



## Influenza Hospital Surveillance During in South Africa

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### Site presentation

Surveillance started on January 2018. Two hospitals are part of our network Chris Hani Baragwanath Academic Hospital (CHBAH) and Bheki Mlangeni District Hospital (BMDH). CHBAH is the major public hospital serving the Soweto population (total population 1.3 million people) and has 3,400 beds. BMDH is a smaller hospital with 300 beds. The HIV prevalence among pregnant women in Soweto is approximately 29%. Influenza virus circulation in South Africa is seasonal and occurs mainly during the Southern Hemisphere winter months on occasion we have observed either extended periods of low-level circulation of the virus throughout the year.

### Methods

At CHBAH children <1 year old were recruited 5 days a week, for 1-14 year olds recruitment was done in 2 wards out of 4 pediatric wards during week days, and for adult (>14 years of age) patients' enrolment was limited to approximately 1 of every 5 working days (selected days varied systematically) per week. At BMDH adult enrollments occurred on the same day as CHBAH; due to the negligible number of pediatric admissions at BMDH and to the less severe disease that adult patients admitted to this hospital present with compared to patients at CHBAH only adults were recruited at BMDH.

Nasopharyngeal flocked swabs were collected in viral transport media from children; nasopharyngeal plus oropharyngeal swabs will be collected from adults and placed in a single vial of viral transport media. Nucleic acids were extracted using a NucliSENS easyMAG platform and testing for influenza virus was undertaken by an in-house qualitative real-time PCR assay that has been established and validated at our Unit. Samples were also tested by an in-house PCR assay for RSV-A, RSV-B, hMPV and *Bordetella pertussis*.

### Results

**TABLE 1.** Patients screened, consented and included in the study up until first week of September

	<5 years old	≥5 years old
<b>N. Screened</b>	2207	817
<b>N. Consented</b>	1411	495
<b>N. Excluded<sup>1</sup></b>	420	157
<b>Non-residents</b>	323	95
<b>Institutionalized</b>	2	4
<b>Prev. hospitalized (30d)</b>	58	26
<b>Onset &gt;7d and/or no ILI</b>	67	65
<b>N. Total Included</b>	<b>991</b>	<b>338</b>

<sup>1</sup>Exclusion reasons are not mutually exclusive.

**TABLE 3.** Burden of Influenza disease and other respiratory pathogens in participants <5 years of age, enrolments up until first week of September

	<5 years old	0-<6 months old	6-<12 months old	12-<59 months old
<b>N. Participants</b>	991	481	210	300
<b>Influenza+</b>	100 (10.1%)	13 (2.7%)	28 (13.3%)	59 (19.7%)
<b>HIV-exposed</b>	231 (23.3%)	128 (26.6%)	54 (25.7%)	49 (16.3%)
<b>% of Influenza+</b>	19 (19.0%)	2 (15.4%)	6 (21.4%)	11 (18.6%)
<b>% of Influenza-</b>	212 (23.8%)	126 (26.9%)	48 (26.4%)	38 (15.8%)
<b>Deaths</b>	2 (0.6%)	1 (1.0%)	1 (0.4%)	0
<b>% of Influenza+</b>	0	0	0	0
<b>% of Influenza-</b>	2 (0.2%)	1 (0.2%)	1 (0.5%)	0
<b>Influenza A</b>	66 (6.7%)	8 (1.7%)	20 (9.5%)	38 (12.7%)
<b>Influenza B</b>	34 (3.4%)	5 (1.0%)	8 (3.8%)	21 (7.0%)
<b>RSV A</b>	176 (17.8%)	110 (22.9%)	38 (18.1%)	28 (9.3%)
<b>RSV B</b>	122 (12.3%)	79 (16.4%)	24 (11.4%)	19 (6.3%)
<b>hMPV</b>	42 (4.2%)	22 (4.6%)	12 (5.7%)	8 (2.7%)
<b>Pertussis</b>	22 (2.2%)	21 (4.4%)	0	1 (0.3%)

No participants received influenza vaccine in the current season.

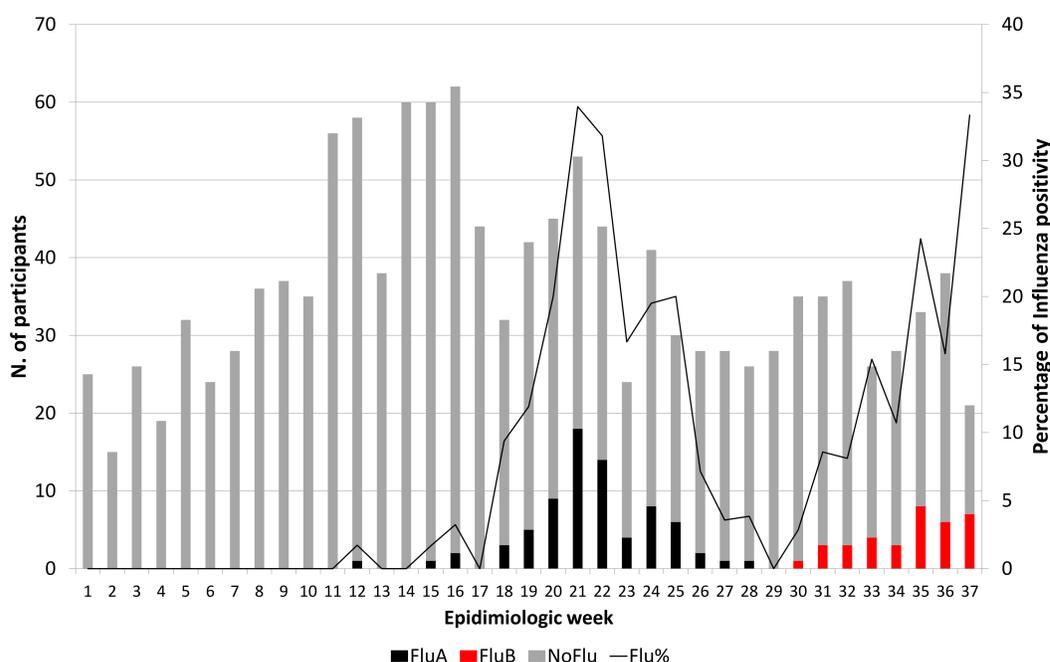
**TABLE 4.** Burden of Influenza disease and other respiratory pathogens in participants ≥5 years of age, enrolments up until first week of September

	≥5 years old	5-<18 years old	18-<65 years old	≥65 years old
<b>N. Participants</b>	338	25	255	58
<b>Influenza+</b>	10 (3.0%)	1 (4.0%)	9 (3.5%)	0
<b>HIV-infected</b>	143/257 (55.6%)	8/25 (32.0%)*	129/202 (63.9%)	6/30 (20%)
<b>% of Influenza+</b>	5 (50%)	1 (100%)	4 (44.4%)	0
<b>% of Influenza-</b>	138 (42.1%)	7 (29.2%)	125 (50.8%)	6 (100%)
<b>Deaths</b>	12 (3.6%)	0	10 (3.9%)	2 (3.4%)
<b>Influenza-</b>	12 (3.7%)	0	10 (4.1%)	2 (3.4%)
<b>Influenza A</b>	9 (2.7%)	0	9 (3.5%)	0
<b>Influenza B</b>	1 (0.3%)	1 (4.0%)	0	0
<b>RSV A</b>	5 (1.5%)	0	3 (1.2%)	2 (3.4%)
<b>RSV B</b>	2 (0.6%)	1 (4.0%)	1 (0.4%)	0
<b>hMPV</b>	1 (0.3%)	0	1 (0.4%)	0
<b>Pertussis</b>	5 (1.5%)	1 (4.0%)	2 (0.8%)	2 (3.4%)

\*HIV-exposed unknown HIV infection status.

No participants received influenza vaccine in the current season.

**FIGURE.** Number of positive samples by influenza strains and detection rate by week



The National Institute for Communicable Diseases in South Africa conducts national syndromic surveillance for pneumonia/Influenza and for Influenza-like illness (ILI). From this program it was noted that the 2018 influenza season started in week 18 (first week of May) when the influenza detection rate rose above 10%. The 2018 influenza season is still ongoing.

75 Influenza-A viruses were detected, 57 of which were A(H1N1)pdm; 35 Influenza-B viruses were detected, all Victoria lineage.

### Challenges:

- Due to the large number of participants and the particularities of the eligibility criteria for the study, the study staff requires some extra time to be able to complete all the source documents.
- Data management of the study was challenging. Data management has been outsourced to an external company, and delays in obtaining the datasets have been encountered.
- Influenza season in South Africa may extend to late November. We perform a thorough data cleaning at the end of the influenza season as a consequence the requests from the GHSN office for data downloads from early May are impractical in our site.
- For the current season we are still performing influenza strain subtyping. Results will be available at the end of the season.

### Key aspects:

- 8.3% (110/1329) of the enrolled participants were positive for influenza. Restricting the analysis to samples collected during the influenza season the percentage increased to 15.7% (106/674).
- Due to the high HIV-burden in our population, HIV-stratified analysis need to be conducted.
- The uptake of influenza vaccine in our setting is very low. Overall vaccine effectiveness estimates are not possible.
- We are conducting a case-control study to evaluate the effectiveness of influenza vaccination of pregnant women in protecting their infants during the first 6 months of life against influenza associated hospitalizations. Hospitalized pregnant and post-partum women and infants <6 months are being enrolled.

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