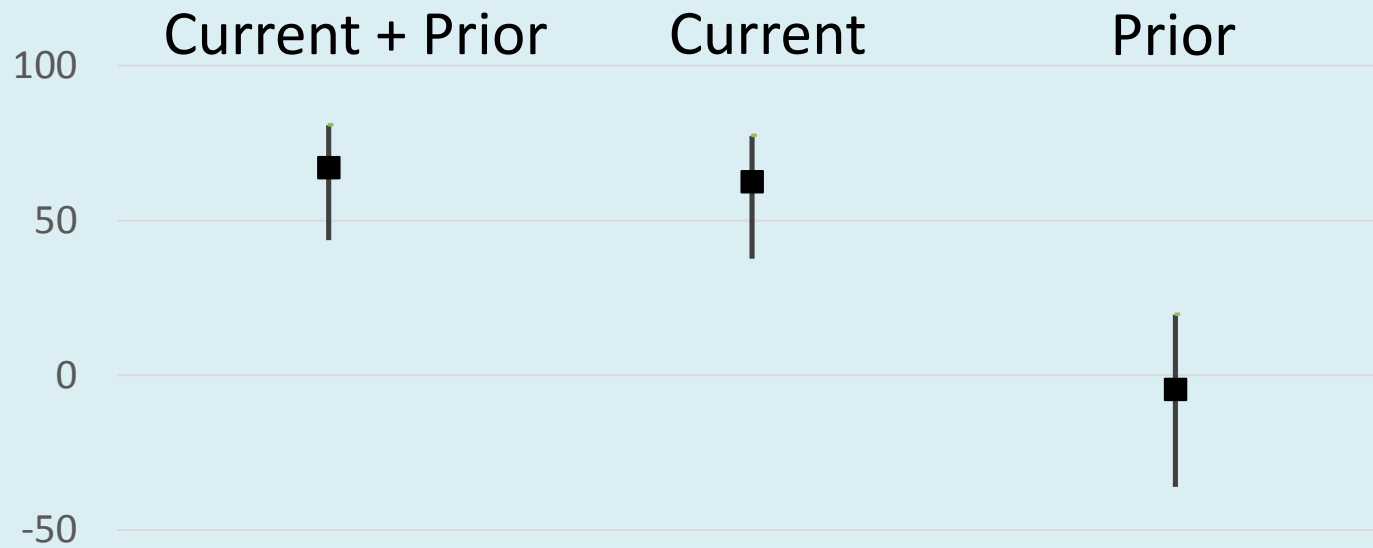
# Vaccine Effectiveness by subtype

Influenza subtype	Test-positive	Test-negative	VE full / partial (95% CI)	
A/H1N1	168	10,001	<b>80.5</b> <b>(20.7, 95.2)</b>	27.1 (-50.3, 64.6)
A/H3N2	288	9,881	47.6 (-7.9, 74.6)	<b>67.4</b> <b>(19.8, 86.7)</b>
B	408	9,736	<b>56.7</b> <b>(26.2, 74.7)</b>	10.1 (-47.4, 45.2)

# Repeat immunization by season



# Repeat immunization by subtype



# Limitations

- Imperfect capture of vaccination status
  - Majority in this age group receive immunization at physician office
- Lack of case definition
  - VE remained the same when limited to those with an ARI-coded hospitalization
- Power to detect significant VE when vaccination coverage is low

# Conclusions

- Influenza vaccines associated with reduced risk of laboratory-confirmed influenza hospitalizations in children 6-59 months of age
- VE generally higher in fully immunized children relative to partially immunized
- VE similar for those vaccinated in both seasons and current season only, except in 2012-13
- Vaccine coverage in this age group remains low in Ontario



# Questions?

[sarah.buchan@mail.utoronto.ca](mailto:sarah.buchan@mail.utoronto.ca)

[jeff.kwong@utoronto.ca](mailto:jeff.kwong@utoronto.ca)

