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Centre for Health Protection

Epidemiology of Seasonal Influenza in Hong Kong and Recommendations on Vaccination for 2018/19

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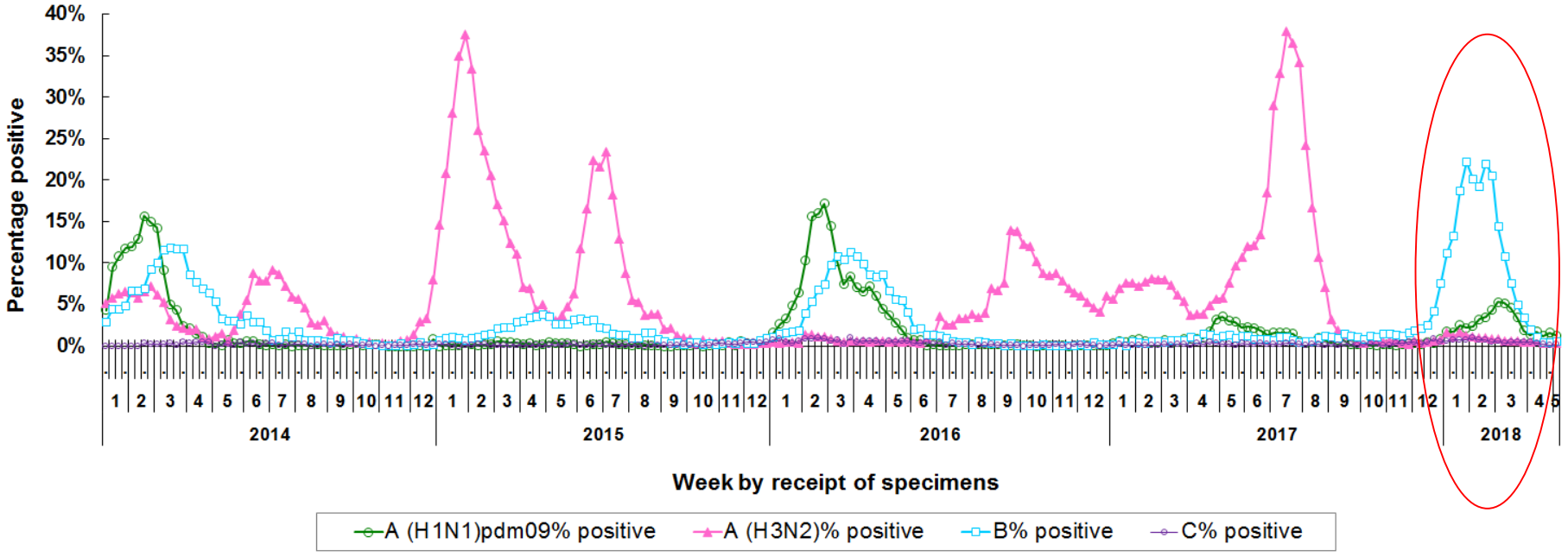
Overview of local situation

- 2017/18 winter influenza season started in early Jan 2018
- Overall local seasonal influenza activity had increased rapidly to a high level in early to mid-Feb
- Started to decrease since early Mar and returned to baseline in late Mar
- Lasted about 12 weeks (compared with 16 weeks in major flu seasons in past few years)

Laboratory surveillance

- Predominating virus: B (76% of all positive detections)

  [Seasons in previous 5 years (2013-17) with significant circulation of B: 38% in 2013/14 winter; 44% in 2015/16 winter]
- Among influenza B detections, mostly Yamagata lineage (~95%)
- Positive percentage among respiratory specimens reached the peak of 27.2% in the week ending Feb 17 (compared with ~40% in 2017 summer)



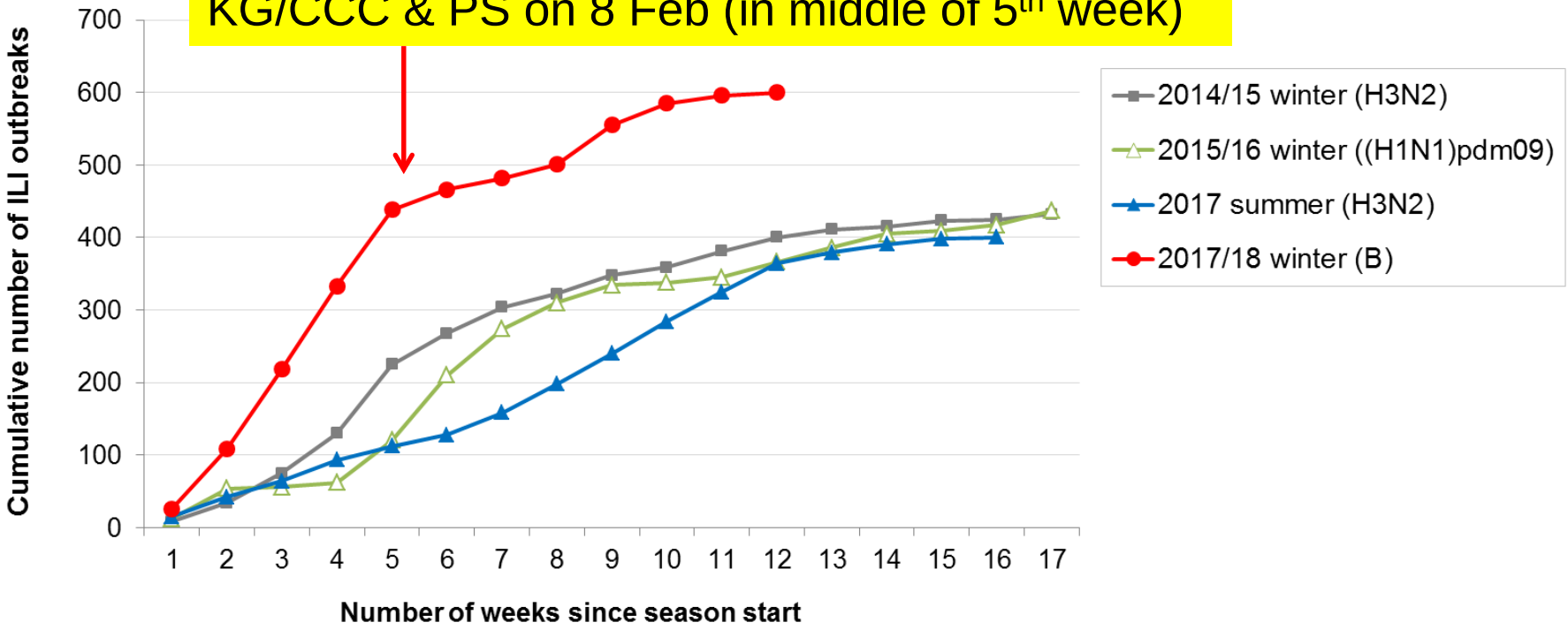
Outbreaks of influenza-like illness (ILI) in schools/institutions

- ILI outbreaks markedly increased to very high level between late Jan and early Feb (109 -115 outbreaks per week)
- 600 ILI outbreaks recorded in this season, exceeded total numbers recorded in major flu seasons since 2013

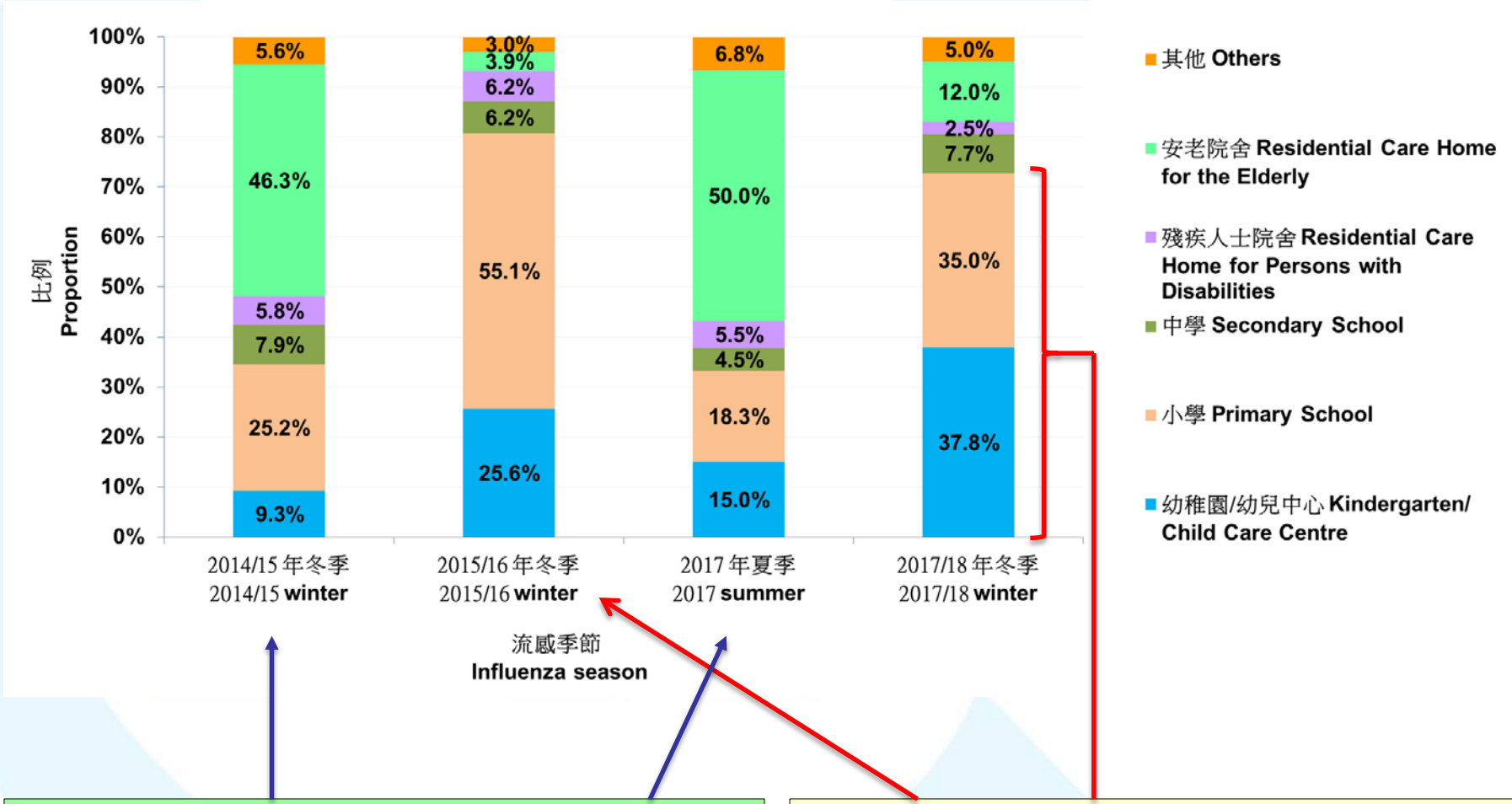
Type of institution	No. of outbreaks (% among all outbreaks)	Total no. of institutions in HK	% of institutions affected
KGs/CCCs	**227 (38%)**	**1083**	**21%**
Primary schools	**210 (35%)**	**575**	**37%**
Secondary schools	46 (8%)	506	10%
Residential care homes for the elderly	72 (12%)	738	10%
Residential care homes for persons with disabilities	15 (3%)	307	5%
Others	30 (5%)	--	--
Total	600	--	--

Cumulative numbers of ILI outbreaks reported during major influenza seasons, 2015–2018

Start of early break for Chinese New Year for KG/CCC & PS on 8 Feb (in middle of 5th week)



Distribution of venues of ILI outbreaks



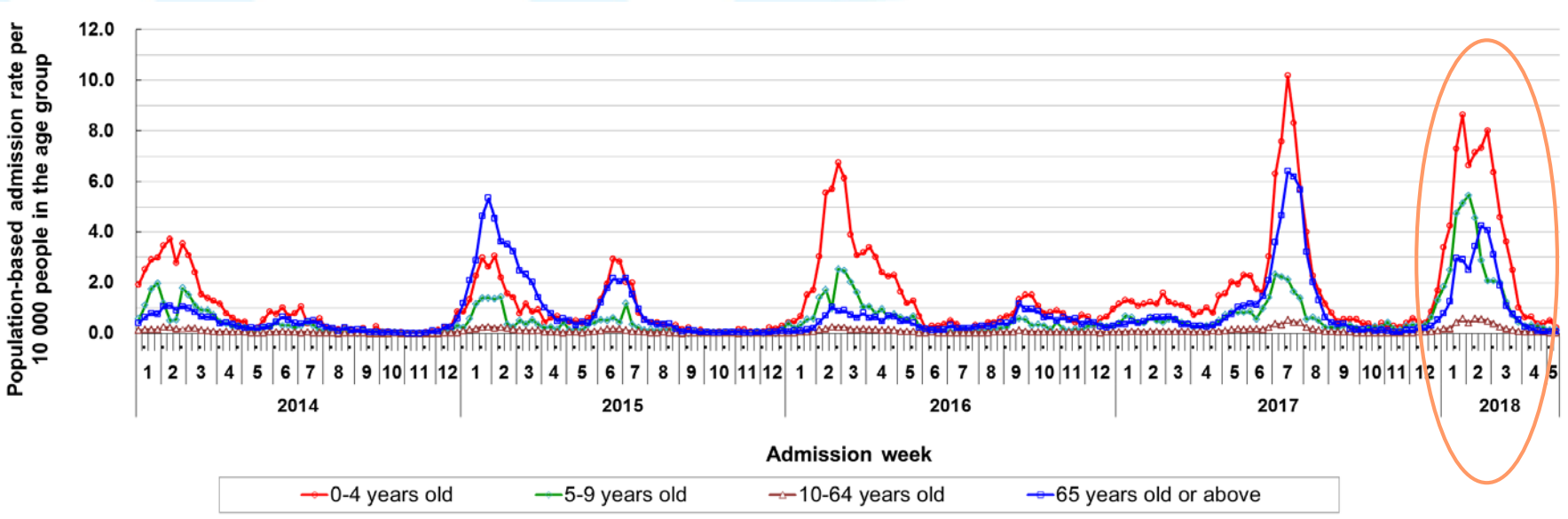
Most outbreaks occurred in RCHEs during 2014/15 winter & 2017 summer seasons predominated by H3N2

This season is similar to 2015/16 winter season with co-circulation of influenza A(H1N1)pdm09 & influenza B

Admission rates with principal discharge diagnosis of influenza in public hospitals

- Peaked in week 7 (Feb 11-17)
- Age-specific peak rates were highest among young children 0-5 years (8.63 per 10,000 population), followed by elderly ≥65 years (4.25) & children 6-11 years (3.81)

Season	Peak weekly admission rate (per 10,000 population)						
	0-5	6-11	12-17	18-49	50-64	≥65	All ages
Current season	8.63	3.81	1.48	0.35	0.87	4.25	1.51
2017 summer	9.07	1.63	0.61	0.31	0.88	6.40	1.91
2015/16 winter	6.15	1.79	0.38	0.17	0.38	1.04	0.67
2014/15 winter	2.78	1.26	0.42	0.16	0.39	5.34	1.17



Surveillance of adult influenza cases who required ICU admission or died

- Total 570 cases (including 382 deaths) in this season
- [647 (501 deaths) in 2014/15 winter; 409 (211 deaths) in 2016/17 winter; 582 (430 deaths) in 2017 summer]
- Most (72%) affected elderly ≥65 years, proportion among 50-64 years was higher than previous H3N2 seasons (e.g. 15% in 2017 summer) but lower than previous H1N1 seasons (e.g. 33% in 2015/16 winter)

Age group	All cases including deaths		Deaths among the cases	
	No. of cases (%)	Cumulative incidence (per 100,000 population)	No. of deaths (%)	Cumulative mortality (per 100,000 population)
18 – 49	41 (7.2%)	1.2	8 (2.1%)	0.2
50 – 64	116 (20.4%)	6.5	43 (11.3%)	2.4
≥ 65	413 (72.5%)	33.8	331 (86.6%)	27.1
Total	570	8.9	382	6.0

- About 75% had pre-existing chronic medical diseases
- Only 27% were known to have received SIV for 2017/18 season

Age distribution of adult severe cases

All severe cases (ICU admissions + deaths):

Age group	H3N2 seasons		H1N1 and B season	B season
	2014/15 winter	2017 summer	2015/16 winter	2017/18 winter
18-49	21 (3.2%)	29 (5.0%)	58 (14.2%)	39 (7.3%)
50-64	**65 (10.0%)**	**89 (15.3%)**	**133 (32.5%)**	**111 (20.9%)**
≥65	561 (86.7%)	464 (79.7%)	218 (53.3%)	382 (71.8%)

Deaths:

Age group	H3N2 seasons		H1N1 and B season	B season
	2014/15 winter	2017 summer	2015/16 winter	2017/18 winter
18-49	4 (0.8%)	9 (2.1%)	4 (1.9%)	7 (2.0%)
50-64	**28 (5.6%)**	**31 (7.2%)**	**46 (21.8%)**	**40 (11.3%)**
≥65	469 (93.6%)	390 (90.7%)	161 (76.3%)	306 (86.7%)

Paediatric influenza-associated severe complications/deaths

- 20 cases (including 2 deaths) recorded in 2017/18 winter season *(including 2 imported non-fatal cases)*

  [18 (1 death) in 2014/15 winter; 27 (3 deaths) in 2016/17 winter; 19 (3 deaths) in 2017 summer]
- Age range: 19 months – 15 years (median: 4.5 years)

Age group	No. of cases (death among the cases)	Cumulative incidence (per 100,000 population)
0 – 5*	11 (2)	3.2
6 - 11	5 (0)	1.4
12 - 17	2 (0)	0.6

**excluding 2 imported cases in calculation of incidence*

- 4 (20%) had pre-existing chronic diseases
- 13 (65%) had neurological complications including the 2 deaths (11 encephalopathy & 2 status epilepticus)
- 19 (95%) did not receive the 2017/18 SIV, one received SIV in the Mainland (likely TIV with Victoria lineage of B)

Cumulative incidences of severe cases (per 100,000 population)

Age group	2014/15 winter (16 weeks) H3N2	2015/16 winter (16 weeks) H1N1 & B	2017 summer (17 weeks) H3N2	2017/18 winter (12 weeks) B
0-5	2.9	4.1	4.1	3.2
6-11	1.6	2.1	0.6	1.4
12-17	0.6	1.5	0.6	0.6
18-49	0.6	1.7	0.9	1.2
50-64	3.7	7.6	5.0	6.5
≥65	50.3	18.7	38.0	33.8
All ages	9.1	5.9	8.1	8.0

Case definitions:

- Adult (≥18 years) – Laboratory confirmed influenza cases requiring ICU admission or death
- Children (<18 years) - Cases with influenza-associated severe complications (severe pneumonia requiring either assisted ventilation or admission to ICU; sepsis; shock; encephalopathy; or myocarditis) or death

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Seasonal Influenza Vaccine (SIV)

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Recommendation on seasonal influenza vaccine composition for 2018/19 (northern hemisphere)

- H1: an A/Michigan/45/2015 (H1N1)pdm09-like virus
- H3: an A/Singapore/INFIMH-16-0019/2016 (H3N2)-like virus
- B/Victoria: a B/Colorado/06/2017-like virus *(a B/Brisbane/60/2008-like virus in 2017/18 in TIV)*
- B/Yamagata: a B/Phuket/3073/2013-like

If trivalent vaccine is being used, the influenza B component shall contain a B/Colorado/06/2017-like virus.

Full version of SCVPD recommendation on SIV:
https://www.chp.gov.hk/files/pdf/scvpd_recommendations_on_siv_for_2018_19_season.pdf

Priority groups in 2018/19 season

- Some people are at increased risk of severe influenza or transmitting influenza to other high risk persons, hence they shall have higher priority for seasonal influenza vaccination.
  1) Pregnant women
  2) Elderly persons living in residential care homes
  3) Long-stay residents of institutions for persons with disabilities
  4) Persons aged 50 years or above
  5) Persons with chronic medical problems
  6) Healthcare workers
  7) Children aged 6 months to under 12 years
  8) Poultry workers
  9) Pig farmers and pig-slaughtering industry personnel

SIV used in HK

- WHO recommends annual influenza vaccination
- Major influenza seasons in HK in the past were usually the winter season, from Jan to Mar/Apr
- People should get vaccinated before the winter season for protection
- **Northern hemisphere** SIV (the only SIV available before the local winter season) is all along used in HK, usually available in Sep/Oct every year

SIV registered in HK

- **Inactivated** influenza vaccines (IIV) (both trivalent & quadrivalent)
  - to be used in GVP
- **Live attenuated** influenza vaccine (LAIV) (only quadrivalent)
  - registered in HK in April 2018 (Flumist)
  - given intranasally
  - can be used among non-pregnant and non-immunocompromised people 2-49 years of age
  - will not be used in GVP
- Dosages for adults and children: ***always refer to product inserts***

Inactivated influenza vaccines

- Both trivalent and quadrivalent IIVs are recommended for use in HK
- Based on past laboratory data in HK, trivalent SIV is expected to prevent majority of influenza burden, while quadrivalent SIV may potentially offer additional protection against influenza B

Live attenuated influenza vaccine

- US CDC recommended not to use LAIV in 2016/17 & 2017/18 seasons due to concerns about low effectiveness against influenza A(H1N1)pdm09-like viruses during 2013/14 and 2015/16 seasons
  - Attributable to decreased replicative fitness of H1N1 vaccine viruses (A/California/7/2009 for 2013/14 and A/Bolivia/559/2013 for 2015/16)
- In 2017/18 season, a new H1N1 virus (A/Slovenia/2903/2015) replaced A/Bolivia/559/2013
  - shed by a higher proportion of children
  - induced significantly higher antibody responses
  - no estimates of VE against influenza A(H1N1)pdm09 available

https://www.cdc.gov/mmwr/volumes/67/wr/mm6722a5.htm?s_cid=mm6722a5_w

Precautions on SIV (both IIV & LAIV)

- Contraindication: People who have **a history of severe allergic reaction to any vaccine component or a previous dose of any SIV** are not suitable to receive SIV.

- SIV contains ovalbumin (a chicken protein), but the manufacturing process involves repeated purification and the ovalbumin content is very little. Even people who are allergic to eggs are generally safe to receive vaccination.

Precautions for people with egg allergy

- Individuals with mild egg allergy who are considering an influenza vaccination can be given SIV in primary care setting, such as health centres or clinics.

- Individuals with a history of severe allergic reaction to egg should have SIV administered by healthcare professionals in appropriate medical facilities with capacity to recognise and manage severe allergic reactions.

Additional contraindications for LAIV

- LAIV is generally contraindicated in the following conditions:
  1) Concomitant aspirin or salicylate-containing therapy in children and adolescents
  2) Children aged 2 to 4 who have been diagnosed of asthma; or whose health care provider has reported during the preceding 12 months that the child had wheezing or asthma; or whose medical record indicates a wheezing episode has occurred during the preceding 12 months
  3) Children and adults who are immunocompromised due to any cause
  4) Close contacts and caregivers of severely immunosuppressed persons who require a protected environment
  5) Pregnancy
  6) Receipt of influenza antiviral medication within previous 48 hours

Administration of LAIV

- If nasal congestion is present that might impede delivery of the vaccine to the nasopharyngeal mucosa, deferral of administration should be considered until resolution of the illness, or another appropriate vaccine should be administered instead.

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Estimates of vaccine effectiveness (VE) of SIV at primary care settings in HK Nov 2017 to Mar 2018

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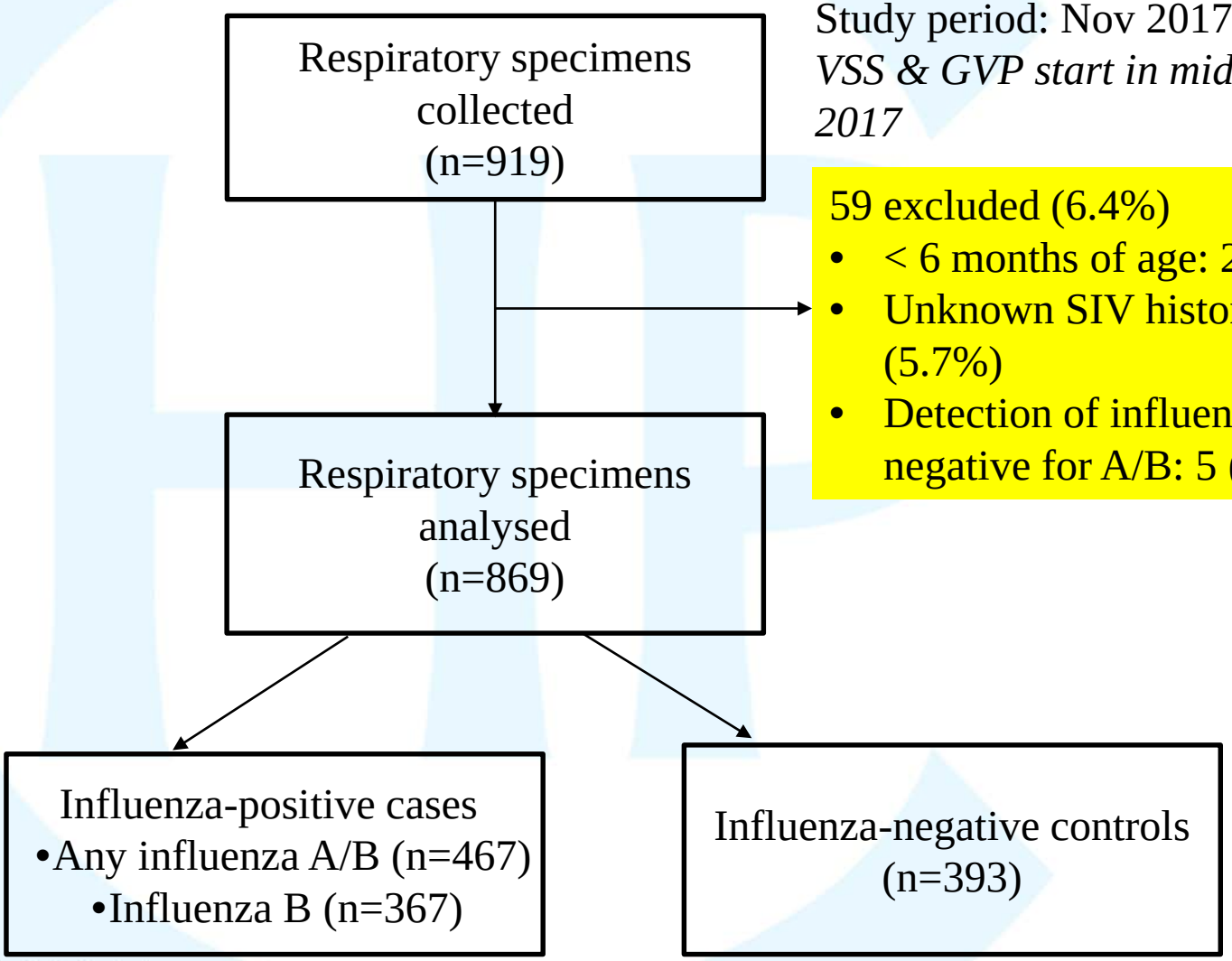
Method

- Study setting: Private medical practitioners (PMPs) participating in CHP's sentinel surveillance system
- Respiratory specimens were taken from ILI patients^ attending PMPs for RT-PCR test for respiratory viruses (including influenza) by PHLSB:

  - Cases: ILI patients tested positive for influenza
  - Controls: ILI patients tested negative for influenza
- PMPs collect information on SIV history and chronic disease from swabbed patients
- Test-negative case-control (TNCC) method to estimate VE of the 2017/18 SIV
- Odds ratio (OR) of vaccination among cases and controls were computed using logistic regression with adjustment for relevant covariates. VE = ((1 – OR)*100)

^Clinical definition of ILI: fever >38^{o}C and cough OR sore throat. Patients are swabbed if they have disease onset within 3 days.

No. of specimens collected



Estimates of VE

All influenza (A and B)					
Characteristics	Cases		Controls		VE^
	No. vac/ No.	% vac	No. vac/ No.	% vac	% (95%CI)
All ages	70/467	15.0	121/393	30.8	59.1 (41.1 to 71.8)
6 months to 17 years	42/226	18.9	65/191	34.0	39.4 (-1.9 to 64.1)
18 to 64 years	18/213	8.5	38/170	22.4	71.0 (42.7 to 85.8)

Influenza B					
Characteristics	Cases		Controls		VE^
	No. vac/ No.	% vac	No. vac/ No.	% vac	% (95%CI)
All ages	58/367	15.8	121/393	30.8	53.5 (35.4 to 74.6)
6 months to 17 years	37/187	19.8	65/191	34.0	27.1 (-25.9 to 57.8)
18 to 64 years	11/154	7.1	38/170	22.4	76.8 (49.3 to 90.1)

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^Adjusted for age, gender, time of specimen received (week) and chronic medical illness

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RAPID COMMUNICATIONS

Interim estimate of influenza vaccine effectiveness in hospitalised children, Hong Kong, 2017/18

Susan S Chiu[1,2], Mike Y W Kwan[2,3], Shuo Feng[4], Joshua S C Wong[3], Chi-Wai Leung[3], Eunice L Y Chan[1], J S Malik Peiris[4,5], Benjamin J Cowling[4]

We conducted a hospital-based test-negative study in Hong Kong to estimate influenza vaccine effectiveness (VE) for the winter of 2017/18. The interim analysis included data on 1,078 children admitted between 4 December 2017 and 31 January 2018 with febrile acute respiratory illness and tested for influenza. We estimated influenza VE at 66% (95% confidence interval (CI): 43–79) overall, and 65% (95% CI: 40–80) against influenza B, the dominant virus type (predominantly B/Yamagata).

Euro Surveill. 2018 Feb;23(8).

Thank you