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Influenza Surveillance In the WHO African Region

Epi Weeks 1 to 52, 2016

Contents

HIGHLIGTHS

- Nineteen of the 23 (83%) Member States of the influenza laboratory network shared influenza virological data from epidemiological weeks 1 to 52 of 2016.
- A total of 34,553 specimens were tested, 16% of which were positive for influenza virus. The predominant circulating virus was influenza type A, accounting for 62% of the positive specimens, of which 56% were influenza A(H3N2) subtype.
- Senegal (western African zone), South Africa (southern African zone) and Algeria (northern African zone) exhibited seasonal patterns of influenza transmission, while the majority of countries in the other African zones had no seasonality.
- **Priority in the WHO Africa region for 2017 is to further enhance influenza surveillance through integration of virological and epidemiological surveillance data.**

BACKGROUND

The occurrence of the avian influenza outbreak in 2006 and influenza H1N1 pandemic in 2009 triggered coordinated regional activities to better prepare for future outbreaks. These activities included human capacity building for influenza sentinel surveillance and diagnosis, creation of the influenza laboratory network, infrastructure and technology transfer to selected laboratories.
So far, 34 countries[1] out of 47 in the WHO African region have developed influenza laboratory diagnostic capacity using the minimum standards recommended by WHO[2]. The African Region influenza virological surveillance network was established in 2006 to characterize the different epidemiological profiles within this expansive continent, which has vastly different climatic conditions. This lead to a better understanding of the epidemiology of influenza in the region and therefore development of more timely and appropriate response mechanisms. However, there is still a paucity of data on the epidemiology of influenza in the WHO African region.

The African Regional (AFR) influenza laboratory network is responsible for biological monitoring of circulating viral type/subtype. This enables WHO, in collaboration with partners and the pharmaceutical industry, to better define the choice of viruses for inclusion in future influenza vaccines. To date, the 23 countries[3] of the AFR influenza laboratory network are implementing sentinel surveillance for Influenza-Like Illness (ILI) and/or Severe Acute Respiratory Infection (SARI) and contributing to weekly influenza surveillance reporting. This is in addition to surveillance data received through FluNet, the global web-based tool for influenza virological surveillance.

The purpose of the weekly influenza surveillance bulletin is to monitor the influenza activity in the region by zone of transmission and to provide information on the seasonal pattern. This last report for 2016 provides a review of influenza activity from epidemiological (epi) weeks 1 to 52 in the region.

1) Algeria, Angola, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Congo, Cote d'Ivoire, DR Congo, Ethiopia, Gabon, Guinea, Ghana, Kenya, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, South Africa, Tanzania, Togo, Uganda, Zambia and Zimbabwe.
2) http://www.afro.who.int/en/integrated-disease-surveillance/publications/3951-lab-capacity-requirements-for-ihr-and-their-implementation-in-the-who-afro.html
3) Algeria, Burkina Faso, Cameroon, Central African Republic, Cote d'Ivoire, DR Congo, Ethiopia, Ghana, Kenya, Madagascar, Mali, Mauritania, Mauritius, Mozambique, Niger, Nigeria, Rwanda, Senegal, South Africa, Tanzania, Togo, Uganda, and Zambia.

METHODOLOGY

Data collected for this bulletin meets the standardized case definitions for ILI and SARI as defined by WHO[4]. National Influenza Centres (NICs) and National Influenza Reference laboratories (NIRL) were provided with a standardized electronic form to collect aggregated data on the number of specimens received and processed, the number that tested positive for influenza and the number of each type/subtype of influenza virus identified. Data presented in this bulletin was collected according to the epi week calendar and shared directly to WHO AFRO[5] every Friday of the following epi week. The influenza virus A subtypes reported include A(H1N1) pandemic (pdm), A(H3N2), A(H5N1) and A(unsubtyped). Influenza activity is based on the positivity rate for influenza samples tested. Completed data is defined as data reported for every epi week of 2016. Member countries of the AFR influenza laboratory network are classified into five zones of transmission to facilitate the analysis of seasonal patterns of influenza.

REVIEW OF 2016 INFLUENZA VIRUS CIRCULATION

Nineteen of the 23 (83%) member countries of the AFR influenza laboratory network shared influenza virological data from epi weeks 1 to 52 of 2016. Four countries (Kenya, Nigeria, the Democratic Republic of Congo and Tanzania) did not submit data for all the weeks of the year. A total of 34,553 specimens were tested and 16% were positive for influenza virus. The predominant influenza virus circulating was influenza type A, constituting 62% of positive specimens, 56% of which were influenza influenza A(H3N2) subtype, 32% A(H1N1)pdm subtype and 12% A(unsubtyped). No human avian influenza virus A(H5N1) subtype was detected throughout the year. During 2015 influenza A(H1N1)pdm subtype was the predominant virus circulating in the region, particularly during the first half of the year. Conversely, in 2016 influenza A(H1N1)pdm was the predominant subtype circulating in the region up to epi week 16; subsequently increased influenza A(H3N2) activity were reported from epi weeks 7 to 40 ; while Influenza B activity increased during the last quarter of 2016 from epi weeks 40 to 52. In 2016 influenza activity started late compared to 2015, a notable increase in influenza activity was observed from epi week 28 which persisted for the remainder of 2016 while increased influenza activity was observed during the first 6 months in 2015. (Figure 1)

Figure 1: Trend of influenza viruses reported in the WHO African Region, epi weeks 1 to 52, 2016

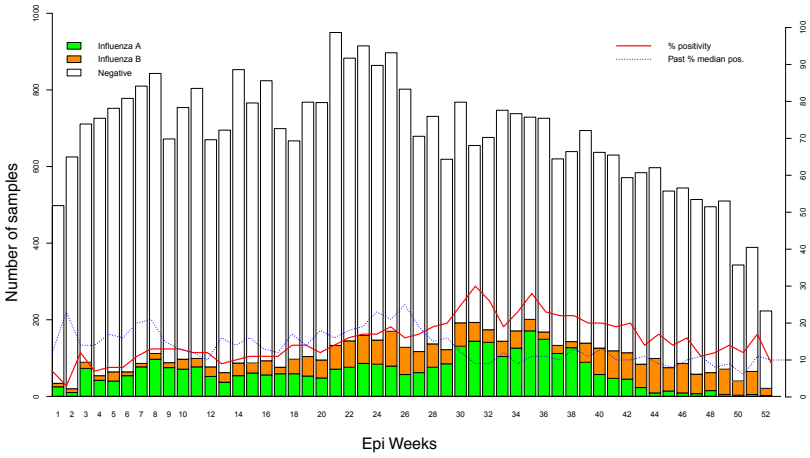
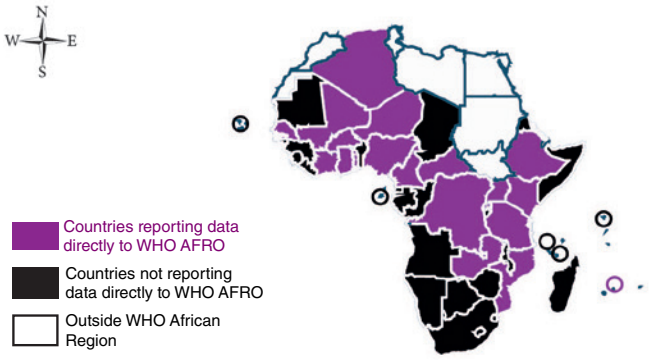
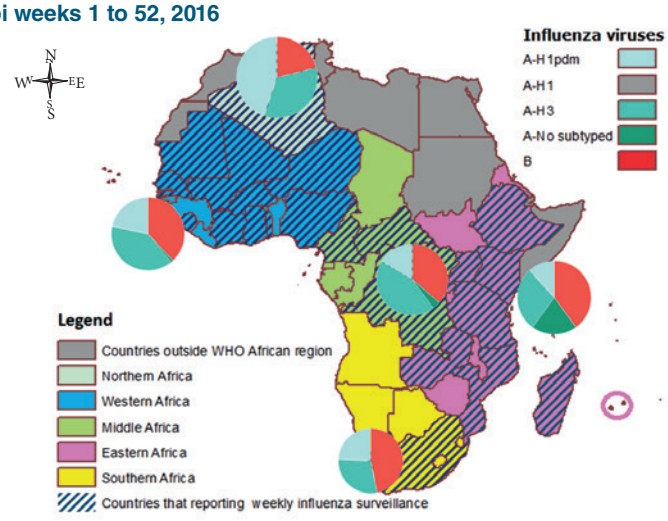


Figure 1a : Countries reporting influenza surveillance data directly to WHO AFRO, epi weeks 1 to 52, 2016



The distribution of virus type/subtype by zone of transmission is shown in Figure 2. The most frequently reported influenza type/subtype in 2016 was influenza A(H3N2) in western African zone (positivity rate of 17%), influenza type B in middle African zone (positive rate of 12%), eastern African zone (positive rate of 18%) and in southern African zone (positive rate of 13%), and influenza A(H1N1)pdm in northern African zone (positive rate of 13%).

Figure 2 : Geographic distribution of influenza viruses circulating in the WHO African Region by zone of transmission, epi weeks 1 to 52, 2016



SEASONAL PATTERNS OF INFLUENZA TRANSMISSION

The WHO African Region is similar to both the WHO Western Pacific and WHO Americas/PAHO regions in that it spans both the northern and southern hemispheres. Furthermore, seasonal patterns of influenza transmission exist in Senegal (western African zone) in addition to South Africa (southern African zone) and Algeria (northern African zone) with the majority of countries in the other African zones exhibiting no seasonality.

4) http://www.afro.who.int/en/integrated-disease-surveillance/publications/4792-protocol-for-national-influenza-sentinel-surveillance.html
5) Data from Madagascar is not included in this bulletin as not shared to AFRO reporting channel.

In the northern African zone, comprising only of Algeria, a total of 509 specimens were tested and 47% were positive for influenza irus (Figure 3). The predominant influenza virus circulating was influenza type A (79% of positive specimens), which included 57% of influenza A(H1N1)pdm subtype and 44% of influenza A(H3N2) subtype (Figure 4). The seasonality of influenza activity concurs with patterns observed in the countries of the northern hemisphere, from epi weeks 3 to 12 of 2016. The peak of transmission was observed from epi weeks 7 to 9 of 2016, which coincided with the northern hemisphere winter and influenza type A was predominant. This is similar to what was observed during the same period in 2015. There was a second increase in influenza activity from epi weeks 48 to 51 of 2016 predominated by influenza type B contrary to what was observed during the same period in 2015.

Figure 3 : Trend of influenza viruses in the northern African zone of transmission, epi weeks 1 to 52, 2016

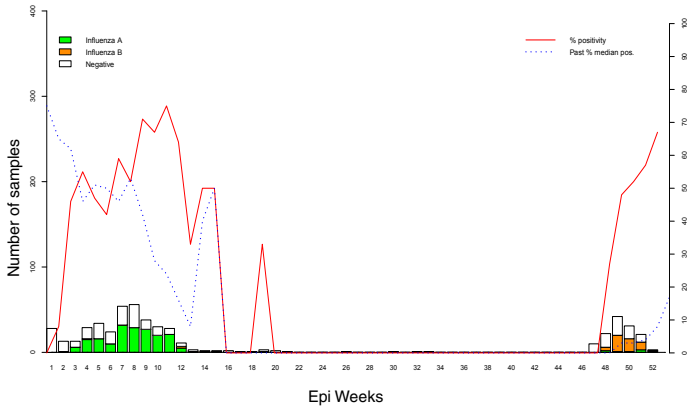


Figure 3a : Country from northern African zone of transmission reporting data directly to WHO AFRO, epi weeks 1 to 52, 2016

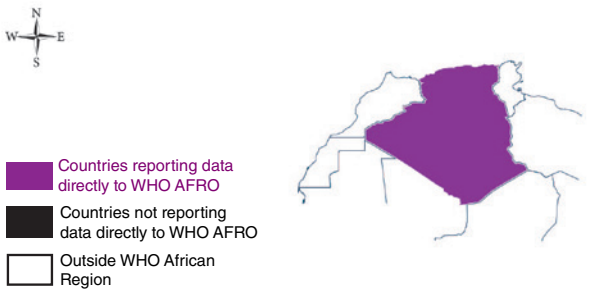
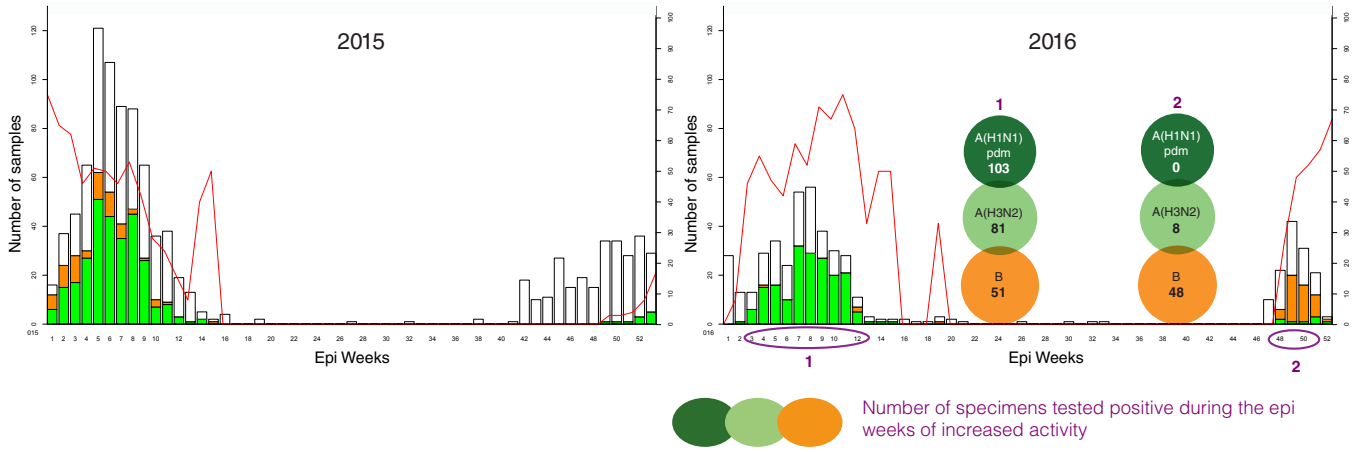


Figure 4: Trend of influenza viruses in Algeria, epi weeks 1 to 52, 2015-2016



In the southern African zone (Figure 5), which includes South Africa, a total of 7,458 specimens were type A (54% positivity rate) 53% was influenza A(H3N2) subtype and 47% was influenza A(H1N1)pdm subtype. In the southern African zone, influenza transmission peaked in epi weeks 33 to 35, corresponding to the southern hemisphere winter. Influenza type B activity predominated during the first part of the seasonal influenza epidemic (epi weeks 18 to 28) followed by influenza type A (epi weeks 29 to 38) (Figure 6). During the seasonal influenza epidemic of 2015, influenza type A was predominant (epi weeks 19 to 28).

Figure 5 : Trend of influenza viruses in the southern African zone of transmission, epi weeks 1 to 52, 2016

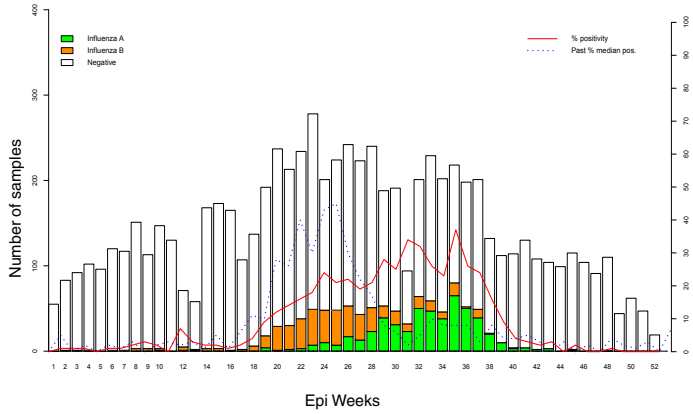
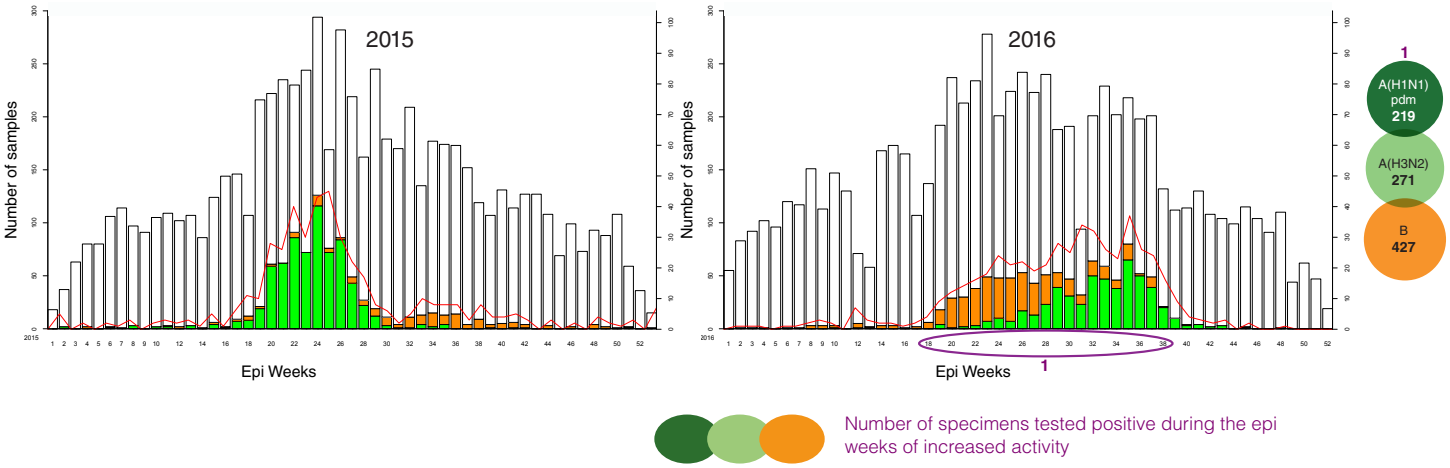


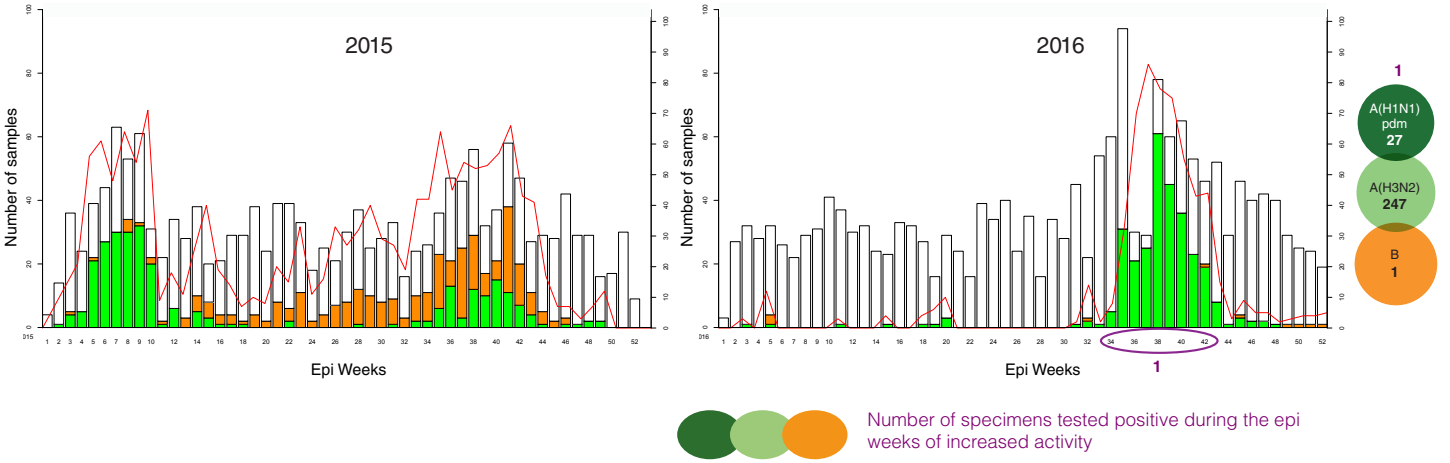
Figure 5a : Country from southern African zone of transmission reporting data directly to WHO AFRO, epi weeks 1 to 52, 2016

Figure 6 : Trend of influenza viruses in South Africa, epi weeks 1 to 52, 2015-2016



In Senegal there was little influenza activity throughout 2016 compared to 2015. A total of 1,826 specimens were tested and 16% were positive for influenza virus (33% of influenza tested positive in 2015). The predominant influenza virus circulating was influenza type A (98% of positive specimens) which included 87% of influenza A(H3N2) subtype and 13% of influenza A(H1N1)pdm subtype. There was a brief increase in influenza activity from epi weeks 34 to 43, with a peak of transmission during epi week 38 (Figure 7). In Senegal, influenza surveillance from 1996 to 2009 has shown that influenza activity consistently peaks during the rainy season from July to October, the same was seen in 2016. This contrasted with data from 2015 where in addition to the usual influenza circulation during the rainy season, an unusual influenza activity was observed in January with a predominance of influenza A(H1N1) pdm subtype. This was probably related to the international context particularly the influenza spread in the northern hemisphere.

Figure 7 : Trend of influenza viruses in Senegal, epi weeks 1 to 52, 2015-2016



For the other African zones, there is no clear pattern of seasonality with continuous transmission of influenza throughout 2016 with the exception of Togo, and the Central African Republic where influenza activity was neither seasonal nor continuous but showed uncharacteristic peaks in activity. (Figures 8,9,10)

Figure 8 : Trend of influenza viruses in the western African zone of transmission, epi weeks 1 to 52, 2016

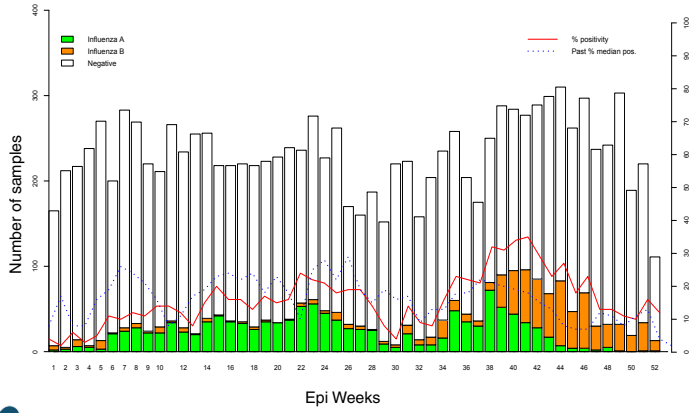


Figure 8a : Countries from western African zone of transmission reporting data directly to WHO AFRO, epi weeks 1 to 52, 2016

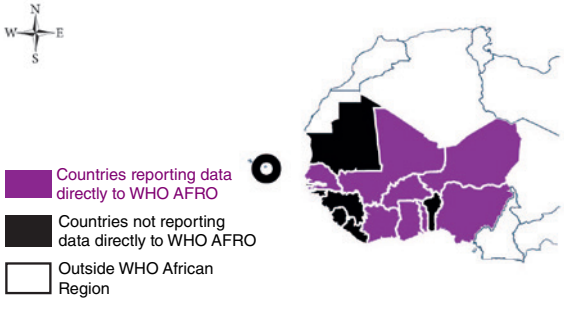


Figure 9 : Trend of influenza viruses in the middle African zone of transmission, epi weeks 1 to 52, 2016

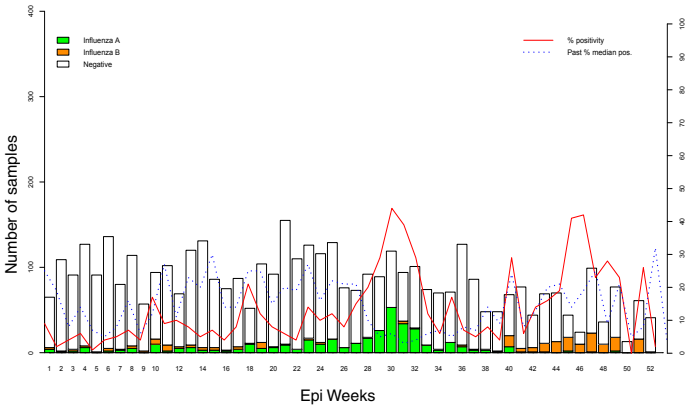


Figure 9a : Countries from Middle African zone of transmission reporting data directly to WHO AFRO, epi weeks 1 to 52, 2016

Figure 10 : Trend of influenza viruses in the eastern African zone of transmission, epi weeks 1 to 52, 2016

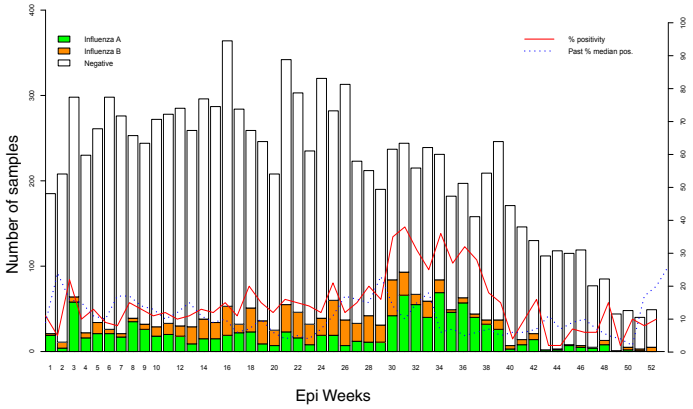
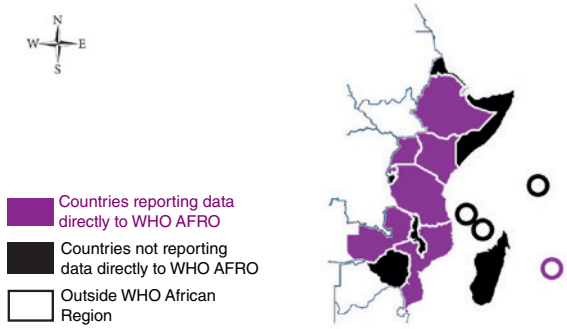
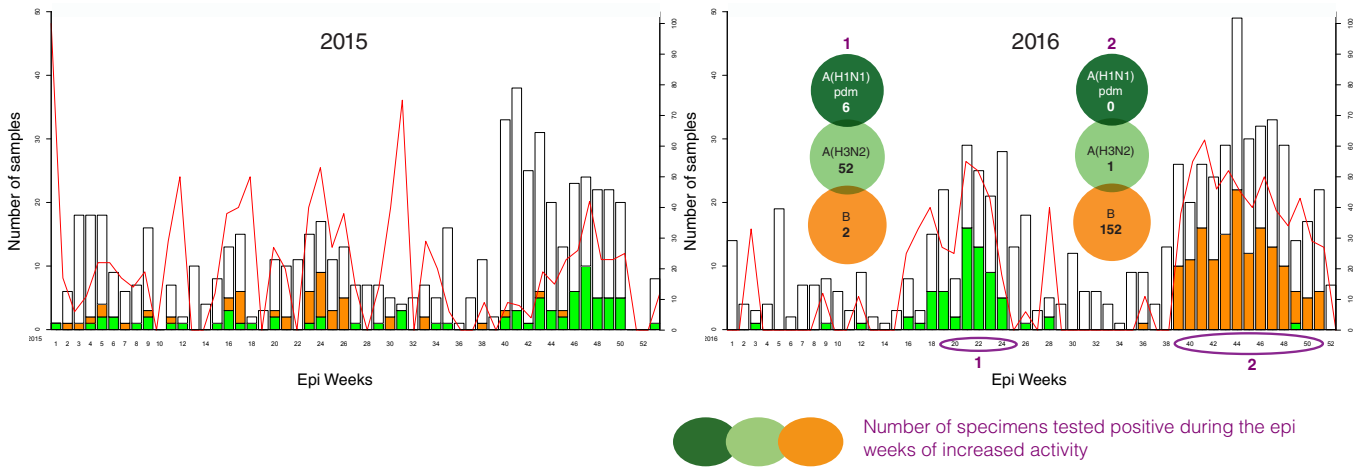


Figure 10a : Countries from eastern African zone of transmission reporting data directly to WHO AFRO, epi weeks 1 to 52, 2016



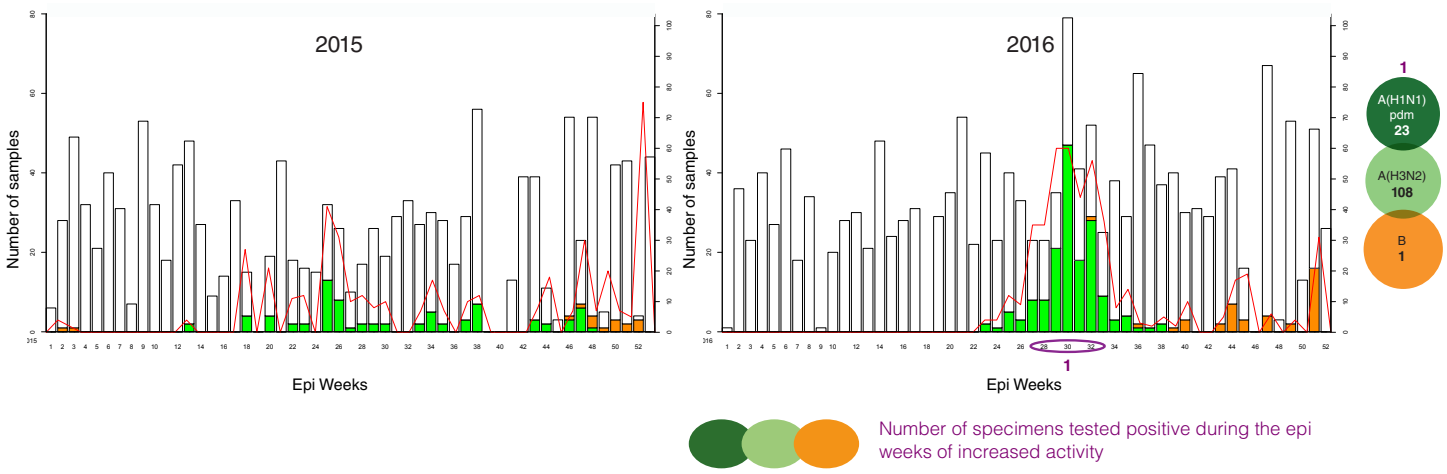
In Togo, a total of 730 specimens were tested and 31% were positive for influenza virus. The predominant influenza virus circulating was influenza type B (68% positive specimens). Influenza activity registered two peaks of distribution, each of which was exclusively composed of one of two influenza types. Influenza A(H3N2) subtype predominated from epi weeks 19 to 25, while influenza type B circulated from epi weeks 39 to 51. (Figure 11)

Figure 11 : Trend of influenza viruses in Togo, epi weeks 1 to 52, 2015-2016



In the Central African Republic a total of 1,687 specimens were tested and 11% were positive for influenza virus. The predominant influenza virus circulating was influenza type A (79% positive specimens) which included 78% of influenza A(H3N2) subtype and 22% of influenza A(H1N1) pdm subtype. It is worth noting that no influenza activity was observed in the Central African Republic until epi week 18 with influenza A(H3N2) subtype predominant from epi weeks 27 to 33. (Figure 12)

Figure 12: Trend of influenza viruses in Central African Republic, epi weeks 1 to 52, 2015-2016



WAY FORWARD

Strengthening of the influenza surveillance system should be undertaken in a step-wise manner. Countries should first ensure that they have the capacity to diagnose influenza viruses and determine seasonal epidemics. Next, the virological surveillance should be enhanced by the integration of epidemiological and virological surveillance data in order to ensure appropriate decision making through the knowledge of the burden of influenza disease. Lastly, collaboration between the human and animal interface should be put in place for better preparation, an early warning system, early detection and rapid response in case of spread.

The top priorities in our region for 2017 to further enhance influenza surveillance are the integration of virological and epidemiological surveillance data which is crucial for improved decision making and the expansion of the network to other countries for better preparedness. The availability of the AFR influenza sentinel surveillance training modules will help countries to reach these critical objectives, by **i)** addressing the epidemiological, virological and data management components of surveillance in one training program, **ii)** training personnel from all areas involved in surveillance activities, and **iii)** providing a standardized training program instituting best practices for sentinel surveillance for Member States.

CONCLUSION

Influenza virological surveillance data collected during the past five years demonstrates that influenza virus activity seems to vary depending on climate and geographic location. This seasonality is clearly observed in Algeria, Senegal and South Africa. The data collected from countries, as part of influenza sentinel surveillance, will better inform predictions of the timing of influenza activity and preparedness for increases in acute respiratory infections, and importantly the introduction of influenza vaccines. Furthermore, the data describes the extent of virus circulation in the region and possible repercussions on health systems and socio-economic development, since influenza epidemics contribute to a high rate of absenteeism. Sentinel surveillance also contributes to the established early warning systems so that a potential outbreak from a new virus subtype(s) can be rapidly identified and contained.

ACKNOWLEDGMENT

We would like to thank all the countries and the teams of individuals who are actively involved in influenza surveillance in Africa for their diligence and commitment to influenza surveillance in the region. To end, we would also like to thank all the partners who support the WHO African region in strengthening the influenza surveillance system.