



Sentinel Hospital-based Surveillance of Influenza and Respiratory Syncytial Viruses in Patients with Acute Respiratory Illness During 2019, Lebanon

Yolla Youssef^{1,2,3}, Celina Boutros³, Zeina Houry^{1,3}, Sarah Chamseddine^{1,2,3}, Habib Al Kalamouni^{3,4}, Nadia Soudani^{3,4}, Amani Ezzeddine^{3,4}, Ahmad Chmisse³, Magda Haj³, Nour Youssef^{1,2,3}, Aia Assaf Casals², Danielle Fayad², Mireille Lteif², Soha Ghanem⁵, Amal Naous⁵, Rouba Chaker⁶, Imad Shokr⁷, Chantale Lahoud⁷, David Breish⁸, Maria Karam⁹, Hassan Zaraket^{3,4}, Ghassan Dbaibo^{1,2,3}

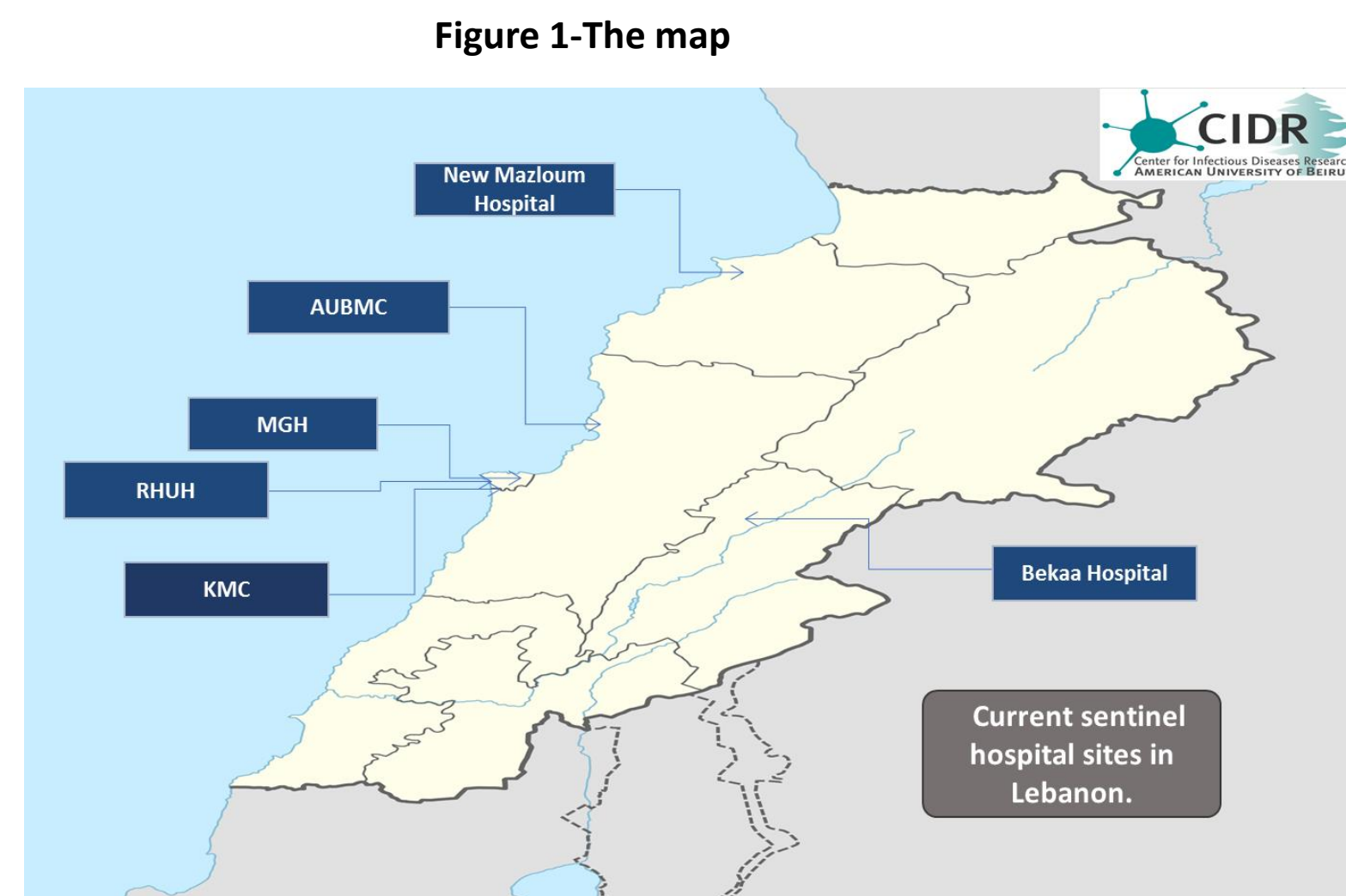
¹ Department of Pediatrics and Adolescent Medicine, American University of Beirut Medical Center, Beirut, Lebanon, ² Division of Pediatric Infectious Diseases, Department of Pediatrics and Adolescent Medicine, Lebanon, ³ Center for Infectious Diseases Research, American University of Beirut Medical Center, Beirut, Lebanon, ⁴ Department of Experimental Pathology, Immunology and Microbiology, Faculty of Medicine, American University of Beirut, Beirut, Lebanon, ⁵ Department of Pediatrics, Makassed General Hospital, ⁶ Department of Pediatrics, New Mazloum Hospital, ⁷ Department of Pediatrics, Rafic Hariri University Hospital, ⁸ Department of Pediatrics, Beqaa Hospital, ⁹ Keserwan Medical Center

Site presentation

- Study conducted in 6 hospitals in four provinces of Lebanon:

- Beirut
- Mount Lebanon
- Beqaa
- North

→ 1320 adult and pediatrics in-patient beds.



Methods

1- Screening of daily admissions

CASE NO	ADMISSION	STAY	BIRTHDATE
440280	Heart failure	3	*****
556840	on top BMT has fever, new	2	*****
603543	syncope	2	*****
650122	febrile neutropenia	2	*****
690863	Heart failure (recurrent)	1	*****
857843	fever dehydration	2	*****
889717	62 yo male with ACS	2	*****
1124503	pneumonia, not respond	3	*****
1320218	post fall, for pain man	1	*****
1637414	COVID-19 hemoptysis	2	*****
1641553	rash, cough, SOB, new me	2	*****

2- Enrollment/data collection

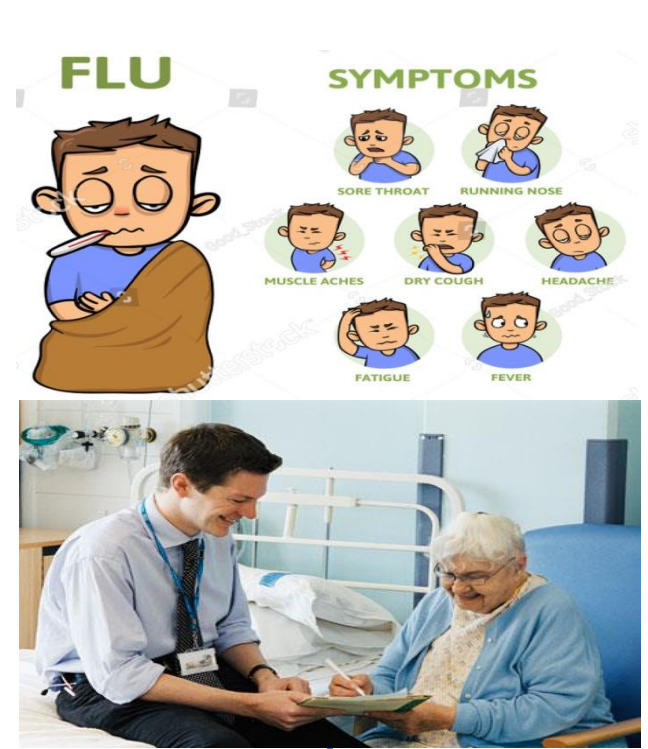


Figure 2- Study Flow Diagram

Recruitment period for 2018-2019 season:

January 3 to May 31, 2019

5- Data analysis



4- Sample Processing



Results

- Out of a total of 47083 subjects screened, 1326 subjects met the predefined set of conditions for admission diagnosis of whom 677 subjects were enrolled.
- A total of 159 influenza cases (Influenza A: 151, Influenza B:6, Influenza C:2), 50 RSV cases and 8 Mixed viruses cases (3 mixed A (A/NT+A/H1N1; A/NT+A/H3N2; A/H1N1+A/H3N2), 1 mixed B (B/NT+B/Victoria), 1 Mixed FLU A/H1N1+FLU C, 3 mixed FLU A and RSV) were detected in all sites during this season

Figure 3- Distribution of subjects who were enrolled by age and sex (N=677)

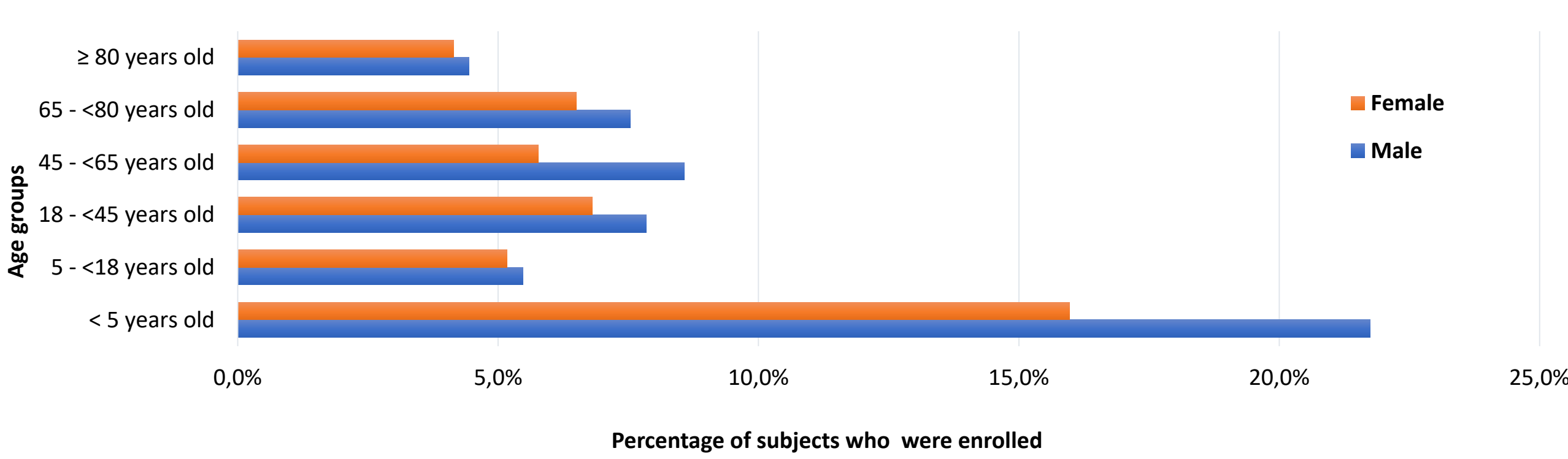


Figure 4- Virus type and subtype monthly distribution from January to May 2019 (n=640)

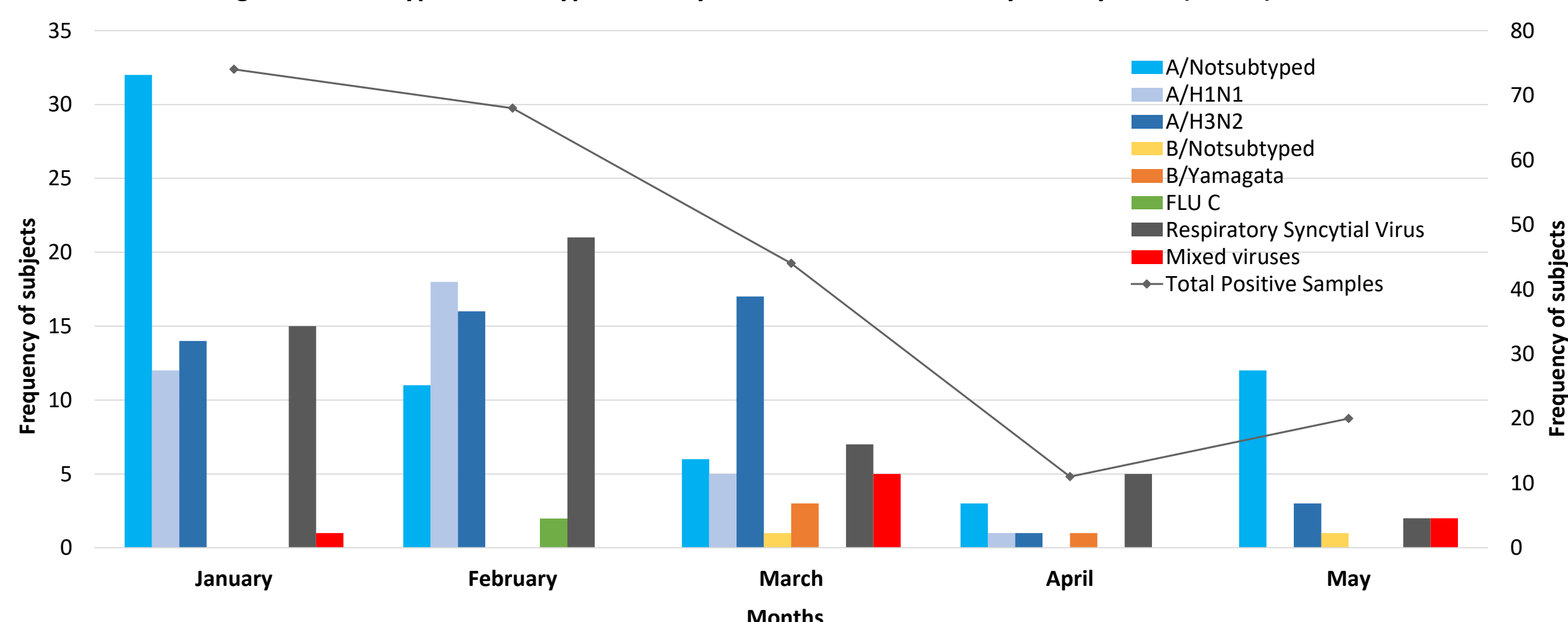
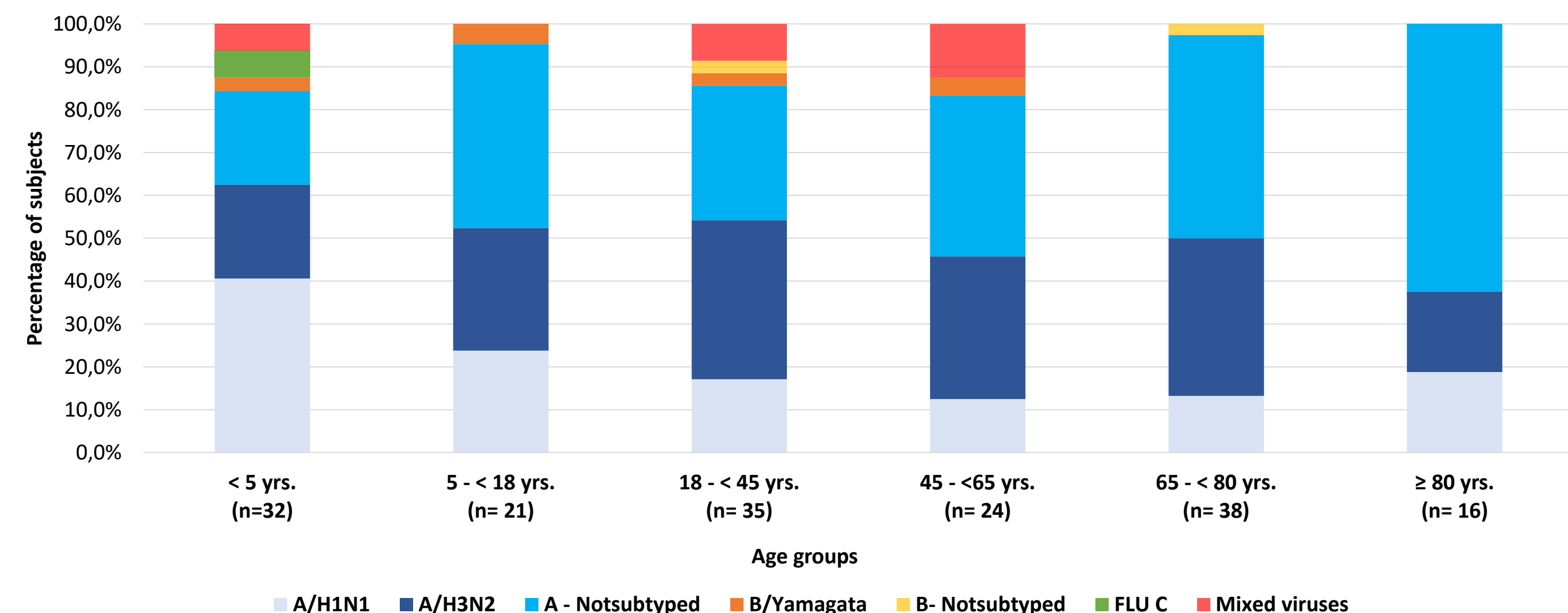


Figure 5- Influenza virus subtypes distribution by age groups (n=166)



- There was no difference in the severity of symptoms upon presentation between Influenza and non-influenza cases among different age groups assessed by the O₂ supplementation requirement, vasopressor support, lethargy and fever.

Results 2/2

Figure 5- Influenza virus status distribution by chronic conditions for subjects according to age

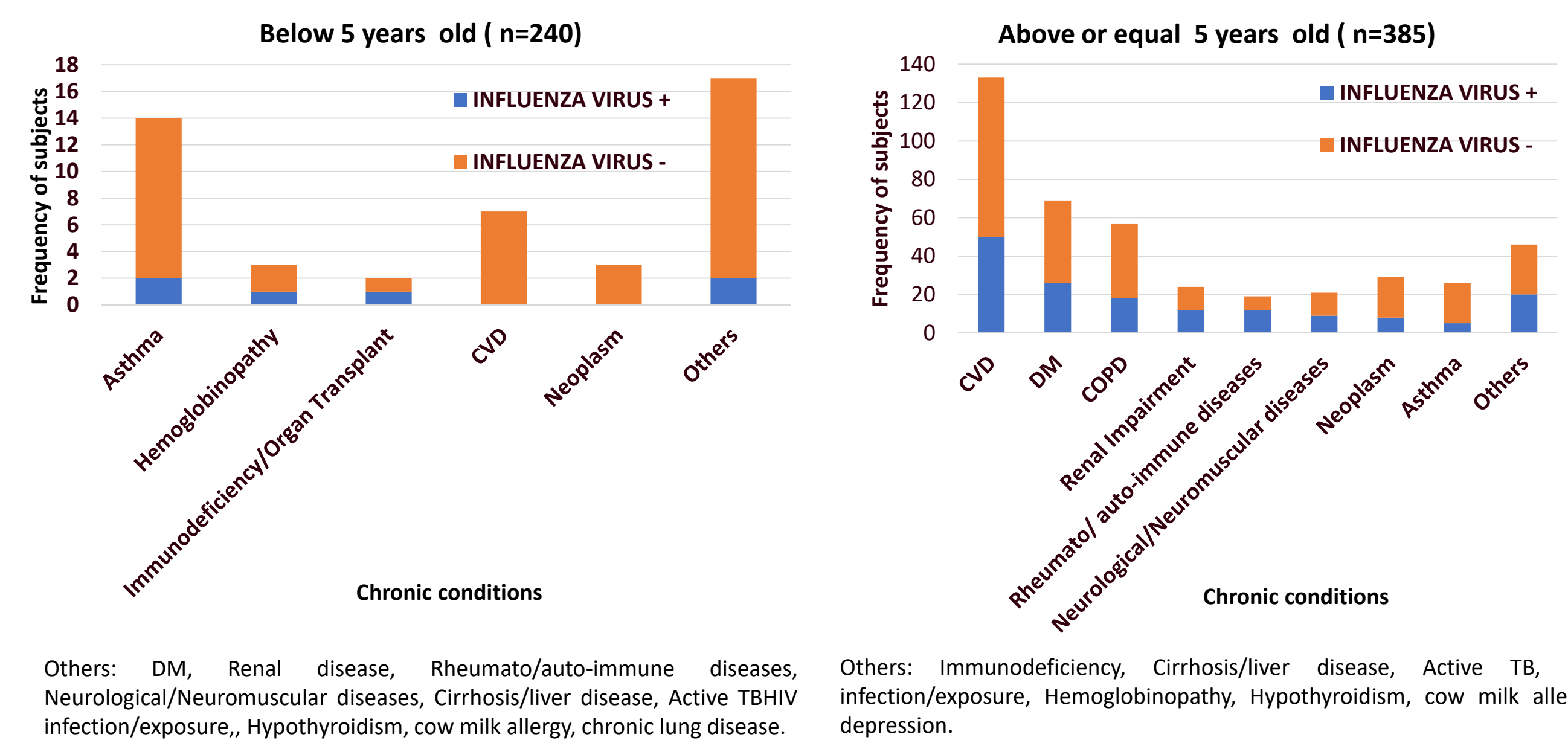


Figure 6- Influenza infection rate among vaccinated (n=15) and unvaccinated (n=220) subjects < 5 years old

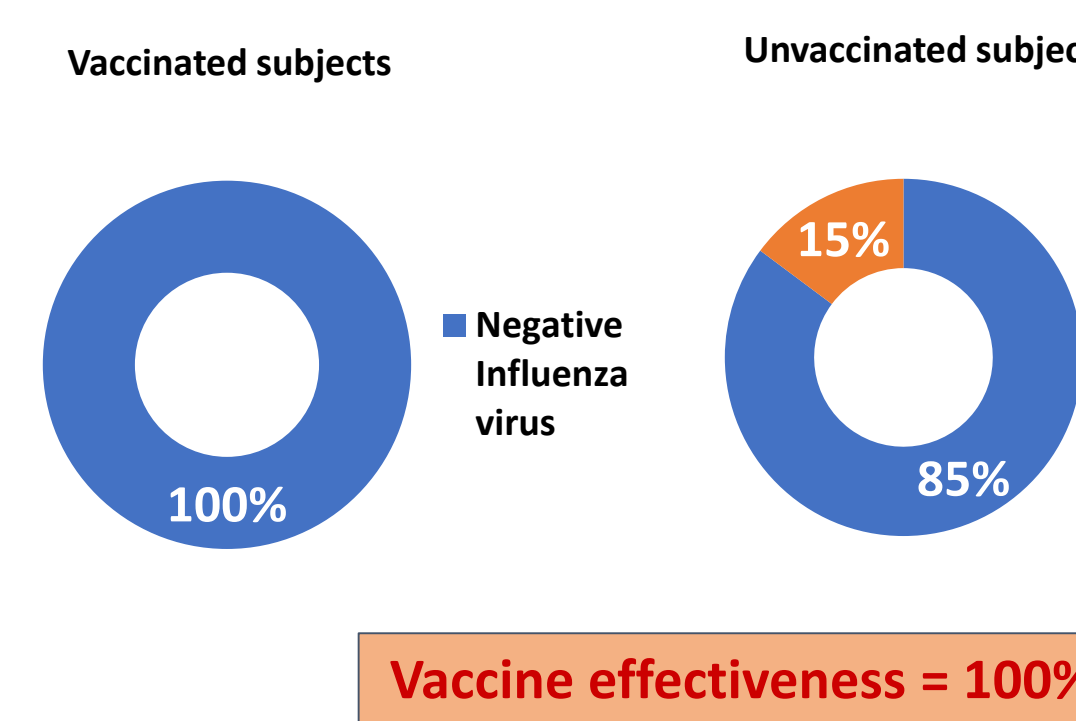
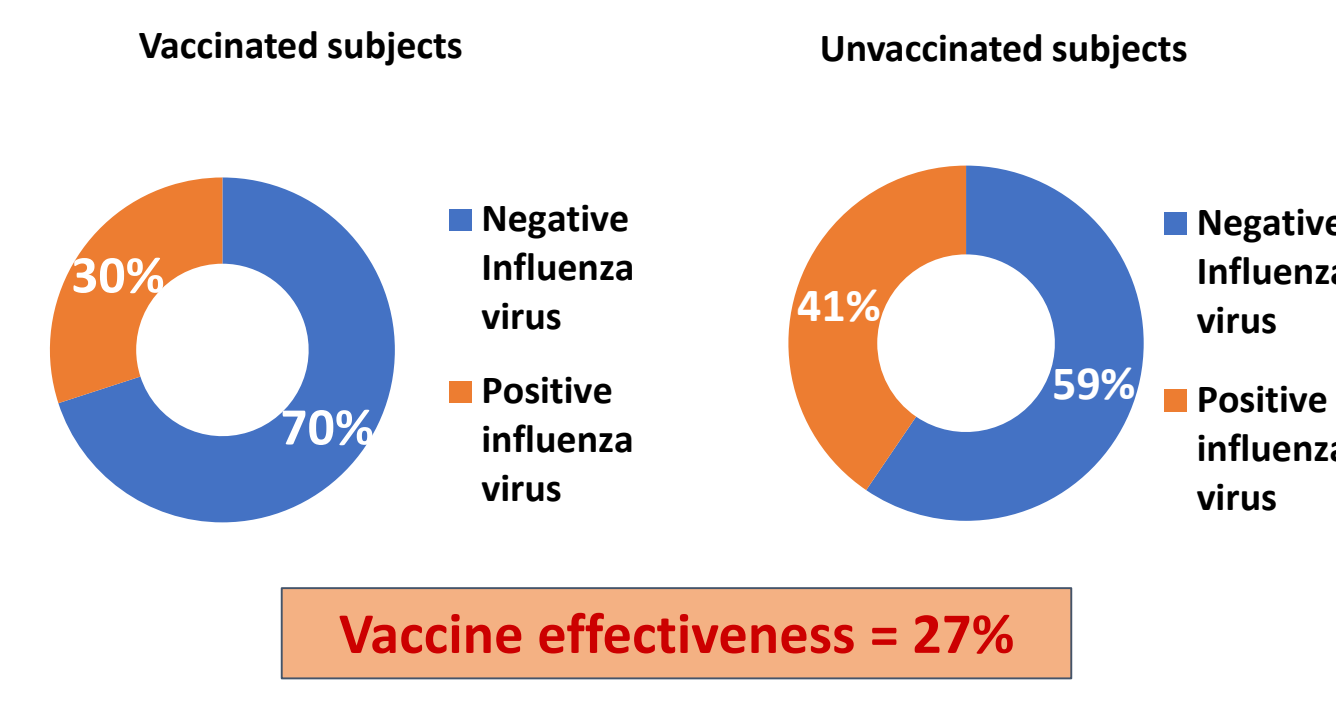


Figure 7- Influenza infection rate among vaccinated (n=10) and unvaccinated (n=9) subjects 65 - < 80 years old



- However, when all age groups were pooled, attack rate among vaccinated subjects was 32.7% as compared to 25.5% among the unvaccinated subjects included in the study.

Table 1- Subjects with positive influenza virus (n=158) distribution by age and severity of illness during hospital stay

Age groups	ICU admission	Mechanical Ventilation	Death
< 5 years old	0.6%	0.0%	0.0%
5- <18 years old	0.0%	0.0%	0.0%
18 - <45 years old	0.6%	0.6%	0.0%
45 - <65 years old	1.3%	0.6%	0.0%
65 - < 80 years old	1.9%	1.3%	0.6%
≥ 80 years old	0.6%	1.9%	0.0%

Conclusions & challenges

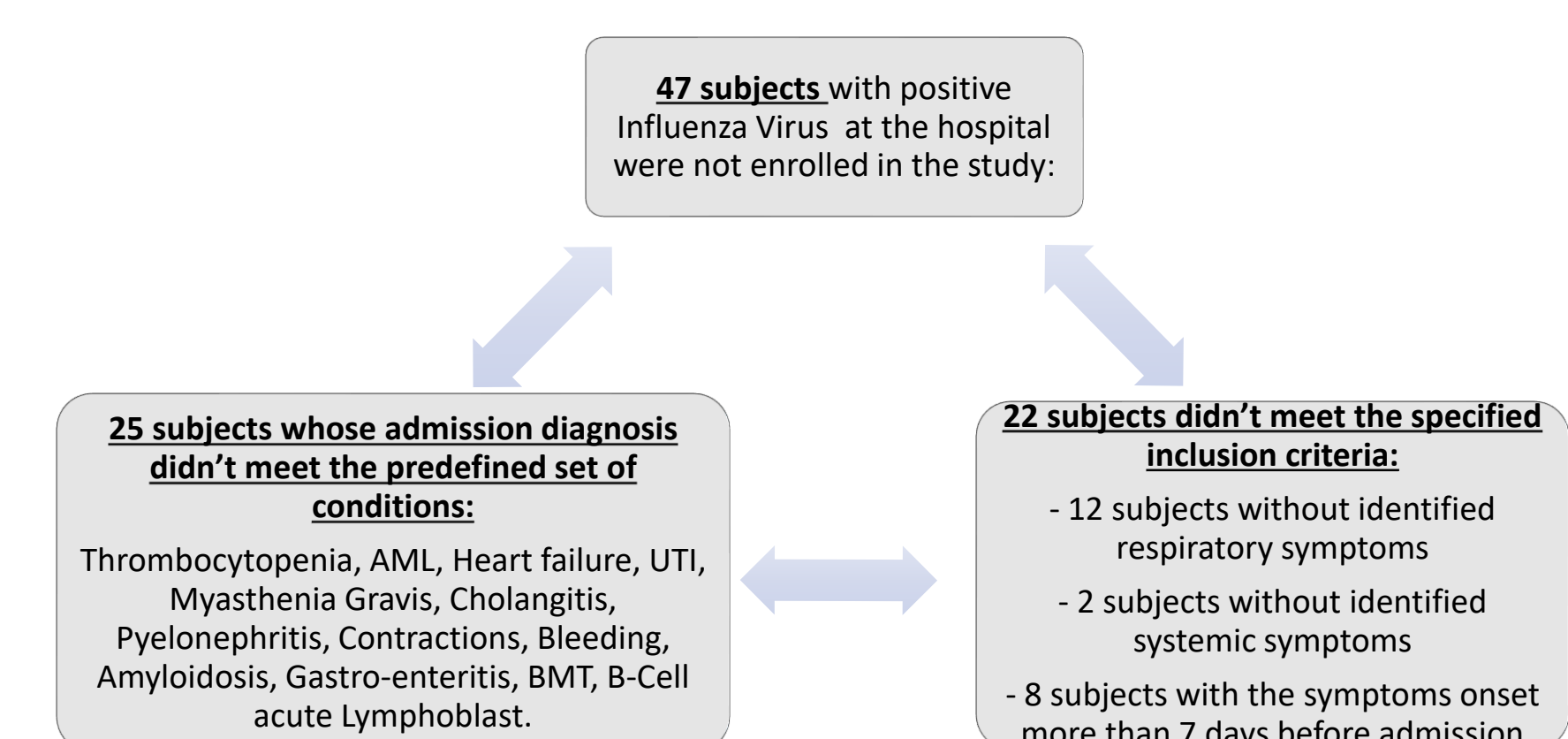
Conclusions:

- Influenza A virus was the most commonly detected virus among hospitalized patients with ILI symptoms during 2019 in Lebanon
- Influenza A/H1N1 and A/H3N2 circulated equally but 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 primer binding sites).
- There was no difference in age and sex distribution among hospitalized subjects with positive influenza testing
- Subjects with co-morbidities accounted for 93 out of the 166 influenza-associated hospitalizations
- The elderly were more likely to be admitted to the ICU and to receive mechanical ventilation
- Vaccine effectiveness was highest among the subjects below 5 years of age, followed by those between 65 and 80 years old.

Challenges and Future Directions:

- During 2019 season we had limited capturing of all the influenza cases for the following reasons:
 - Late start of subjects enrollment → missing cases admitted between Oct-Dec
 - Abiding by the ILI criteria → missing Influenza cases with only respiratory or generalized symptoms
 - Suboptimal close monitoring of screening and data collection process at Non-AUBMC sites.
- At AUBMC, parallel surveillance for influenza was being run by the Infection Control Program, which was reporting its findings to us on a daily basis. We discovered that some influenza positive cases were being missed.

Figure 8- Influenza cases not included in the study at AUBMC ONLY



Contact:

Ghassan Dbaibo M.D., Director, Center for Infectious Diseases Research, Department of Pediatrics and Adolescent Medicine, American University of Beirut Medical Center (AUBMC), Cairo Street, Hamra, Beirut, Lebanon.
Email: gdbaibo@aub.edu.lb

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