



Global Influenza
Hospital Surveillance
Network

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ANNUAL MEETING, 19-20 OCTOBER 2020

GIHSN 2019-2020: RESULTS BY SITE

All Sites



Foundation for
Influenza
Epidemiology

Sous l'égide de

Fondation
de
France



RESULTS OF THE GIHSN PROJECT- INFLUENZA SEASON 2019/20
IN VOJVODINA PROVINCE, SERBIA

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Institute of Public Health of Vojvodina, Serbia



**Foundation for
Influenza
Epidemiology**

VOJVODINA PROVINCE, SERBIA (INFLUENZA SEASON 2019/20)

INSTITUTE OF PUBLIC HEALTH OF VOJVODINA

Patients included = **1136**

LCI patients = **500**
(**44% of included**)

Number of sequenced
samples = **36 (7,2% of LCI+)**

Site presentation

Influenza surveillance in the season 2019/20 was carried out in cooperation of the Institute of Public Health of Vojvodina (IPHV) and five tertiary care (study) hospitals:

1. Institute of Pulmonary Diseases of Vojvodina
2. Institute for Health Care of Children and Youth of Vojvodina
3. Clinic for Infectious Diseases of the Clinical Center of Vojvodina
4. Clinic for internal Diseases of the Clinical Center of Vojvodina
5. Emergency Hospital of the Clinical Center of Vojvodina



- Study hospitals (total capacity of 1000 hospital beds including 350 pediatric and 93 ICU beds)
- All hospitals situated in the city of Novi Sad (Capitol of Vojvodina Province).
- Total catchment area equal to the population of Vojvodina (≈2 million inhabitants; 27% of Serbian population).

Results

- The 2019/20 influenza season in Vojvodina was characterized by **strong domination of influenza A virus (≈80% of all positives)**.
- Influenza AH1N1pdm09 and AH3N2 co-circulated (**AH3N2 48%; AH1N1 38%; A untyped 14%**)
- Influenza B accounted for 17.0% (84/500) of all influenza confirmed cases overall.
- B/Victoria-like virus was confirmed in all influenza B positives.
- Fatal outcome was recorded in 6.4% (32/500) of LCI+ patients (influenza A detected in all cases)
- Influenza season lasted from week 49, 2019 to week 12, 2020.
- The epidemic lasted from week 4 to week 6, 2020 and ended in mid-February.
- Testing by real-time RT PCR tests for typing of influenza A and B viruses, and subtyping of influenza A H1N1, H3N2, H1N1pdm09, H5N1, H7 viruses and subtyping of influenza B (B/Yamagata and B/Victoria) was performed. Multiplex RT-PCR was in use.

Results/influenza season 2019/20

- Overall 49 samples ($\approx 10\%$ of LCI cases) were sent to the National Influenza Center in Lyon, France, for sequencing using GHSN capacities. Overall 36 samples were sequenced.

Some characteristics of sampled patients

Gender distribution (n=36)	Male (n=17;47%)	Female (n=19;53%)	Total (n=36;100%)	
Age distribution per age groups and gender	0-<5 n=3 (8,3%) 5-<18 n=2 (5.5%) 18-<45 n=3 (8,3%) 45-<65 n=4 (11.1%) 65-<80 n=5 (13.9%) +80 n=0 (0.0%)	0-<5 n=0 (0.0%) 5-<18 n=2(5.5%) 18-<45 n=4 (11,1%) 45-<65 n=6 (16.7%) 65-<80 n=5 (13.9%) >80 n=2 (5.6%)	0-<5 n=3 (8.3%) 5-<18 n=4(11,1%) 18-<45 n=7(19.4%) 45-<65 n=10(27.8%) 65-<80 n=10(27.8%) >80 n=2(5.6%)	
Virus distribution&evolution	AH3N2 n=14 (39%); AH1N1 n=14(39%); B/Victoria n=8 (22%) ORV confirmed in 5,6% of all sequenced GHSN patients.	0-<5 n=3 (B/Victoria n=2; AH3N2 n=1) 5-<18 n=4 (B/Victoria n=2; AH3N2 n=2) 18-<45 n=7 (AH1N1 n=4; B/Victoria n=2;AH3N2 n=1) 45-<65 n=10 (AH1N1 n=6; AH3N2 n=4) 65-<80 n=10 (AH1N1 n=4; AH3N2 n=5, B/Victoria n=1) +80 n=2 (AH3N2 n=1; B/Victoria n=1)	December 2019 (weeks 49 and 51): B/Victoria (n=3) January 2020 (weeks 1-5) B/Victoria(n=5) AH1N1 (n=13); AH3N2 (n=10) February 2020 (week 6); AH3N2 (n=4);AH1N1 (n=1)	
Characteristics of sequenced patients	Fatality rate (n=4/36; 11,1%); Influenza A was primary cause of death in 3 out of 4 patients (age of deceased patients >70 years, all unvaccinated and with chronic conditions) Only one out of 36 patients was vaccinated against influenza (and with favorable outcome); Chronic conditions were present in 28 out of 36 sequenced patients; Overall 7 patients were admitted to ICU and 6 were mechanically ventilated;			



ROMANIA

National Institute of Infectious Diseases "Prof. Dr. Matei Balș", Bucharest, Romania



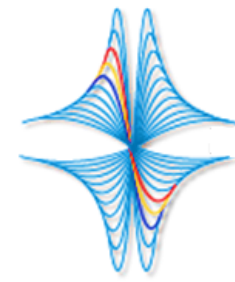
**Foundation for
Influenza
Epidemiology**

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ROMANIA



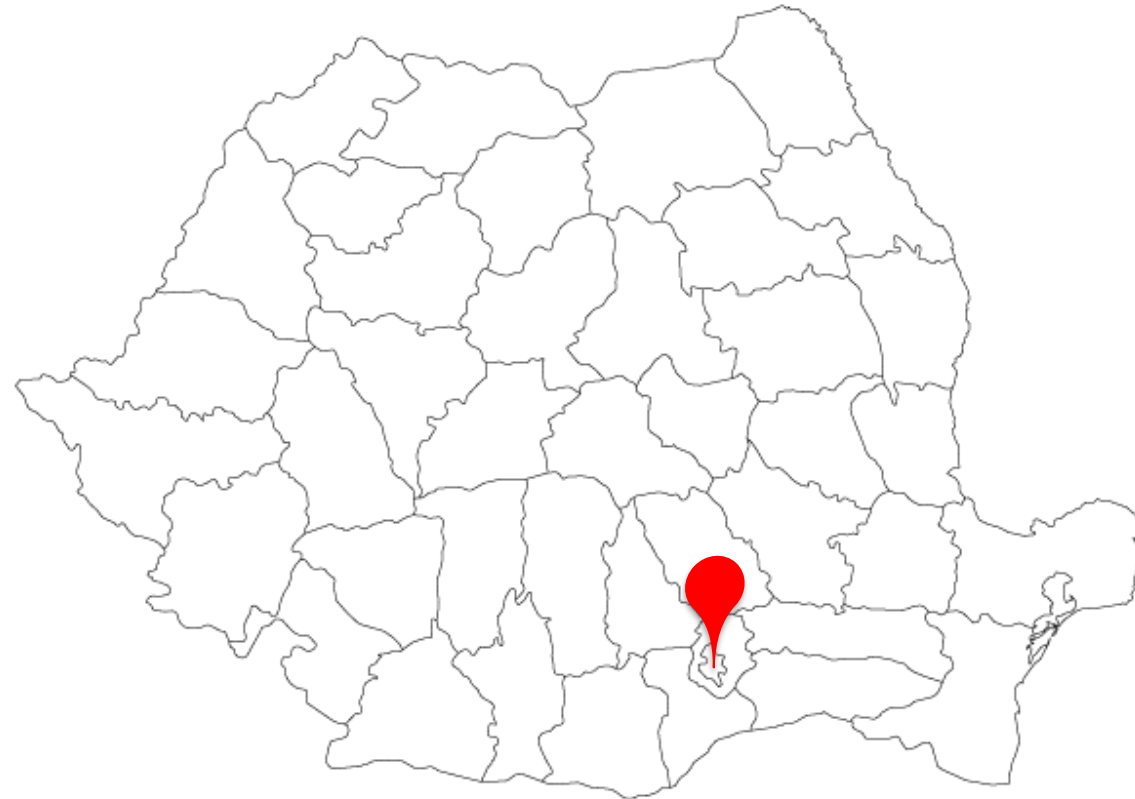
NATIONAL INSTITUTE
OF INFECTIOUS DISEASES
"PROF. DR. MATEI BALȘ"
Bucharest, Romania

965 included

484 (50.2%) positive for influenza

67 influenza strains were sequenced
(Whole Genome Sequencing)

National Institute of Infectious Diseases
"Prof. Dr. Matei Balș"
Bucharest, Romania

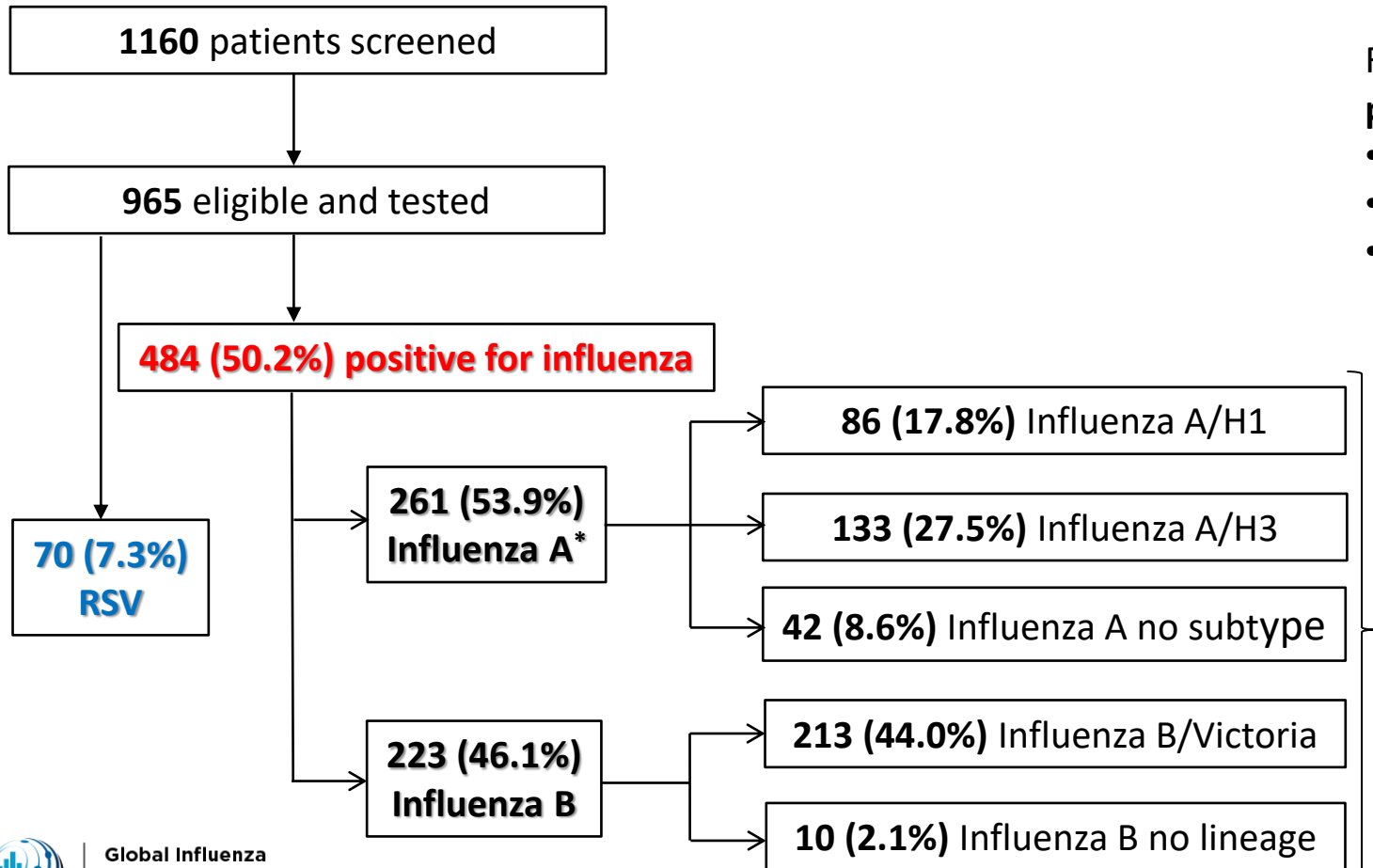


ROMANIA

11 Nov.
2019

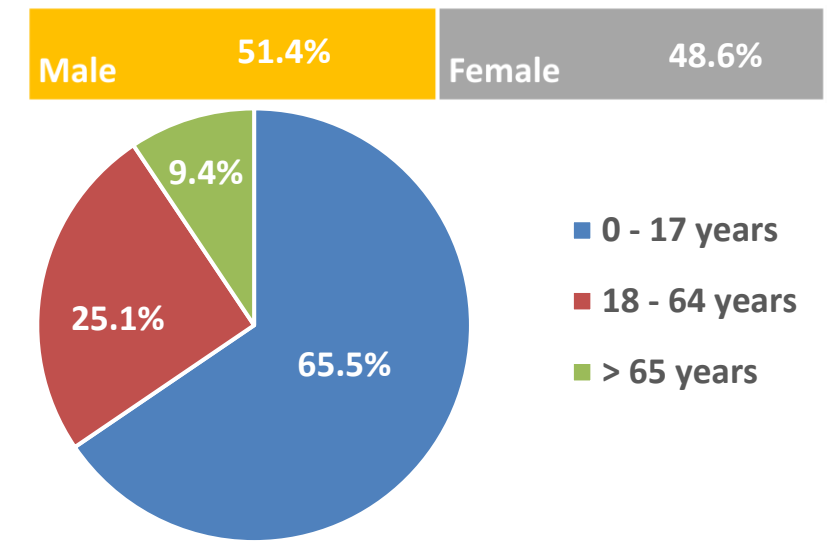
22 Mar.
2020

NIID "Prof. Dr. Matei Balș"
COVID-only first line hospital



From March 22, to April 30, 2020, we identified **10 patients** with influenza (4 children, 6 adults):

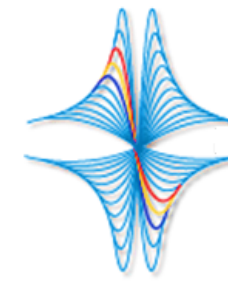
- **one coinfection:** SARS-CoV-2 + influenza B (ARDS)
- **5 influenza A** (3 – A/H3, 1 – A/H1, 1 – A no subtype)
- **4 influenza B** no lineage



* In 2 cases a coinfection, influenza A+B, was identified; 9 cases coinfections influenza + RSV

ROMANIA

Conclusions



NATIONAL INSTITUTE
OF INFECTIOUS DISEASES
"PROF. DR. MATEI BALȘ"
Bucharest, Romania

- In the 2019/20 season there was a co-circulation of influenza A (53.9%) and B (46.1%) viruses, compared to the previous season when there was an exclusive circulation of influenza A viruses (99.8%)
- There was a high rate of positivity among children who required hospitalization (65.5%). This is higher than in the 2018/19 season, when 52.5% of hospitalized patients positive for the influenza were children.
- A percentage of 4.2% of influenza positive patients required hospitalization in the ICU and the case fatality rate among patients with laboratory confirmed influenza was 0.6%.
- We sequenced 67 influenza strains from the entire influenza season.
- Due to the occurrence of the COVID-19 pandemic, our institute has been mandated by the authorities as a COVID-only first line hospital since the end of March 2020.





RUSSIA-ST PETERSBURG

Daria DANILENKO



**Foundation for
Influenza
Epidemiology**

SAINT PETERSBURG, RUSSIA

SMORODINTSEV RESEARCH INSTITUTE OF INFLUENZA

#included = **3988**
1595 adults+2393
children

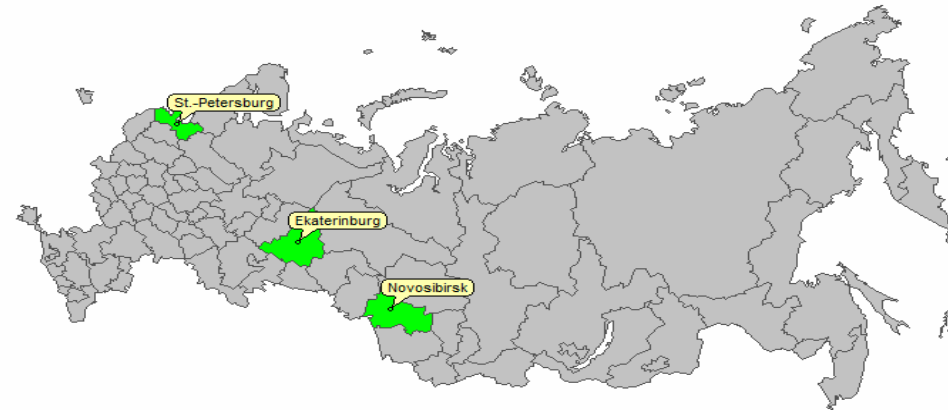
#LCI = **1419**
579 adults +840
children

#sequenced
= **400**
samples

Site presentation

Smorodintsev Research Institute of Influenza (Coordinating Centre):

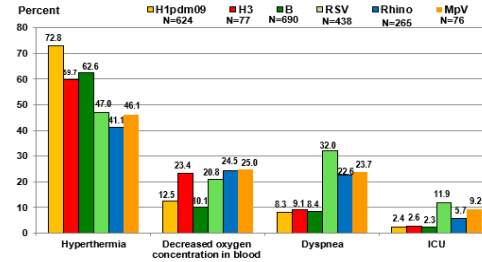
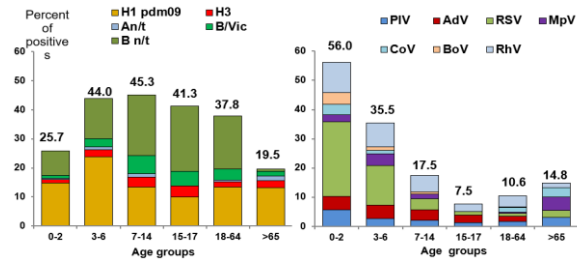
1. St. Petersburg RII (4 hospitals) 2662 patients, 881 (33,1%) LCI cases;
2. Ekaterinburg Research Institute of Viral Infections (2 hospitals): 327 patients, 74 (22,5%) LCI cases;
3. Novosibirsk, Federal Research Centre for Fundamental and Translational Medicine (3 hospitals): 999 patients, 464 (46,4%) LCI cases.



ILI patients of all age groups were selected by criteria of inclusion/exclusion in study. All procedures were performed according to GHSN standardized protocol, Version 7.4, 2019 and Core Questionnaires. The study was approved by the Local Ethics Committees and conducted in accordance with the principles of GCP. Clinical specimens were tested by rRT-PCR using “AmpliSens” kits (Interlabservice, Russia) for influenza A&B as well as for subtyping of H1N1pdm09, H3N2 and ORV viruses. NGS was performed using Nextera XT sample preparation kit, Illumina MiSeq and MinION. All sequences were submitted to Epiflu GISAID database.

Results

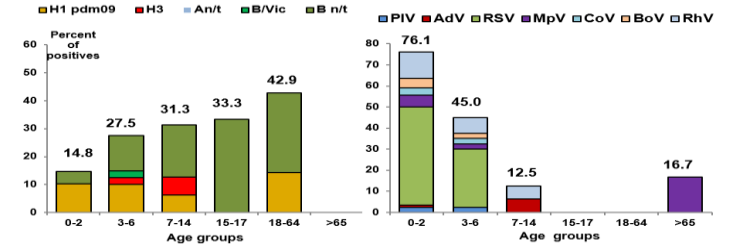
Influenza and other ARI in hospitalized patients during the season 2019-2020



Influenza viruses were most often detected in children aged 3-17 (up to 45.3%). RSV dominated in young children ≤2 yrs. RhV, CoV and PIV viruses affected more pediatric patients.

Hyperthermia was the most often sign in influenza patients. Hypoxia, dyspnea and decreased oxygen concentration in blood were more regular in RSV, rhinovirus and metapneumovirus infections.

ILI and ARI in ICU patients, 2019-2020



160 (4,0%) patients were placed in ICU; 147 patients were children, 60% were ≤2 yrs. RSV >> A(H1N1)pdm09 = B = RhV

IVE against admission of patients with influenza (by age groups and virus subtypes).

Virus subtype detected	Vaccinated		Not vaccinated		Odds ratio	IVE
	Flu (+)	Flu (-)	Flu (+)	Flu (-)		
A(H1N1)pdm09	12	167	436	2183	0,36	64,0%
A(H3N2)	4	175	59	2560	0,99	0,8%
B/Vic	16	163	90	2529	2,76	No

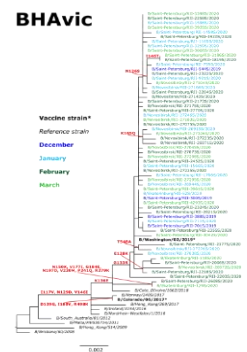
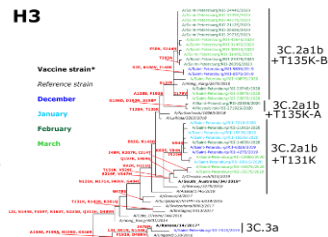
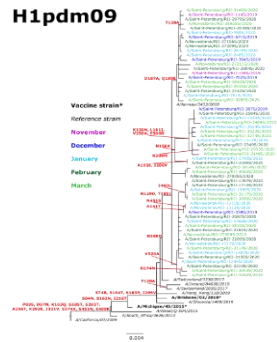
* Note: Age group 0-2 years was excluded from analysis

Age group (years)	Number of vaccinated patients	Vaccinated #		Not vaccinated #		Odds ratio	IVE adjusted
		Flu (+)	Flu (-)	Flu (+)	Flu (-)		
3-6	19	6	13	312	390	0,58	42,0%
7-14	37	8	29	176	193	0,30	70,0%
15-17	12	3	9	30	38	0,42	58,0%
Subtotal children	68	17	51	518	621	0,40	60,0%
Adults	111	37	74	541	939	0,87	13,0%
Total*	179	54	125	1059	1560	0,64	36,0%

Pregnancy as a risk factor

Index	Pregnant woman	Not pregnant (adjusted control)
Number of women	260	92
Influenza positives:	131 (50,4%)	47 (51,1%)
A(H1N1)pdm09	40 (15,4%)	8 (8,7%)
A(H3N2)	3 (1,2%)	0
B/Vic	7 (2,7%)	4 (4,3%)
ORI agents positives:	22 (8,5%)	15 (16,3%)
Parainfluenza virus	3 (1,2%)	4 (4,3%)
Adenovirus	3 (1,2%)	0
RSV	2 (0,8%)	5 (5,4%)
Metapneumovirus	1 (0,4%)	0
Corona	3 (1,2%)	0
Rhinovirus	9 (3,5%)	6 (6,5%)
Co-morbidity cases:	33 (12,7%)	11 (12,0%)
Co-morbidity cases + FLU	18 (6,9%)	4 (4,3%)
Co-morbidity cases + ORI	3 (1,2%)	0

Acknowledgements: We would like to thank Cedric Mahé, Maria Morizet and all GIHSN and OpenHealth Co. staff for close cooperation. We thank all the doctors participating in the study for their dedicated work. We thank the Foundation for Influenza Epidemiology for catalytic financial support of our investigation.



Influenza A(H1N1)pdm09 viruses: subgroup 6B.1A5A, antigenically similar to the vaccine strain A/Brisbane/02/2018. Of the 41 influenza A(H3N2) viruses, only 4 strains belonged to clade 3C.3a (vaccine strain A/Kansas/14/2017). All other viruses analyzed (90.2%) belonged to clade 3C.2a 1b of different genetic clusters. All influenza B viruses were of Victoria lineage belonged to the genetic group 1A-Δ3 and were similar to B/Washington/02/2019.

Conclusion & Challenges

Conclusions:

1. Influenza A(H1N1)pdm09 and B/Victoria viruses were the most commonly detected in hospitalized patients in 2019-2020 season, influenza A(H3N2) virus was detected relatively less often;
2. Sequencing of influenza A(H1N1)pdm09 showed that most of them belonged to the clade 6B.1A5A , A(H3N2) to the clade 3C.2a.1b, influenza B/Victoria to the clade 1A (del 162-164);
3. There were no significant differences in age and sex distribution among hospitalized patients in total with positive influenza testing;
4. Patients with co-morbidities accounted for 245 of the 1419 influenza associated hospitalizations;
5. The young children were more likely to be admitted to the ICU mostly due to influenza and RSV infection;
6. Duration of influenza virus detection in hospitalized patients was estimated as 18 weeks;
7. RSV was the dominating agent of admission in young patients throughout the epidemic;
8. CVD, COPD, asthma, neuromuscular diseases and diabetes were the main co-morbidity in patients with influenza;
9. Vaccine effectiveness was the highest against influenza A(H1N1)pdm09 virus (64.0%) however decreased against influenza A(H3N2) and B infection due to mismatch of circulated in Russia viruses and vaccine strains.

Challenges:

Full genome analysis of influenza viruses using NGS data must be continued for recognition of pathogenicity determinants of influenza viruses;

IVE needs to be improved, however this objective is complicated now due to heterogeneity of circulated viruses by genetic and antigenic properties;

Investigations on COVID-19 in hospitalized patients along with NGS sequencing of SARS-CoV-2 should be enhanced.



RUSSIA-MOSCOW

Svetlana Trushakova



**Foundation for
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Epidemiology**

Moscow, Russia

FSBI National Center of Epidemiology and Microbiology by N.F.Gamaleya
Hospitals for Infectious Diseases #1 and #2

#included = 950 (ILI)/126 (SARS-Cov-2)

#LCI = 341 (36%)
#SARS-2 = 65 (52%)

#sequenced = 61

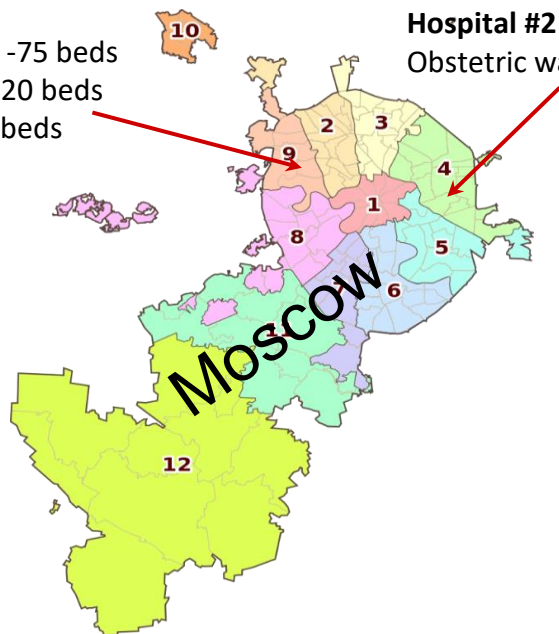
Site presentation

Hospital #1

Children ward - 75 beds
Adult ward - 120 beds
ICU ward - 12 beds

Hospital #2

Obstetric ward - 80 beds



- Study conducted in Moscow
- Population – 12 678 079 (2020)
- Usual influenza seasonality – from December to May
- 2 Hospitals: Hospital#1 for Infectious Diseases
 - Hospital#2 for Infectious Diseases
- Patients – Moscow residents and guests from 0 to 90 y.o.

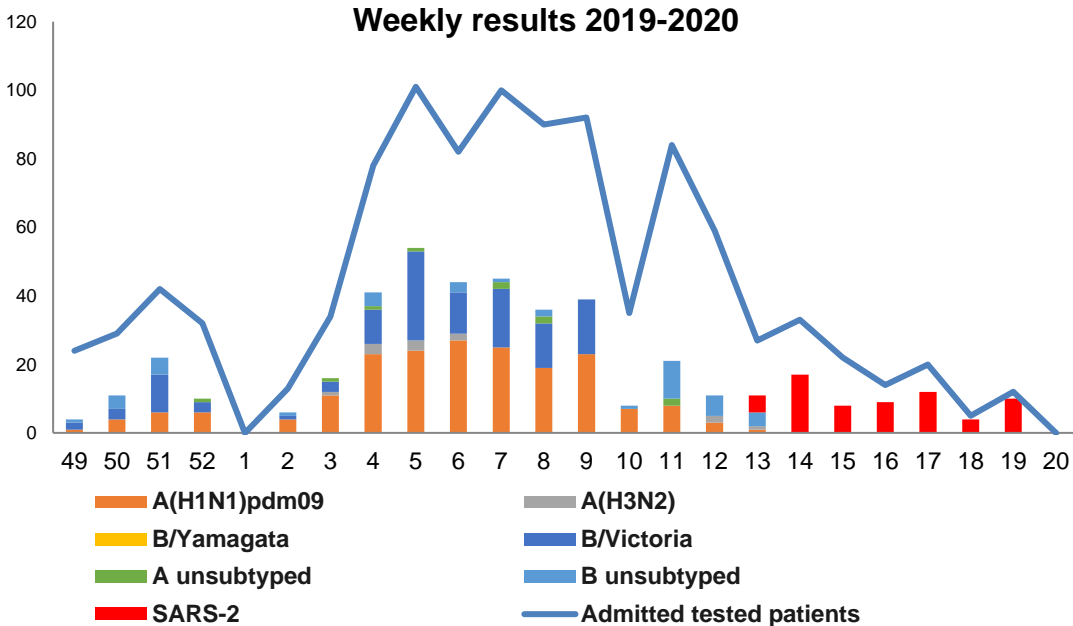


Moscow, Russia

FSBI National Center of Epidemiology and Microbiology by N.F.Gamaleya
Hospitals for Infectious Diseases #1 and #2

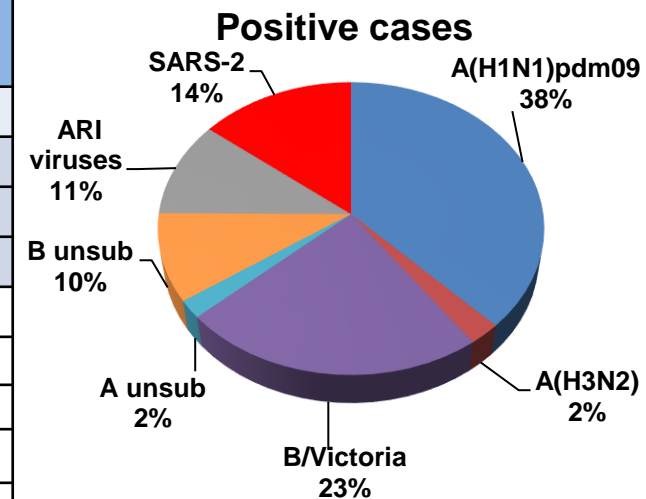
Results

Weekly results 2019-2020



Data are publishing in **Voprosy virusologii volume 6**. Dmitry K. Lvov, Elena I. Burtseva, Lyudmila V. Kolobuchina et al. PECULIARITIES OF THE INFLUENZA AND ARVI VIRUSES DURING EPIDEMIC SEASON 2019-2020 ON SOME REGIONS OF RUSSIA.

Characteristics	Influenza N =341 (%)	SARS-Cov-2 N =65 (%)
Adults (15-64)	193 (56.6)	46 (70.8)
Pregnants	49 (63)	No data
Elderly 65+	19 (5.6)	19 (29.3)
Comorbidities	79 (23.2)	46 (70.8)
ICU treatment	1 (0.3)	3 (4.6)
Mechanical ventilation	0	1 (1.5)
Support oxygen in adults	19 (5.6)	10 (15.4)
Bronchitis	149 (43.7)	7 (10.8)
Pneumonia	50 (14.7)	56 (86.2)
Death	0	5 (7.7)



Genetic group		
A(H1N1)pdm09 N= 30	A(H3N2) N=3	B/Victoria N=28
6b1.A/183P-5a (28) 6b1.A/187A (1) 6b1.A/156K (1)	3c3A (3C2A1b137F)	V1A.3 (del162-164)



Conclusion & Challenges

Conclusions:

- Influenza season lasted from 49 to 13 weeks of 2020, followed by SARS-Cov-2 pandemic
- Influenza A(H1N1)pdm09 and Influenza B/Victoria-like strains co-circulated during epidemic season
- Influenza A(H3N2) viruses were detected in sporadic cases
- There was no B/Yamagata-like virus activity
- Pregnant women were at high risk to be hospitalized due to influenza infection
- Low number of vaccinated patients (63% of them were influenza positive due to A(H1N1)pdm09 infection mainly)
- SARS-Cov-2 appeared after peaked influenza virus circulation with following substitution of influenza
- Cases of SARS-Cov-2 were more severe compare with influenza cases

Challenges:

- Limited access to obstetric ward due to renovation - small number of pregnant cases
- Long winter holidays – reduced number of enroll patients
- Difficulties with collecting clinical data for assessment severity - missing data
- Work with on-line platform (inconvenience with searching patients and missing data, presenting data)



UKRAINE

Presenter: Nataliia Teteriuk



**Foundation for
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Epidemiology**

UKRAINE

L.V.Gromashevsky Institute of Epidemiology & Infectious Diseases NAMS of Ukraine

#included = 75

#LCI = 68

#sequenced = 36

Study conducted in 5 hospitals in 3 cities of Ukraine

- Kyiv – 3 hospitals
- Dnipro -1 hospital
- Khmelnytsky – 1 hospital

1210 adult and pediatrics in-patient beds



RESULTS -UKRAINE

Name of virus/subtype	Mutation in HA	Description of the meaning of the mutation
A/Kyiv/327/2019 (H1N1)pdm	K147N, N173K	<p>-Mutation HA K147N already occurred 463 times (5.63% of all samples with HA sequence) in 6 countries. A mutation at the position equivalent to HA 147 has been reported in the literature to be related to antigenic drift.</p> <p>- Mutation HA N173K already occurred 48 times (0.58% of all samples with HA sequence) in 7 countries. A mutation at the position equivalent to HA 173 has been reported in the literature to be related to host specificity shift.</p>
A/Kyiv/21/2020 (H1N1)pdm	K147N, N173K	
A/Kyiv/31/2020 (H1N1)pdm	K147N	
A/Kyiv/69/2020 (H1N1)pdm	K147N, N173K	
A/Kyiv/116/2020 (H3N2)	K176T	Mutation HA K176T creates a new potential N-glycosylation site which may also affect antigenic and other properties of this strain
B/Kyiv 277/2019 (Victoria lin)	S209N	Mutation HA S209N creates a new potential N-glycosylation site which may also affect antigenic and other properties of this strain

None mutation were distinguished in all sequenced viruses which association with resistance to neuraminidase inhibitors



Conclusion & Challenges

Conclusions:

- Influenza A was the most commonly detected virus among hospitalized patients with ILI symptoms during 2019/2020 season in Ukraine
- Influenza A(H1N1)pdm subtype virus was dominant (96%) among all flu viruses. 53% were belong to A/Brisbane/02/2018 and 47% - to A/Michigan/45/2015
- 3% of all flu viruses were belong to B/Victoria lineage – strain B/Washington/02/2019 with 3 deletion in 162-164 position of HA
- Influenza A(H3N2) subtype was in minor in this season – only 1%. It belong to strain A/South Australia/34/2019
- There was no difference in age and sex distribution among hospitalized subjects with positive influenza testing
- Subjects with co-morbidities accounted for 7 from 68 influenza-associated hospitalizations
- None vaccination persons were occurred among hospitalized subjects

Challenges and Future Directions:

- The influenza surveillance was affected after implementation of COVID-19 lockdown in March 2020
- The whole genome sequencing of influenza viruses will be preferable in future influenza season



LEBANON

Nour Youssef, MD

Senior Pediatrics Infectious Diseases Fellow (PGYVI)

CIDR – AUBMC -Lebanon



**Foundation for
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Epidemiology**

LEBANON

AMERICAN UNIVERSITY
OF BEIRUT MEDICAL CENTER

#included = **1079**

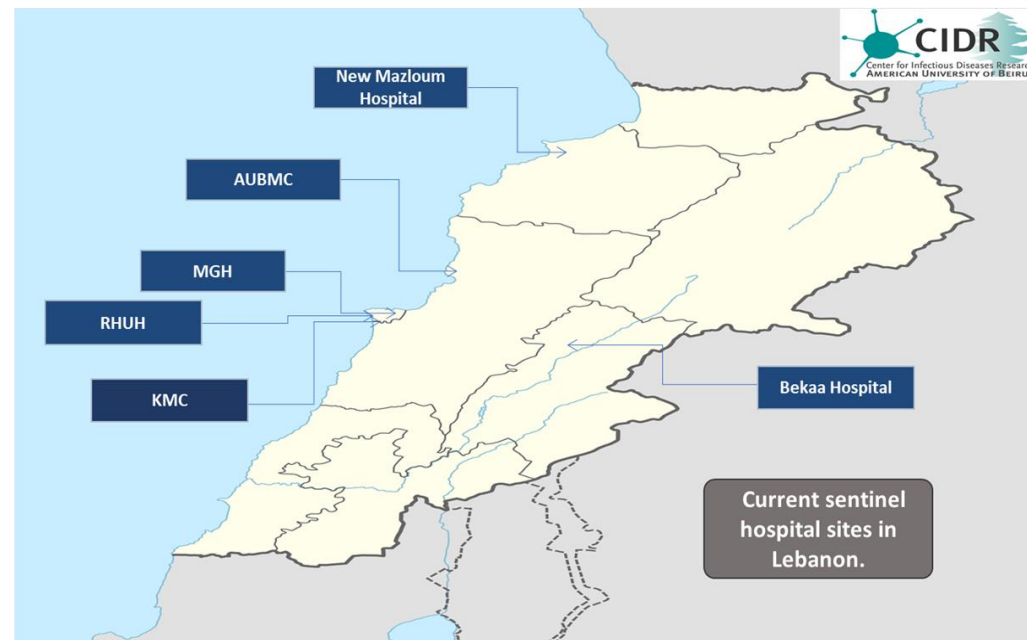
#LCI = 262

#sequenced = **87**

Site presentation

- Study conducted in 6 hospitals in four provinces of Lebanon:
 - Beirut
 - Mount Lebanon
 - Beqaa
 - North

→ 1320 adult and pediatrics in-patient beds.



Results

- Out of a total of **62062** subjects screened, **2232** subjects met the predefined set of conditions for admission diagnosis of whom **1079** subjects were enrolled during the season 2019-2020.
- A total of **262 influenza cases** (Influenza A: 152, Influenza B:110, Influenza C:1) ,**94 RSV cases** and **20 Mixed viruses** cases (2 A/H1N1 + B/VIC; 5 A/H1N1 + RSV; 5 A/NT + RSV; 1 A/NT + B/VIC; 1 A/NT + FLU C; 5 B/VIC + RSV; 1 B/NT + RSV) were detected in all sites.
- The virus subtypes were distributed as follows: RSV (9%), B/Victoria (8.2%), A/H1N1 (7.8%), A/NT (6%), B/NT (2.3%), Mixed viruses (1.9%), A/H3N2 (0.7%) and FLU C (0.1%).
- The peak of the reported cases was in January.
- The subjects aged < 5 years showed the highest number of cases of LCI, RSV and mixed viruses.
- 80.6% of subjects with positive flu aged < 5 years presented with fever and 66.3% with lethargy. Whereas, 58.5% of those aged >60 years presented with lethargy and 22% required O2 supplementation.
- 65% of subjects with positive flu aged ≥ 65 years were admitted to ICU (p-value <0.001) and 14.3% of those aged 65-<80 years needed mechanical ventilation (p-value=0.001).

Conclusion & Challenges

Conclusion:

- Influenza A virus was the most commonly detected virus among hospitalized patients with ILI symptoms during 2020 in Lebanon.
- Influenza A/H1N1 was the prevalent subtype among the flu A subtypes.
- There was a large fraction of A viruses that could not be subtyped (they could be either H1N1 or H3N2 but had mutations in their respective primers).
- There was an important percentage of subjects with Influenza B/Victoria during this season whereas 0 cases of Influenza B/Yamagata was found.
- The subjects aged < 5 years showed the highest number of cases of LCI, RSV and mixed viruses.
- There was no difference in the length of hospital stay between the subjects with positive influenza virus and those with negative influenza virus.
- The elderly were more likely to be admitted to the ICU and to receive mechanical ventilation.



TURKEY

Dr. Mine DURUSU TANRIOVER



**Foundation for
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TURKEY

TURKISH SOCIETY OF INTERNAL MEDICINE

#included = **273**

#LCI = **84**

#sequenced = **29**

Site presentation

- Study was conducted in Ankara, capital city of Turkey with 5.5 million inhabitants
- 6 hospitals participated, whose total bed capacity constituted 20.4% of all inpatient bed capacity in Ankara
- 428 adult and pediatric beds were screened
- Samples were tested for influenza A, influenza B and RSV
- LCI samples were sequenced according to the GISAID protocol



Results

Table 1. Patient characteristics and comorbidities

	Number of patients (%)		
	5 years and older	Under 5 years	Total
Included	194 (71.1)	79 (28.9)	273
RT-PCR result			
Influenza positive	61 (72.6)	23 (27.4)	84
RSV positive	13 (31.0)	29 (69.0)	42

Table 2. The vaccination rates over the years

	Number of patients (%)		
	5 years and older n= 194	Under 5 years n= 79	Total n= 273
Flu vaccine 2019-20	23 (11.9)	3 (3.8)	26 (9.5)
Flu vaccine 14 days before ILI symptoms	17 (8.8)	2 (2.5)	19 (7.0)
Flu vaccine 2018-19	34 (17.5)	2 (2.5)	36 (13.2)

Outcomes (data of 269 patients available):

- 37 patients (13.8%) required ICU admission
- 18 patients (6.7%) died during hospital episode

The sequencing analysis done among 29 samples as below:

HA, NS, NA segments 29/29 samples

NP, MP segments 28/29 samples

PB1, PB2 segments 24/29 samples

PA segment 22/29 samples

*Bioinformatic analysis for phylogenetic tree and variant analyses are still on going.

* The sequenced samples yielded either A(H1N1pdm09) or B(Victoria)

Conclusion & Challenges

- ❑ In 2019-20 GIHSN study, the surveillance was done and patients were enrolled in the shadow of the pandemic COVID-19 in Turkey.
- ❑ The influenza positivity was 30.8% with most of the samples being positive for influenza A virus.
- ❑ The overall influenza vaccination rate was extremely low.
- ❑ Outcomes were worse among those patients over 65 years of age.
- ❑ The genetic sequencing data of 29 samples were submitted to the GISAID platform.

Conclusion & Challenges

- ❑ The first COVID-19 case in Turkey was diagnosed on March 11th, 2020.
- ❑ The organization of the hospitals and patient flow algorithms have dramatically changed. Staff who run the surveillance and do the swabbing were recruited for COVID-19 wards and emergency department. The wards that were screened were either closed or converted to COVID-19 wards in some hospitals, in some others patients with ILI was hospitalized in the isolation wards which were not among the wards to be screened.
- ❑ There was no sample between March 16th and April 13th, 2020 due to the COVID-19 pandemic. As new patients were enrolled after April 13th, there were no new cases of influenza or RSV, probably due to the early end of the influenza season because of the COVID-19 mitigation measures and lockdowns that declined the healthcare seeking behavior of patients with ILI.

Conclusion & Challenges

- ❑ We had several challenges about the sequencing:
 - ❑ We couldn't manage to get the sequencing protocol in a timely manner, which in turn had negative effects in the buy-in of lab materials and in the time period left to set up the system.
 - ❑ Some of the samples especially from children had low levels of viral RNA which in turn led to the failures for sequencing.
 - ❑ As only 29 of the 84 positive influenza samples could be sequenced, we couldn't detect the influenza subtype in the remaining 55 samples.
 - ❑ Segments aside from HA, NS and NA couldn't be sequenced in all of the samples. The primers used for each segment should be reviewed in the light of recent data on mutations and updated primers should be used, if necessary, in upcoming seasons.



Global Influenza
Hospital Surveillance
Network

www.gihsn.org



GIHSN 2019-2020: INDIA

ANNUAL MEETING, 19-20 OCTOBER 2020

Parvaiz A Koul



Foundation for
Influenza
Epidemiology

Sous l'égide de

Fondation
de
France

INDIA

SHER-I-KASHMIR INSTITUTE OF MEDICAL SCIENCES

#included = **1331**

#LCI = **371**

#sequenced* = **110**

Site présentation

INDIA



- The study was conducted in Sher-i-kashmir institute of medical sciences, Srinagar, India.
- A total of 1331 hospitalized patients were recruited for 2019-20 season



* At Lyon, France



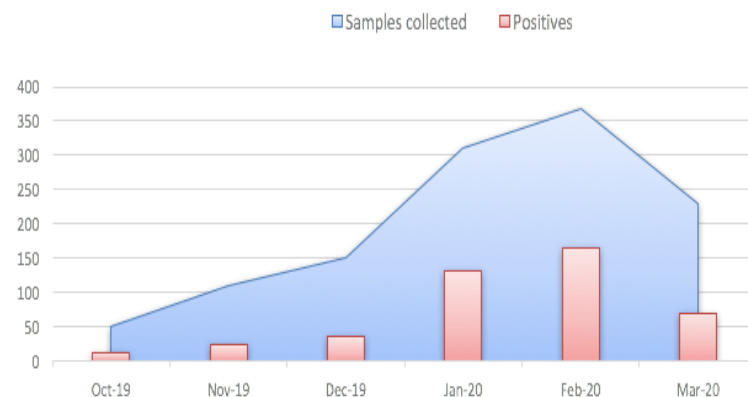
Global Influenza
Hospital Surveillance
Network

Results

Age group wise sample collection in SARI

Age Group	SARI
≤ 5 Year	112
5 years or older	1219
Total	1331

Graphical representation of monthly positivity among the SARI patients



Positivity of viruses in hospitalized patients for season 2019-20

Virus	< 5 Year	≥ 5 Year	Total
	SARI	SARI	
A/H1N1 pdm	15	160	175
A/H3N2	01	14	15
Influenza B	14	167	181
Adenovirus	05	11	16
RSV	9	16	25
Rhino	16	101	117
Co-infection	02	17	19
Positive	58	452	510
Total Enrolled	112	1219	1331
% Positives	51.7%	37%	38.3%

Conclusion & Challenges

1. Demography: From October 2019 to March 2020, a total of 3600 patients with suspected respiratory infections were assessed. Of these, 1331 met the ECDC- case definition FOR SARI and were included in the study.

2. Results:

Of the **1331 recruited cases**, 636 (47.7%) were male. Children aged less than 5 years accounted for 8.4% (n=112) of the eligible patients.

Of the 1331 samples tested, **510 were positive** for any virus including 491 single infection and 17 Co-infection.

Influenza was the predominant virus detected in 371 (27.8%) [B/Victoria= 185; A/H1N1=175; A/H3N2=42] cases followed by Rhino virus (n=171), RSV (n=25) and Adeno (n=16).

Patients without co-morbidities accounted for about 66.7% of the admissions whereas 34.5% had ≥ 2 morbidities.

The vaccination rate among the patients was found to be 7.5% (n=100).

A total of **52 deaths** were observed during the study period in patients positive for one or more respiratory pathogens which included A/H1N1(n=13), A/H3N2 (n=01), influenza B (n=18), Adeno (n=03), Rhino (n=18), co-infection (n=1).

Overall Adjusted Vaccine effectiveness was 13% among those aged > 5 yrs. (only 14 of the predominant circulating strain B/Victoria were positive)

3. Challenges: The study was concluded a little early on 25 March 2020 due to the COVID 19 pandemic.



NEPAL

Kedar Prasad Baral, Nepal



**Foundation for
Influenza
Epidemiology**

Total sample = 141

PCR positive = 32

Sequenced = 00

INTRODUCTION: Process and Progress

1. This is the first time PAHS is partnering with GIHSN.
2. We were a bit late to start surveillance due to preparatory work including ethical approval.
3. PAHS finalized MTA and sent to Lyon but have not received signed copy yet. We understood that this is due to lockdown and suspended flights.
5. Therefore, we were unable to send RNA for sequencing and all the samples stored at -80 degree freezer.

Process and Progress

5. For sequencing, will decide next step in consultation with GIHSN Secretariat and Lab for those PCR positive extracted RNA.
6. We started surveillance activities on third week of Jan.
7. Lockdown declared on March 24 and lasted for four months which disrupted regular surveillance activities.
8. Influenza season in Nepal is similar to tropics and circulate round the year with two peaks – Winter and Summer.
9. We have slowly resumed surveillance activities with difficulty.

Sites and Method

There are two sites:

- Hetauda Hospital:** Located in the Capital of Bagmati Province. Primarily hospital serves very active and busy town and surrounding areas of suburb and rural areas. This is a 100 bedded hospital which will be upgraded to 300 beds by the end of next year. Daily out-patient visitors are between 300-500 patients per day depending on the seasons.



Map of Nepal

Sites and Method

2. Manmohan Memorial Hospital:

- This is a 25 bedded community hospital.
- Located in the south-west of Kathmandu valley.
- It provides service to rural, disadvantaged and poor population.
- Daily out-patient visitors are around 50 per day and available beds are 25.

Sites and Method

Method and Participants:

- All admitted patients, both children and adults, who presented with respiratory illness were screened.
- Administered questionnaires to those who met case definition.
- Samples taken and stored locally and transported to lab on weekly basis.
- PCR test done at the lab in Kathmandu and back-up aliquot and extracted RNA appropriately stored.

Results

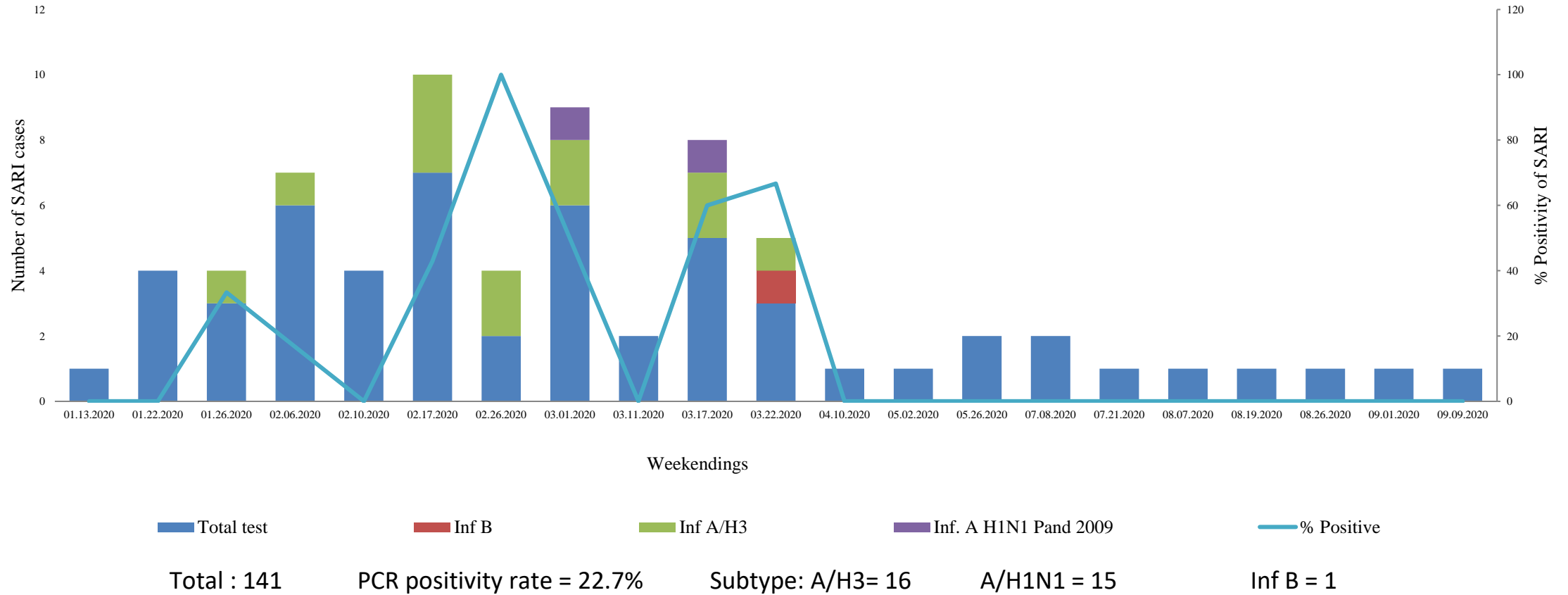


Fig 1: Weekly influenza epidemiological surveillance and positivity rate

Conclusion & Challenges

Conclusion:

1. Both of these sites are newly established.
2. COVID-19 disrupted influenza surveillance, therefore samples were 141 only.
3. Preparatory work took some time and delayed in starting activities.
4. Influenza positive rate out of total sampled found 22.7% and subtypes comprised of A/H3 - 16, A/H1N1 - 15 and influenza B only 1.
5. Our past surveillance data reported that B is more prevalent in summer than winter.

Conclusion & Challenges

Challenges

1. For the last several weeks, major cities and towns experiencing high level of COVID-19 transmission.
2. Lockdown and COVID-19 burden disrupted regular socio-economic life and health services.
3. Influenza surveillance platform is being used for COVID-19 activities.
4. Surveillance activities disrupted from 3rd week of March and a level is continue today.
5. There are competing priorities due to ongoing pandemic.
6. Regular collection and transport, storage and testing of samples is a big challenge as COVID-19 has occupied space and time.
7. Unless we integrate COVID-19 with influenza surveillance, this challenge will remain at least for several months.



Tao ZHANG
CHINA-FUDAN



**Foundation for
Influenza
Epidemiology**

CHINA-FUDAN

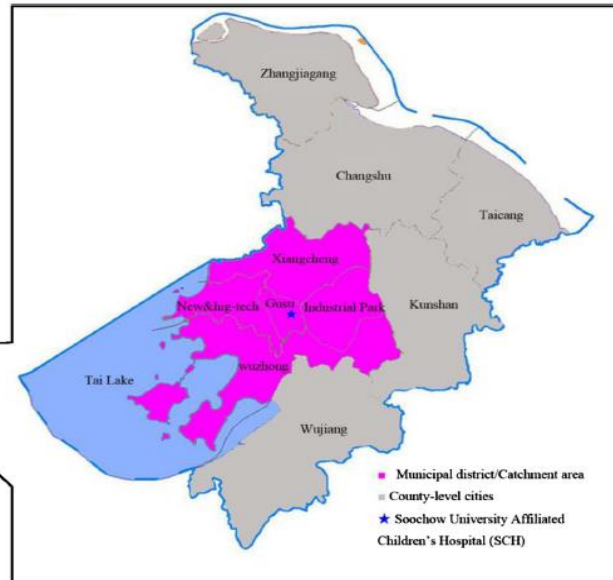
Suzhou University Affiliated Children's Hospital

#included = 1067

#LCI = 52

#sequenced = 0

Site presentation



Suzhou city

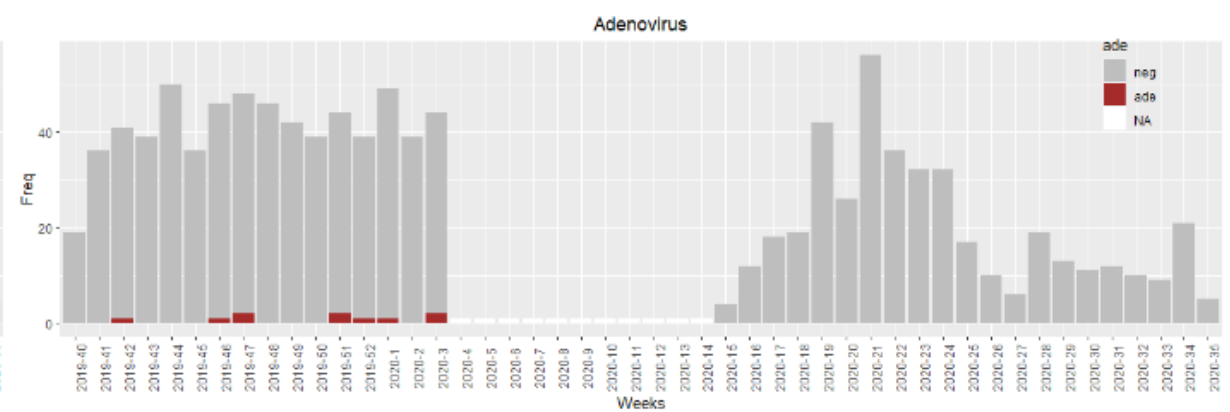
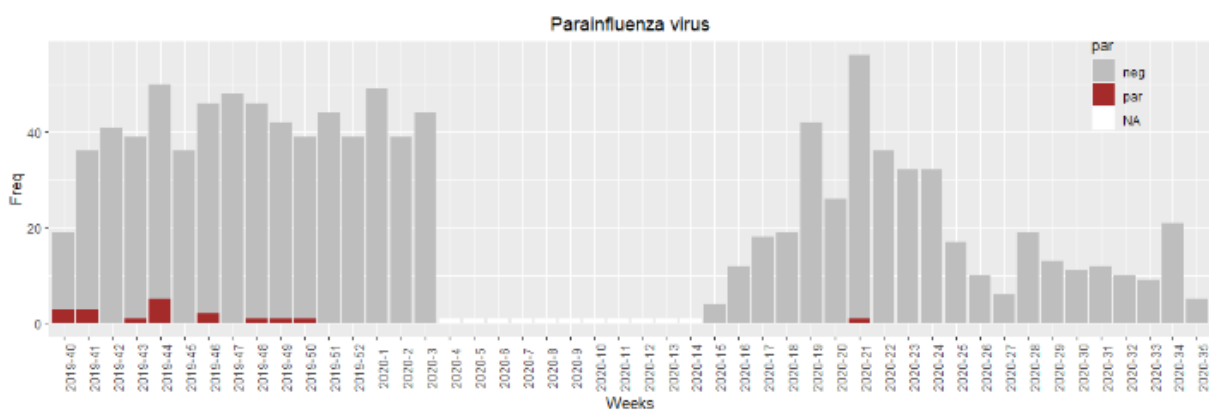
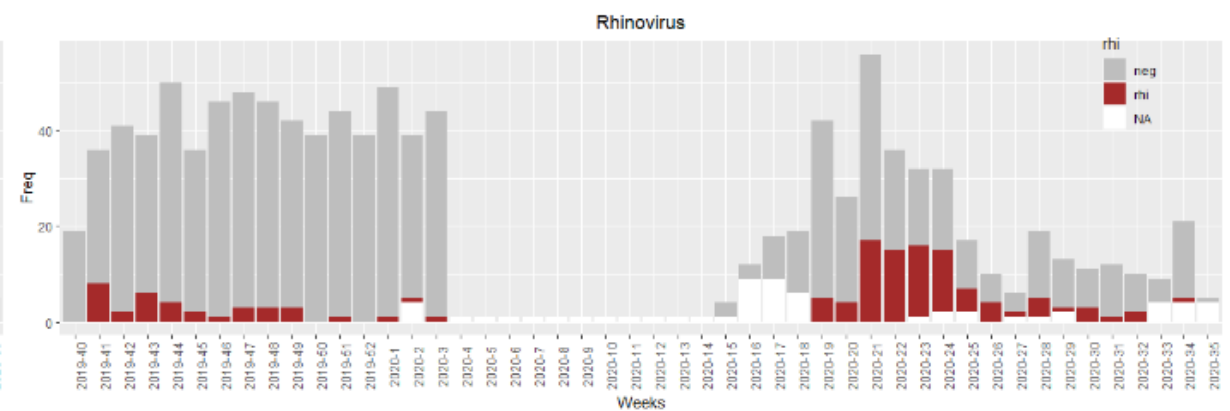
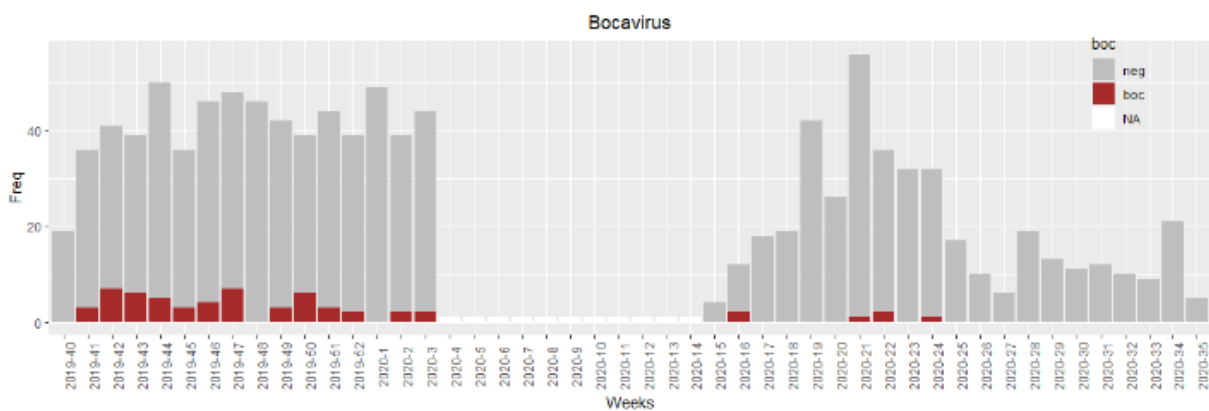
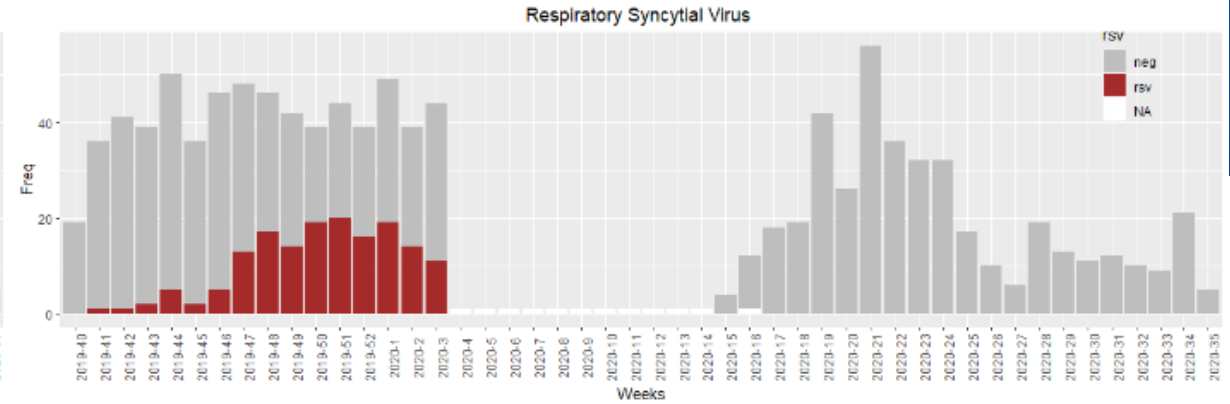
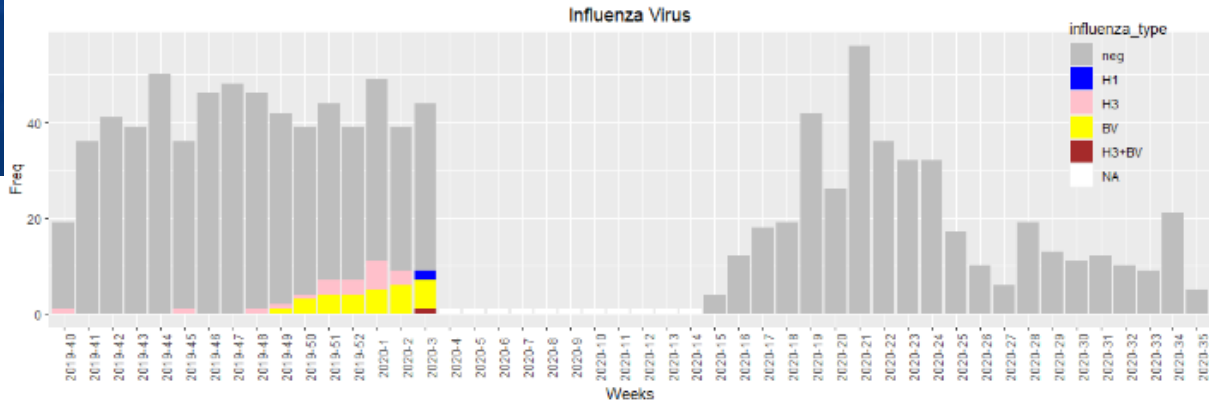
- Middle of the Yangtze Delta
- Borders Shanghai (east), Tai Lake (west), Zhejiang Province (south) and the Yangtze River (north)
- Covers 8,848 km².

Suzhou University Affiliated Children's Hospital

- ◆ The unique children hospital in Suzhou city (tertiary hospital, two sites)
- ◆ Over 1158 wards beds
- ◆ In 2016, a total of 1.9 million outpatient visits including emergency visits and about 45,000 hospitalizations were recorded
- ◆ Since 2011, an enhanced surveillance on severe acute respiratory infection was carried out at SCH. These provided a strong support for this GIHSN project.

	Total	Flu positive	Flu negative	P-value
Gender				
female	429 (40.2%)	23 (44.2%)	406 (40.0%)	0.56
male	638 (59.8%)	29 (55.8%)	609 (60.0%)	
Age				
6months	308 (28.9%)	9 (17.3%)	299 (29.5%)	0.12
~1year	132 (12.4%)	5 (9.6%)	127 (12.5%)	
~2years	176 (16.5%)	7 (13.5%)	169 (16.7%)	
~5years	265 (24.8%)	17 (32.7%)	248 (24.4%)	
~14years	186 (17.4%)	14 (26.9%)	172 (16.9%)	
Low Birth Weight				
yes	67 (6.3%)	3 (5.8%)	64 (6.3%)	1
no	1,000 (93.7%)	49 (94.2%)	951 (93.7%)	
Breat Feeding				
yes	655 (61.4%)	31 (59.6%)	624 (61.5%)	0.77
no	412 (38.6%)	21 (40.4%)	391 (38.5%)	
Consultation in pre-3months				
yes	242 (22.7%)	16 (30.8%)	226 (22.3%)	0.17
no	825 (77.3%)	36 (69.2%)	789 (77.7%)	
Fever				
yes	586 (54.9%)	41 (78.8%)	545 (53.7%)	< 0.001
no	481 (45.1%)	11 (21.2%)	470 (46.3%)	

- A total of 1086 patients admitted to the respiratory wards in SCH with symptoms of respiratory infection were carefully screened. And 1067 patients were included into data analysis.
- When comparing the characteristics of influenza positive and negative cases, there were significant differences across fever ($p < 0.001$).
- As for the gender distribution, breast-feeding, low birth weight, consultation in pre-3 months, the differences were not statistically significant.



Conclusion & Challenges

Conclusions:

- Influenza Bv was the most commonly detected virus among hospitalized children with ARI during 2019 in Suzhou China
- Influenza A/H3N2 circulated equally.
- There were no difference in age, sex, breast feeding, low birth weight and consultation in pre-3 months among hospitalized children with positive and negative influenza testing.
- RSV co-circulated with influenza equally in the 2019 fall-winter season, rhinovirus seems circulated year-around in 2019

Challenges:

We captured limited influenza cases and without sequencing of any influenza virus for the following reasons:

- Late start and low epidemic of influenza in 2019 season
- The impact of pandemic of COVID-19: surveillance and field work halted for several months
- Project regulation become more complicated and NGO registration have not completed yet for this year's activity