



Influenza Hospital Surveillance During Four Months in South Africa

Marta C. Nunes, Nasiba Soofie, Tselane Makgobo, Christian Mukendi, Fatima Solomon and Shabir A. Madhi

Department of Science and Technology/National Research Foundation, Vaccine Preventable Diseases, and

Medical Research Council, Respiratory and Meningeal Pathogens Research Unit, University of the Witwatersrand, Johannesburg, South Africa

Site presentation

After a pilot phase the study was started at Chris Hani Baragwanath Academic Hospital (CHBAH) in the 3rd week of April 2017. The hospital is the major public hospital serving the Soweto population (total population 1.3 million people) and has 3,400 beds. On July 13th enrolment was extended to Bheki Mlangeni District Hospital (BMDH), 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 will 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 from children were also tested by an in-house PCR assay for RSV-A, RSV-B, hMPV and pertussis. Adult samples will be tested for the same pathogens in the near future.

Results

TABLE 1. Burden of Influenza disease and other respiratory pathogens in participants <5 years of age, enrolments up until 31st August

	<5 years old	0-<6 months old	6-<12 months old	12-<59 months old
N. Participants	710	323	133	254
Influenza+	55 (7.8%)	14 (4.3%)	9 (6.8%)	32 (12.6%)
HIV-exposed	185 (26.9%)	94 (30.2%)	33 (25.8%)	58 (23.2%)
Influenza+	9 (16.4%)	2 (14.3%)	0	7 (21.9%)
Influenza-	176 (27.8%)	92 (31.0%)	33 (27.7%)	51 (23.4%)
ICU admissions	13 (1.8%)	11 (3.4%)	1 (0.8%)	1 (0.4)
Influenza+	2 (3.6%)	1 (7.1%)	1 (11.1%)	0
Influenza-	11 (1.7%)	10 (3.2%)	0	1 (0.5%)
Deaths	4 (0.6%)	3 (1.0%)	0	1 (0.4%)
Influenza+	0	0	0	0
Influenza-	4 (0.6%)	3 (1.0%)	0	1 (0.5%)
Influenza A	48 (6.8%)	14 (4.3%)	9 (6.8%)	25 (9.8%)
Influenza B	7 (1.0%)	0	0	7 (2.8%)
RSV A	11 (1.6%)	10 (3.1%)	1 (0.8%)	0
RSV B	73 (10.3%)	43 (13.3%)	12 (9.0%)	18 (7.1%)
hMPV	45 (6.3%)	15 (4.6%)	15 (11.3%)	15 (5.9%)
Pertussis	2 (0.3%)	2 (0.6%)	0	0

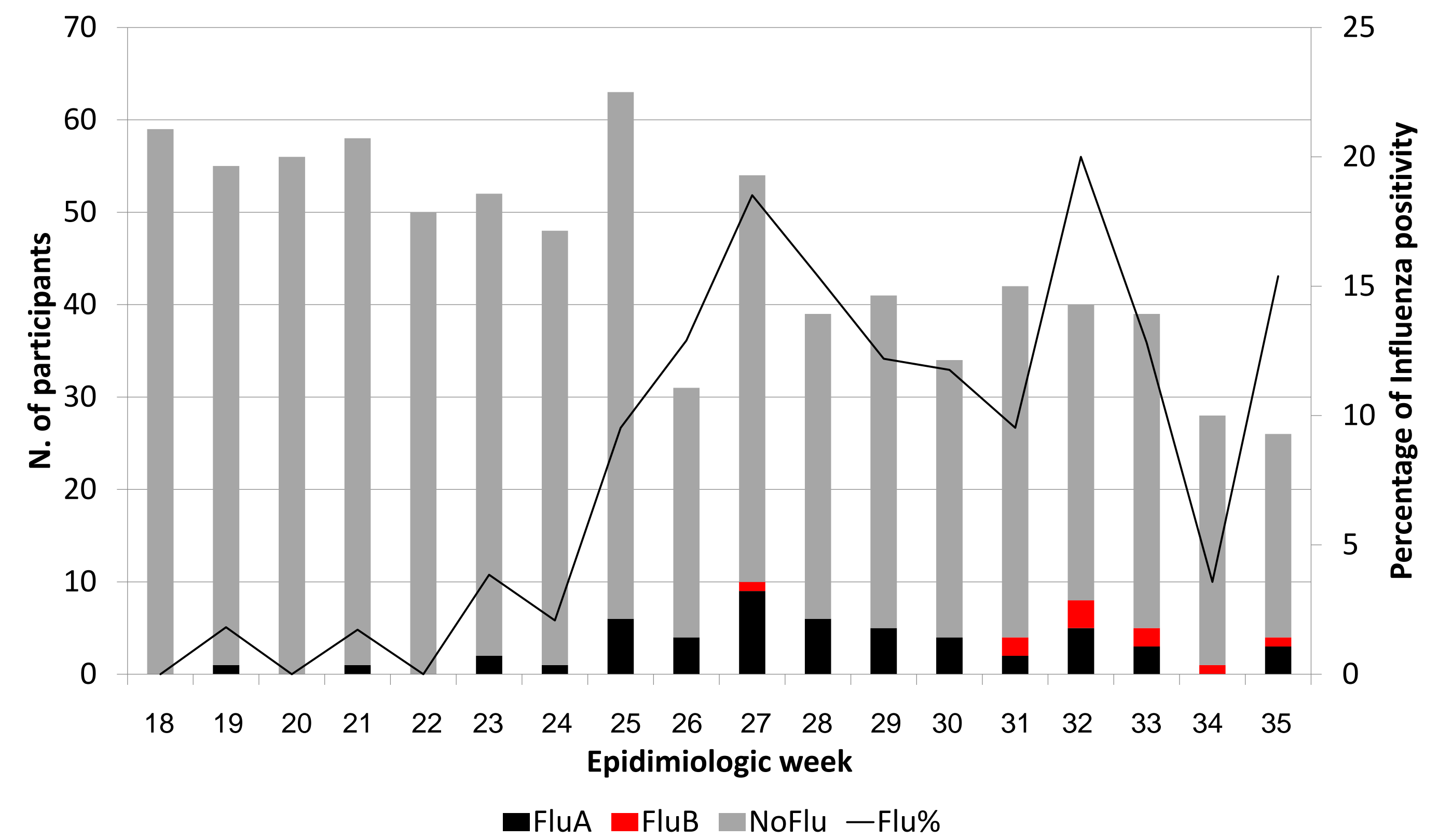
No participants received influenza vaccine in the current season.

TABLE 2. Burden of Influenza disease in participants ≥5 years of age, enrolments up until 31st August

	≥5 years old	5-18 years old	18-<65 years old	≥65 years old
N. Participants	105	11	74	20
Influenza+	7 (6.7%)	2 (18.2%)	4 (5.4%)	1 (5.0%)
HIV-infected		3 (27.3%)*	38 (66.7)	9 (52.9%)
Influenza+		0	1 (50.0%)	0
Influenza-		3 (33.3%)	37 (67.3%)	9 (56.3%)
Pregnant or post-partum	2 (1.9%)	0	2 (2.7%)	0
Influenza-	2 (2.0%)	0	2 (2.9%)	0
Deaths	1 (1.0%)	0	1 (1.4%)	0
Influenza-	1 (1.0%)	0	1 (1.4%)	0
Influenza vaccine	2 (1.9%)	0	2 (2.7%)	0
Influenza-	2 (2.0%)	0	2 (2.9%)	0
Influenza A	4 (3.8%)	0	3 (4.1%)	1 (5.0%)
Influenza B	3 (2.9%)	2 (18.2%)	1 (1.4%)	0

*HIV-exposed not HIV-infected.

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 2017 influenza season which started in week 21 (week starting 29 May) when the influenza detection rate in rose above 10%.

Key aspects & challenges

Challenges:

- The start of the study at BMDH was delayed due to delay in receiving approval from the regulatory authorities.
- Due to the large number of participants and the particularities of the eligibility criteria for the study, the study staff required some more time to be able to complete all the source documents.
- Initially admission details, including symptoms and date of onset were only collected from reviewing the patients' files, since this source was not always complete interviews with the patients/care-givers are now being performed.
- Data management of the study was challenging. At the beginning of August data capture and data management was outsourced to an external company, which needed to get familiarized with the study documents before being able to proceed to full capacity. Currently only data until the end of August is available on the database, but moving forward data will be available within two-three weeks of enrolment.
- Influenza season in South Africa may extend to late November. We perform a thorough data cleaning at the end of influenza season as a consequence the requests from the GIHSN office for data downloads from early May are impractical in our site.
- For the current season we have not subtype the Influenza strains yet. We plan to perform the subtyping at the end of the Influenza season.

Key aspects:

- 7% of the enrolled participants were positive for Influenza.
- Due to the high HIV-burden in our population, HIV-stratified analysis need to be conducted.
- Besides pregnant women 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.

Contact: +27 11 983 4262; nunesm@rmpru.co.za

Funding: This study was funded by the Foundation for Influenza Epidemiology and Bill & Melinda Gates Foundation