



Influenza Surveillance among Patients Hospitalized with Severe Acute Respiratory Illness at Four Hospitals in Kenya

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Background

- Published data have shown a year-round circulation of influenza in Kenya that also results in a substantial burden, especially among children aged less than five years
- Continued surveillance to characterize and quantify the distribution of the circulating influenza viruses, and to estimate the burden of severe influenza disease would help to inform influenza control strategies
- The Kenya Ministry of Health (KMoH) together with the US Centers for Disease Control and Prevention (CDC) and the Kenya Medical Research Institute (KEMRI) conduct surveillance for severe acute respiratory illness (SARI) from eight hospitals
- Here we present data collected from four hospitals in Kenya that are participating in the Global Influenza Hospitalization Surveillance Network (GIHSN)

Methods

- Since January 2018 to date, Kenya has participated as one of the GIHSN sites and contributed data from four hospitals (Figure 1)
- The four sites are among the eight sites for SARI surveillance in Kenya
- The sites were selected to participate in the network due to their unique position as sites where denominator data were available for disease burden estimation
- These sites include;
 - Nakuru County Referral Hospital (CRH)
 - Kakamega CRH
 - Siaya CRH and
 - Marsabit CRH
- At each of the hospitals, surveillance officers identify patients of all ages who;
 - are hospitalized with acute onset (<7 days for GIHSN) of illness
 - with a cough and
 - reported fever or documented temperature $\geq 38^{\circ}\text{C}$
- Patients who provide verbal consent are enrolled and nasal and throat swabs are collected for influenza testing at the National Influenza Center in Nairobi using real-time RT-PCR

Figure 1: Location of GIHSN sites in Kenya

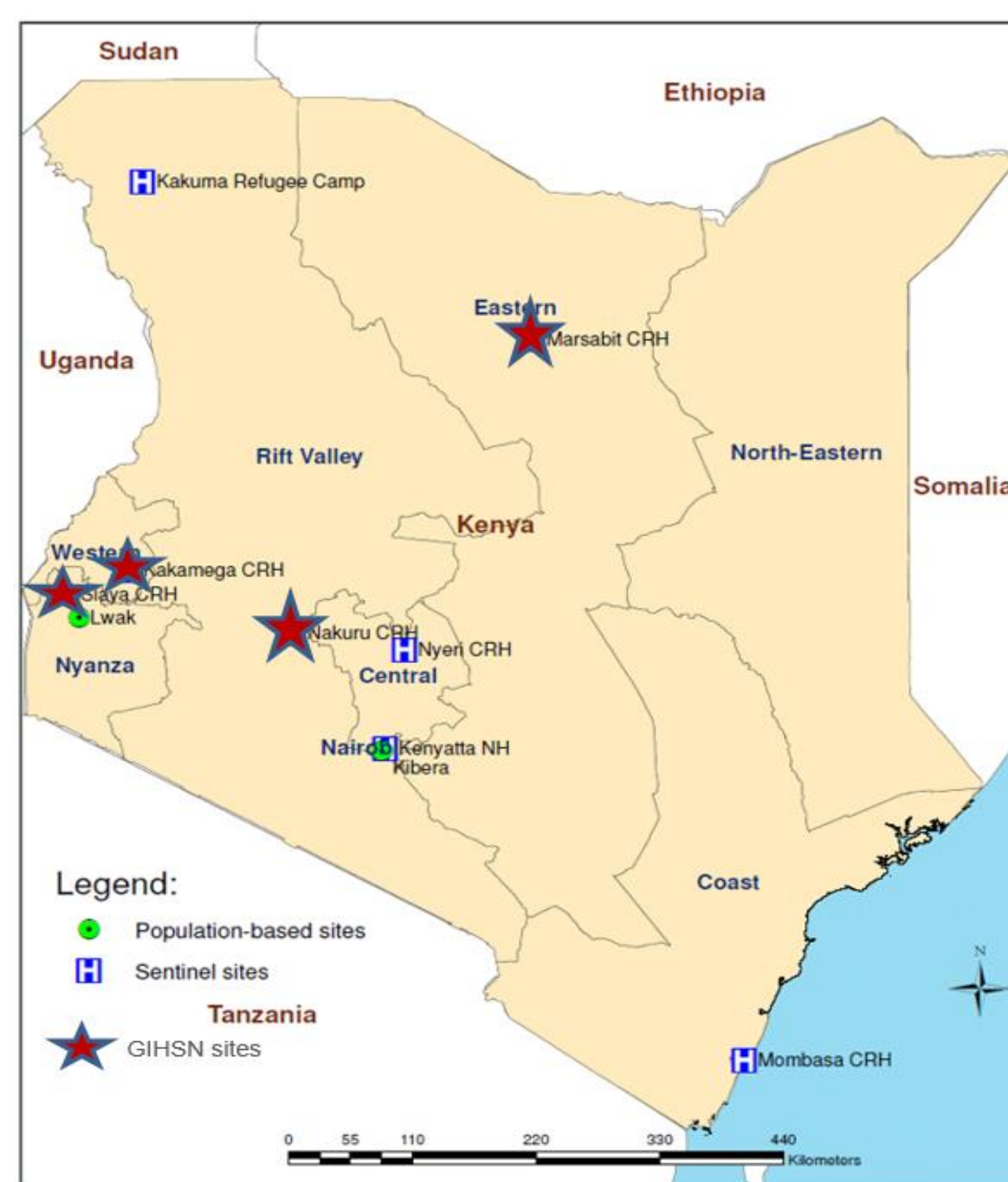
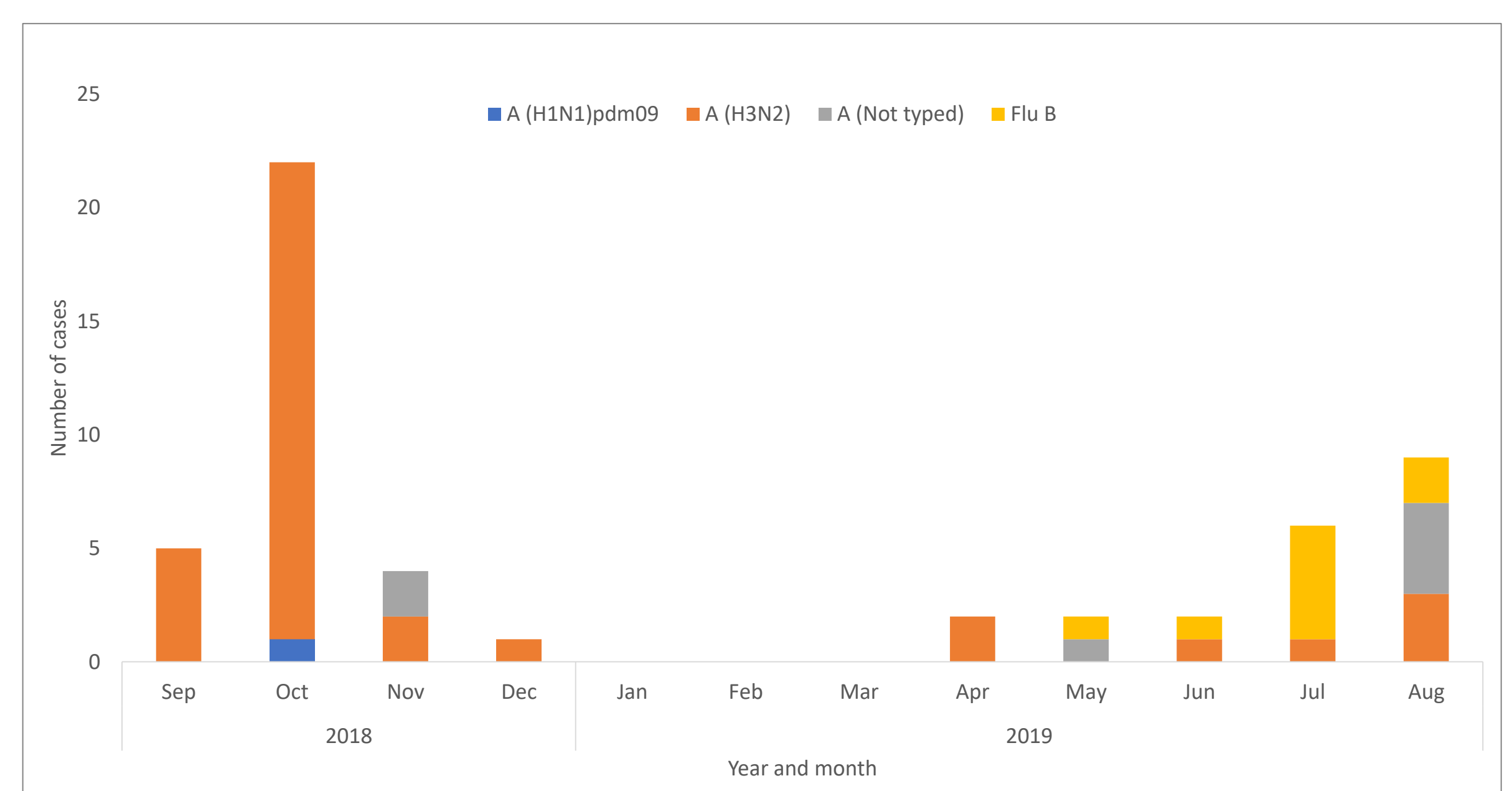


Table 1: Distribution of the cases enrolled by site and age, Sep 2018 – Aug 2019

Variable	Enrolled	Influenza positive n (%)
All	708	53 (7.49)
Site		
Nakuru CRH	254	29 (11.42)
Kakamega CRH	122	11 (9.02)
Siaya CRH	296	10 (3.38)
Marsabit CRH	36	3 (8.33)
Sex		
Male	382	25 (6.54)
Female	326	28 (8.59)
Age		
<2 years	427	25 (5.85)
2-4 years	180	19 (10.56)
5-17 years	73	9 (12.33)
18-49 years	21	0/21
50-64 years	3	0/3
≥ 65 years	4	0/4
<5 years	607	44 (7.25)
≥ 5 years	101	9 (8.91)

- Of the influenza cases, 36 (67.9%) were A(H3N2), only 1 (1.9%) was A(H1N1)pdm09, while 9 (17%) were Flu B (Figure 3)

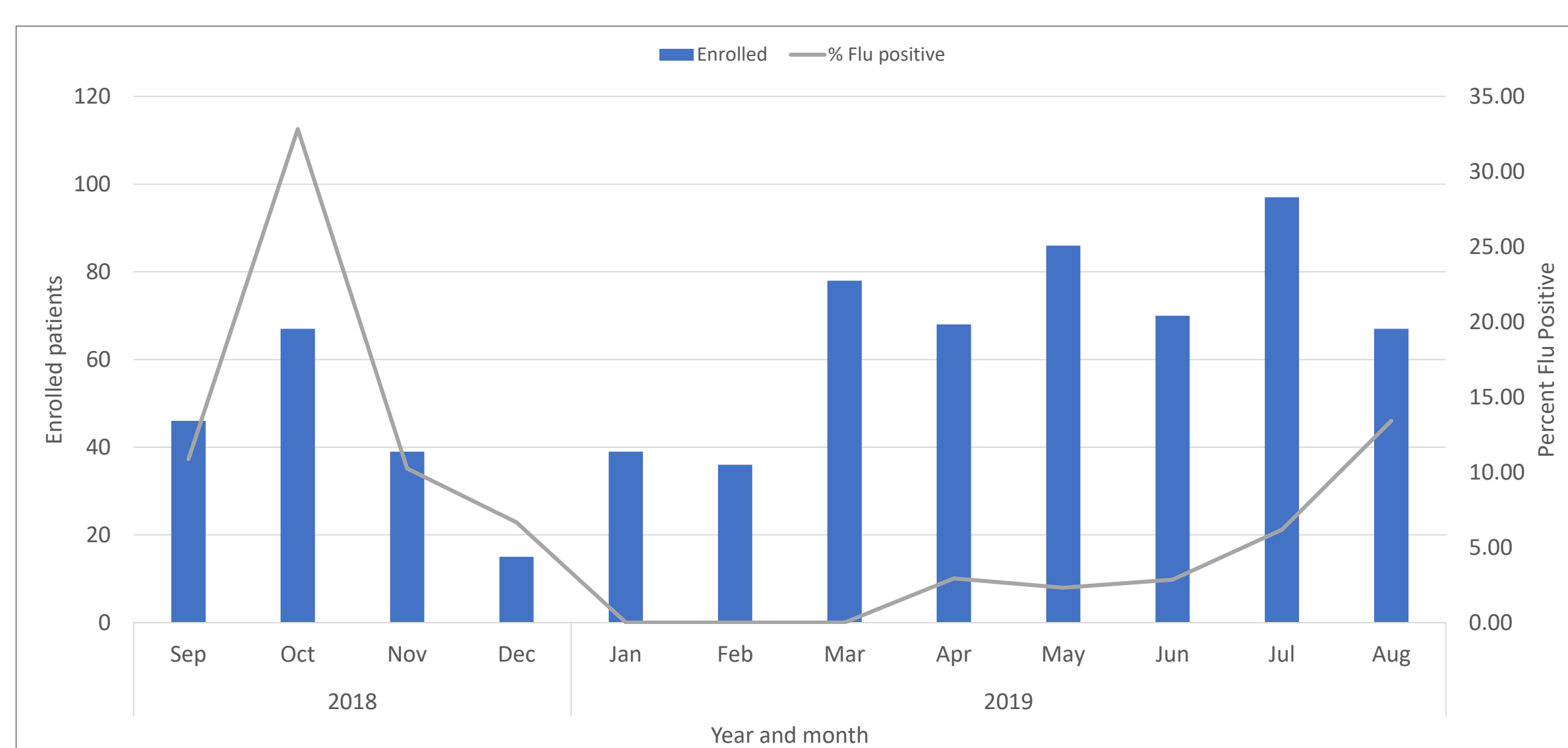
Figure 3: Circulating influenza types and subtypes by month, Sep 2018 – Aug 2019



Results

- We enrolled 708 hospitalized patients in the GIHSN surveillance from September 2018 to August 2019, from the four hospitals (Figure 2)
- Most of the patients who were enrolled (607, 85.7%) were young children aged less than five years, and only four patients were aged ≥ 65 years (Table 1)
- Fifty three (7.5%) of those who were tested had influenza; influenza type A=44 (6.2%) and influenza type B=9 (1.3%)

Figure 2: Monthly number of cases enrolled and percent influenza positive, Sep 2018 – Aug 2019



Key aspects

- Integrated the new questionnaire (rolled out in January 2019) into the electronic data collection applications that are used for data collection at the 4 hospitals
- Data periodically uploaded to the GIHSN through the online data collection platform created by Open Health
- Plans are underway to expand the number of participating hospitals from four to eight to meet the research objectives for the network in the coming season (2019-2020)
- KEMRI laboratories have been enhanced for next generation sequencing (equipped with MiSeq sequencer for whole genomic sequencing of flu A and B viruses, a Bionumeric software and an EDGE bioinformatics server)

Challenges

- The template for online data submission is restrictive for some variables (e.g. education level of mother, child exclusively breast fed). Needs to allow for entry of "Do not know"
- Clinicians typically provide more than one diagnosis for most of the patients. Our data may not show a primary diagnosis if more than one was provided by the attending clinician

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