



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
- 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)
- These sites include Nakuru (NCRH), Kakamega (KCRH), Siaya (SCRH), and Marsabit (MCRH) County Referral Hospitals
- The four sites are among the eight sites in Kenya where the Kenya Ministry of Health (KMoH) together with the US Centers for Disease Control and Prevention (CDC) conduct surveillance for severe acute respiratory illness (SARI)
- A healthcare utilization survey (HUS) has been conducted in all the four sites to identify the catchment population and facilitate adjustment for healthcare seeking in burden of disease estimation
- At each of the hospitals, surveillance officers identify patients (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

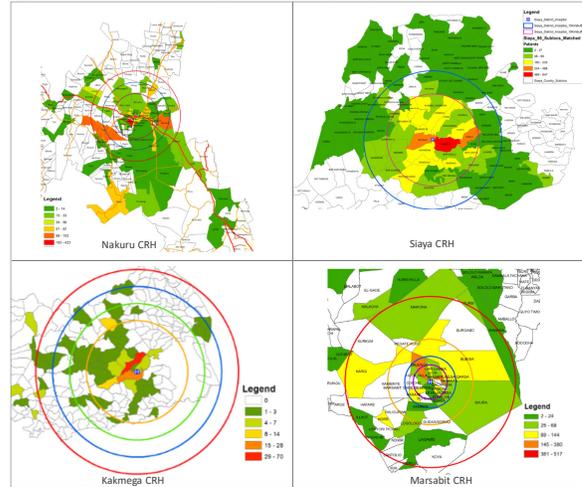
Figure 1: Location of GIHSN sites in Kenya



Defining denominators

- Conducted a healthcare utilization survey (HUS) in the areas around the four hospitals that are sharing data with GIHSN
 - HUS was funded by the US CDC in partnership with Kenya Medical Research Institute (KEMRI) and Washington State University (WSU)
- Catchment areas were determined as areas from where $\geq 80\%$ of the patients who were seen at the hospital were coming from (Figure 4)
- A total of 1,400 households around each of the hospitals participated in the survey
 - Households with children <5 years were specifically targeted

Figure 4: Catchment areas for the hospitals in Kenya that participate in GIHSN



Results

- From January through August 2018, a total of 498 hospitalized patients were enrolled in the GIHSN surveillance from four hospitals (Figure 2)
- A total of 446 (90%) of the patients who were enrolled were young children aged less than five years, and only one patient was aged ≥ 65 years (Table 1)
- 73 (15%) of those who were tested had influenza; influenza type A=57 (11.5%) and influenza type B=17 (3.4%)
- Of the influenza cases, 41 (72%) were A(H1N1)pdm09, while 2 (3.5%) were A(H3N2) (Figure 3)

Table 1: Distribution of the cases enrolled by site and age, Jan - Aug 2018

Variable	Enrolled	Influenza positive n (%)
All	498	73 (14.7)
Site		
Nakuru CRH	187	27 (14.4)
Kakamega CRH	145	25 (17.2)
Siaya CRH	111	18 (16.2)
Marsabit CRH	55	3 (5.5)
Sex		
Male	278	42 (15.1)
Female	220	31 (14.3)
Age		
<2 years	323	37 (11.5)
2-4 years	123	26 (21.1)
5-17 years	47	9 (19.2)
18-49 years	3	0/3
50-64 years	1	1/1
≥ 65 years	1	0/1
<5 years	446	63 (14.1)
≥ 5 years	52	10 (19.2)

Figure 2: Monthly number of cases enrolled and percent influenza positive, Jan - Aug 2018

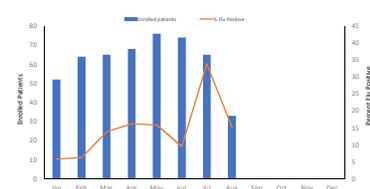
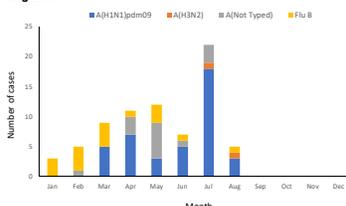


Figure 3: Circulating influenza types and subtypes by month, Jan - Aug 2018



Key aspects

- Ongoing surveillance at all four participating hospitals with minimal interruptions (healthcare worker strikes) since January 2018
- Conducted training of the surveillance officers from all the 4 hospitals to orient them on the GIHSN protocol and questionnaire
- Integrated the additional GIHSN-specific questions 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 Open Health
- Implementation of the HUS helps to define the catchment population for the 4 hospitals and provides a basis for burden of disease estimation
- HUS to enable adjustment for burden of disease in the community that is not medically attended, as well as an adjustment for those who seek care at other health facilities
- Funding from GIHSN covers costs for surveillance at SCRH while the US CDC covers costs for the other three hospitals

Challenges

- Delay in obtaining the required approvals and contractual agreement from the KEMRI
 - Final contract between KEMRI and Foundation for Influenza Epidemiology signed on September 12th, 2018
- Delays mean that GIHSN grant funds could not be accessed hence impacting on the implementation of the activities
 - Relied on funding provided by the US CDC for routine surveillance activities to support activities related to implementing the GIHSN protocol at the 4 hospitals
- Not been able to test for RSV and influenza B lineage types due to limited funding
- Some of required variables (e.g. birth weight for children aged <5 years) in the GIHSN questionnaire are not routinely collected by clinicians in our surveillance sites
- Clinicians typically provide more than one diagnosis for most of the patients. This is contrary to the requirement on the GIHSN database where only the primary diagnosis is needed

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