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

Gideon O. Emukule¹, Nancy A. Otieno², Fredrick Otiato², Bryan Nyawanda², Sandra S. Chaves¹

¹Centers for Disease Control and Prevention - Kenya Country Office, Nairobi, Kenya; ²Kenya Medical Research Institute, Kisumu, Kenya

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 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 Surveillance Network (GISHN)

Methods

- Since January 2018 to date, Kenya has participated as one of the GISHN 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 burden of disease estimation
- At each of the hospitals, surveillance officers identify patients (all ages) who are hospitalized with acute onset (<7 days for GISHN) of illness with a cough and reported fever or documented temperature ≥38°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

Results

- From January through August 2018, a total of 498 hospitalized patients were enrolled in the GISHN 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 265 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)

Defining denominators

- Conducted a healthcare utilization survey (HUS) in the areas around the four hospitals that are sharing data with GISHN
  - 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 the patients presenting 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

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 implementing the GISHN protocol and questionnaire
- Integrated the additional GISHN-specific questions into the electronic data collection applications that are used for data collection at the 4 hospitals
- Data periodically uploaded to the GISHN 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 GISHN 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 GISHN grant funds could not be accessed hence impacting on the implementation of the activities
  - Relying on funding provided by the US CDC for routine surveillance activities to support activities related to implementing the GISHN 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 GISHN 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 GISHN database where only the primary diagnosis is needed

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

<table>
<thead>
<tr>
<th>Variable</th>
<th>Enrolled</th>
<th>Influenza positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nakuru</td>
<td>142</td>
<td>109 (76.9%)</td>
</tr>
<tr>
<td>KCRH</td>
<td>145</td>
<td>114 (78.8%)</td>
</tr>
<tr>
<td>SCRH</td>
<td>111</td>
<td>95 (85.3%)</td>
</tr>
<tr>
<td>MCRH</td>
<td>94</td>
<td>68 (72.6%)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>278</td>
<td>210 (75.4%)</td>
</tr>
<tr>
<td>Female</td>
<td>228</td>
<td>170 (74.5%)</td>
</tr>
<tr>
<td>≥65 years</td>
<td>489</td>
<td>393 (80.0%)</td>
</tr>
<tr>
<td>5–14 years</td>
<td>127</td>
<td>99 (77.6%)</td>
</tr>
<tr>
<td>15–24 years</td>
<td>125</td>
<td>98 (79.6%)</td>
</tr>
<tr>
<td>2–4 years</td>
<td>123</td>
<td>96 (78.1%)</td>
</tr>
<tr>
<td>4–6 years</td>
<td>47</td>
<td>38 (80.9%)</td>
</tr>
<tr>
<td>6–12 years</td>
<td>3</td>
<td>2 (66.7%)</td>
</tr>
</tbody>
</table>

Contact: Gideon O. Emukule, Email: pyr9@cdc.gov, OR Nancy A. Otieno, Email: NOtieno@kemricdc.org

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