Global Influenza Hospital Surveillance Network

GIHSN-China's experience & Results of season 2015-2016

Beijing, China

1. Chinese Center for Disease Control and Prevention

2. WHO Collaborating Centre for Infectious Disease Control and Epidemiology, School of Public Health, The University of Hong Kong

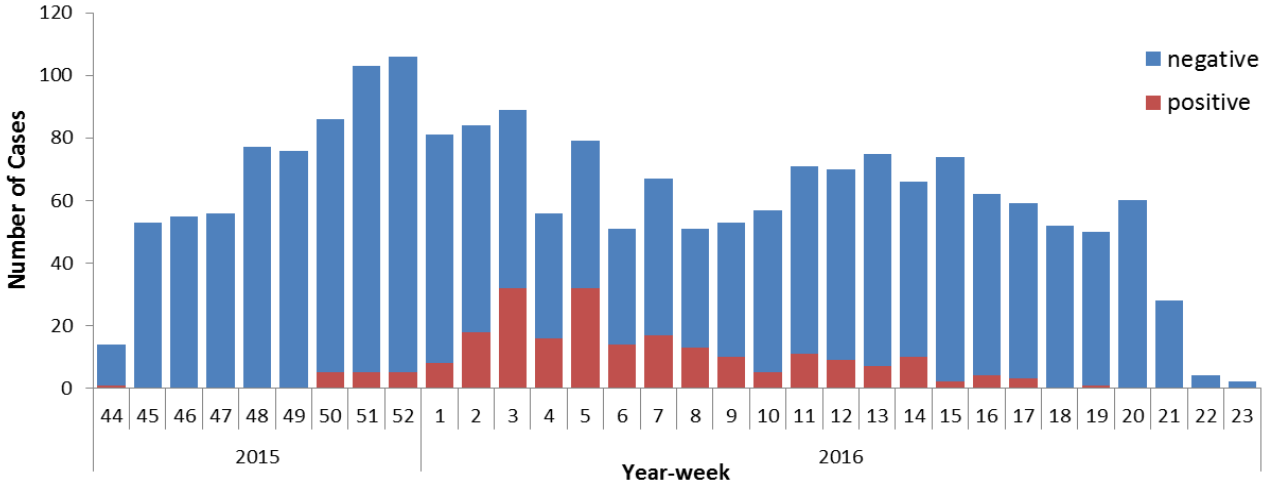
Study management summary

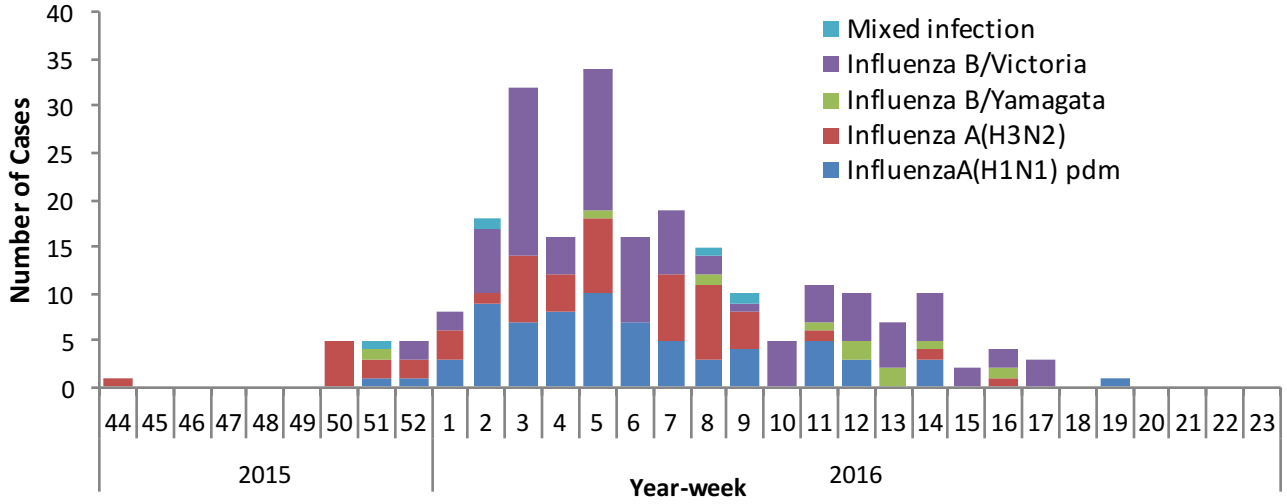
District	Chang Ping	Huai Rou	Da Xing	Mi Yun	Fang Shan
Hospital	Chang Ping Hospital	Huai Rou Hospital	People's Hospital of Da Xing	Mi Yun Hospital	Liang Xiang Hospital
Category	Tertiary	Secondary	Secondary	Tertiary	Tertiary
Population	1,743,133	401,063	1,470,000	473,094	1,020,980
Hospital Beds	576	651	918	541	860
Ward (Number of beds)	•Respiratory (42) •Pediatric (45) •ICU(10)	•Respiratory (55) •Pediatric (38)	•Respiratory (66) •ICU (37)	•Respiratory (46) •Pediatric (32) •ICU (12)	•Respiratory (74) •Pediatric (60) •ICU (12)
Start Date	9 Sep 2013	9 Sep 2013	29 Dec 2014	29 Dec 2014	20 Apr 2015

Features of GIHSN-Beijing 2015-16

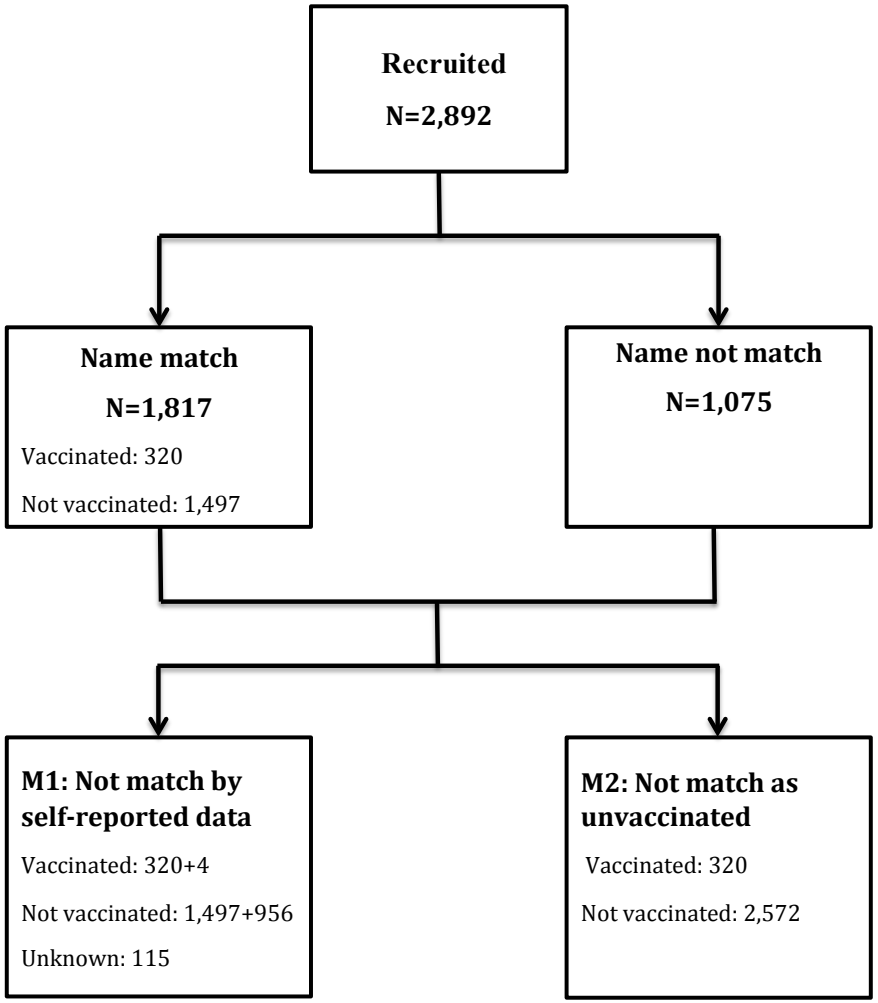
- Participating wards: respiratory, pediatric, intensive care units
- Recruitment started in October 2015 and stopped in May 2016.
- The influenza season is defined as periods during which cases tested positive for influenza for two or more consecutive weeks.
- Same case screening and recruitment criteria as the Core Protocol.
- Data collection:
  - Interview & clinical records
  - Vaccination status was determined by registry vaccination records in Beijing EPI Information Management System
  - Online data management system is used
- Specimen collection: Two pharyngeal swabs were taken for all included cases.

Patient recruitment and case detection





Vaccination status determination



Patients recruited in season 2015-2016

Characteristics	Test-positive (n=350) N (%)	Test-negative (n=1,746) N (%)	p-value
Age group			
6m-4y	158 (45.1%)	669 (38.3%)	0.287
5-17y	58 (16.6%)	204 (11.7%)	
18-59y	45 (12.9%)	320 (18.3%)	
≥60y	89 (25.4%)	553 (31.7%)	
Male	188 (53.7%)	996 (57.0%)	0.262
Chronic conditions	86 (24.6%)	539 (30.9%)	0.021
Vaccination in 2015-16			
Yes	47 (13.4%)	209 (12.0%)	0.418
No	287 (82.0%)	1476 (84.5%)	
Unknown	16 (4.6%)	61 (3.5%)	

Vaccine effectiveness by virus type

Vaccine effectiveness	Positive vaccinated	Positive not vaccinated	Negative vaccinated	Negative not vaccinated	VE (95% CI)
M1					
Influenza overall	47 (14.1%)	287 (85.9%)	209 (12.4%)	1476 (87.6%)	-19.9% (-76.8%, 18.7%)
Influenza A(H1N1)	26 (15.1%)	146 (84.9%)	209 (12.4%)	1476 (87.6%)	-19.3% (-98.5%, 28.2%)
Influenza A(H3N2)	15 (15.2%)	84 (84.8%)	209 (12.4%)	1476 (87.6%)	-71.5% (-233.9%, 11.9%)
Influenza A	13 (17.3%)	62 (82.7%)	209 (12.4%)	1476 (87.6%)	-1.8% (-101.5%, 48.6%)
Influenza B	21 (12.9%)	142 (87.1%)	209 (12.4%)	1476 (87.6%)	-2.8% (-79.2%, 41.1%)
M2					
Influenza overall	47 (13.4%)	303 (86.6%)	209 (12.0%)	1537 (88.0%)	-18.6% (-74.3%, 19.3%)
Influenza A(H1N1)	26 (13.9%)	161 (86.1%)	209 (12.0%)	1537 (88.0%)	-14.2% (-88.4%, 30.7%)
Influenza A(H3N2)	15 (13.9%)	93 (86.1%)	209 (12.0%)	1537 (88.0%)	-62.7% (-212.6%, 15.3%)
Influenza A	13 (16.0%)	68 (84.0%)	209 (12.0%)	1537 (88.0%)	0.2% (-95.2%, 49.0%)
Influenza B	21 (12.7%)	144 (87.3%)	209 (12.0%)	1537 (88.0%)	-4.0% (-81.0%, 40.2%)

Vaccine effectiveness by age

Vaccine effectiveness	Positive vaccinated	Positive not vaccinated	Negative vaccinated	Negative not vaccinated	VE (95% CI)
M1					
6m-4y	5 (3.2%)	153 (96.8%)	14 (2.1%)	655 (97.9%)	-42.4% (-344.4%, 54.4%)
5-17y	16 (27.6%)	42 (72.4%)	54 (26.5%)	150 (73.5%)	-29.7% (-168.4%, 37.3%)
18-59y	1 (2.9%)	34 (97.1%)	9 (3.1%)	278 (96.9%)	-4.4% (-787.5%, 87.7%)
≥60y	25 (30.1%)	58 (69.9%)	132 (25.1%)	393 (74.9%)	-13.8% (-97.3%, 34.3%)
Overall	47 (14.1%)	287 (85.9%)	209 (12.4%)	1476 (87.6%)	-19.9% (-76.8%, 18.7%)
M2					
6m-4y	5 (3.2%)	153 (96.8%)	14 (2.1%)	655 (97.9%)	-42.4% (-344.4%, 54.4%)
5-17y	16 (27.6%)	42 (72.4%)	54 (26.5%)	150 (73.5%)	-29.7% (-168.4%, 37.3%)
18-59y	1 (2.2%)	44 (97.8%)	9 (2.8%)	311 (97.2%)	-4.0% (-793.7%, 87.9%)
≥60y	25 (28.1%)	64 (71.9%)	132 (23.9%)	421 (76.1%)	-9.3% (-87.0%, 36.1%)
Overall	47 (13.4%)	303 (86.6%)	209 (12.0%)	1537 (88.0%)	-18.6% (-74.3%, 19.3%)

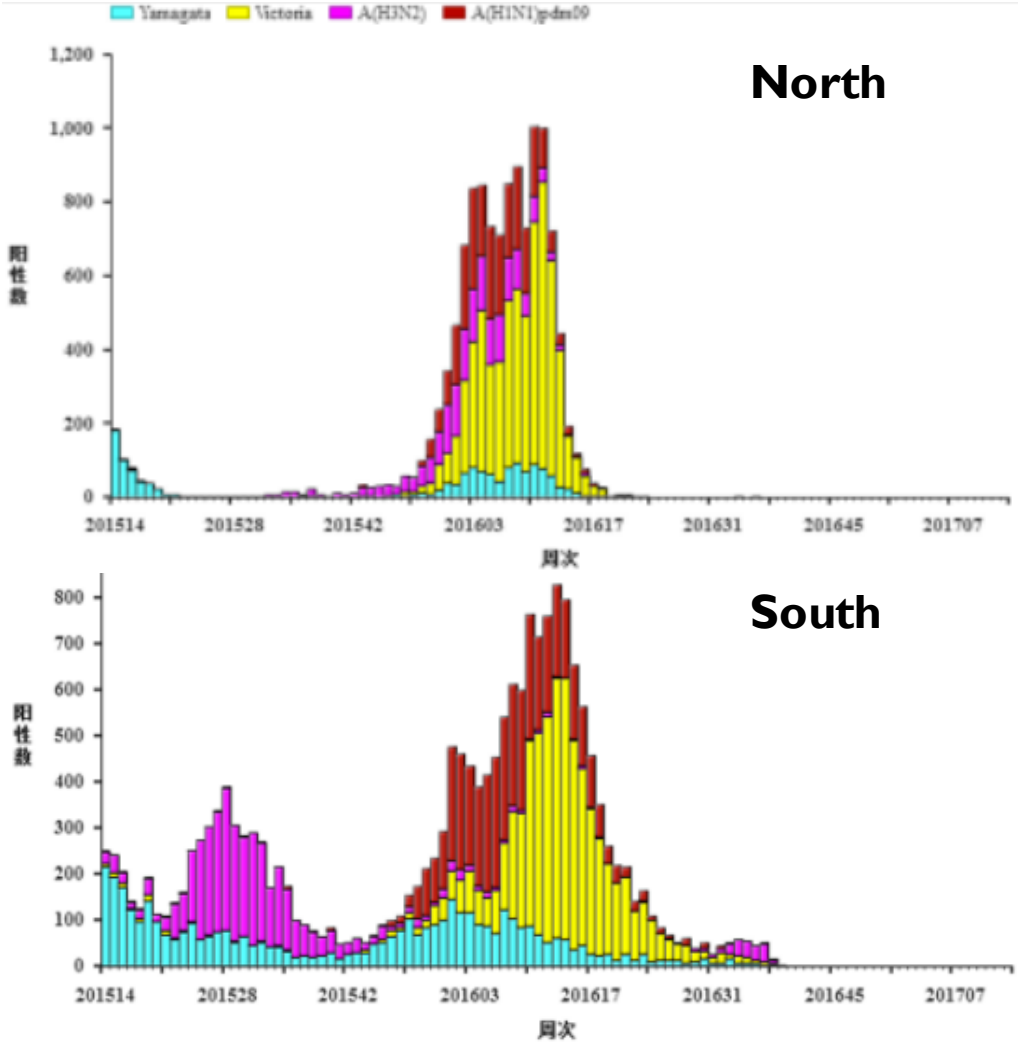
Discussion

- Use of electronic patient data management and vaccination registry to improve data quality
- Effectiveness estimation of the 2015-16 trivalent vaccine for northern hemisphere in China (Beijing) is low.
  - Mismatch between vaccine strains and circulating strains
  - Data quality? (but this has not been an issue in previous years)
  - Other factors?

Self-reported vs registry vaccination

Self-reported	Registry						Sub-total	
	Vaccinated		Non-vaccinated		Unknown			
Vaccinated	173	54.1%	19	1.3%	4	0.4%	196	6.8%
Non-vaccinated	99	30.9%	1410	94.3%	956	88.9%	2465	85.2%
Unknown	48	15.0%	68	4.5%	115	10.7%	231	7.9%
Sub-total	320	100.0%	1497	100.0%	1075	100.0%	2892	100.0%

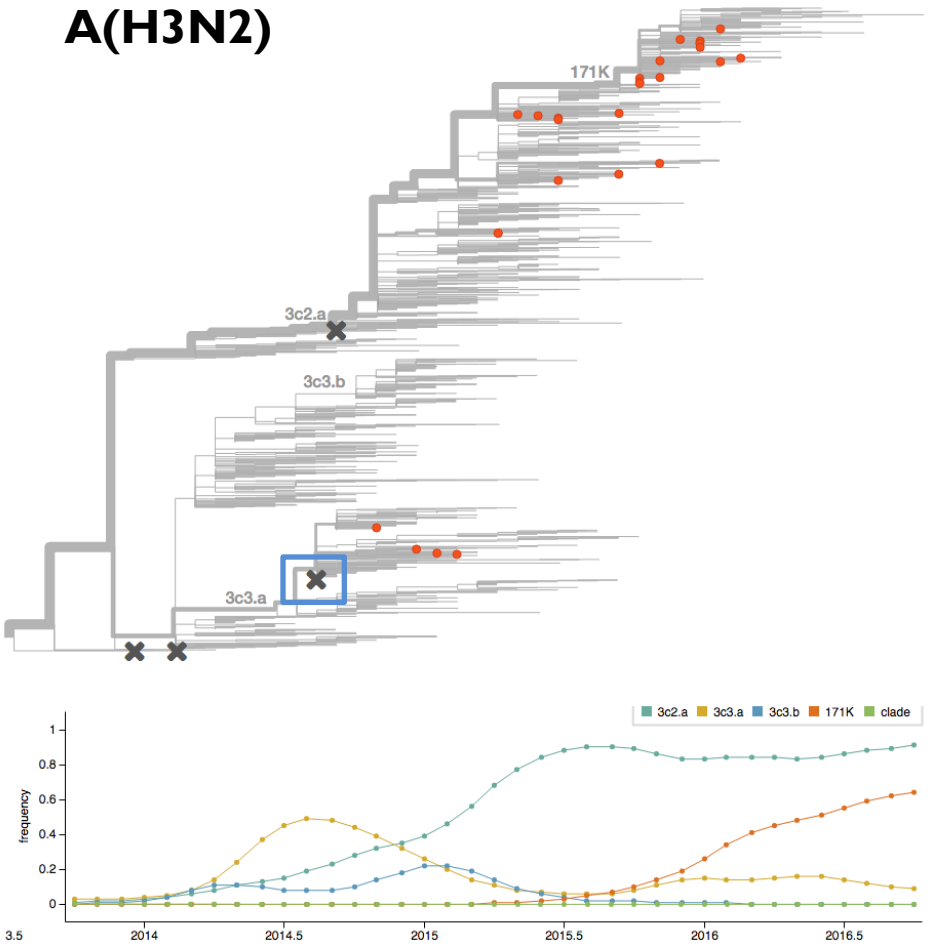
Virus detection by CNIC



- Largely similar virus circulation in northern and southern China
- Influenza B (Victoria lineage) predominant throughout 2015-16 season
- Much fewer influenza A(H1N1) and A(H3N2) viruses detected than B

Virus detection in China 2015-16

A(H3N2)



- WHO 2015-16 trivalent influenza vaccine recommendation for northern hemisphere
  - an A/California/7/2009 (H1N1)pdm09-like virus
  - an A/Switzerland/9715293/2013 (H3N2)-like virus (sub-clade 3C.3a)
  - a B/Phuket/3073/2013-like virus (Yamagata lineage)

Source: www.nextflu.org

Challenges

- Explanations for varied vaccine effectiveness estimates across seasons
  - Methodological issues of studies
  - Variations in population immunity due to different vaccination strategies and prior virus circulation history in different regions
- Cross-protection between influenza B lineages

Acknowledgments

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