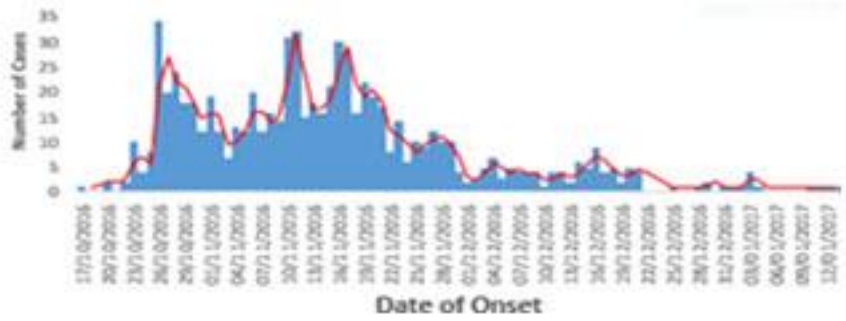
MINISTRY OF HEALTH

Ghana Weekly Epidemiological Report



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Strengthening IHR Implementation at Points of Entry in Ghana: a Vector Surveillance Report

Background

The fast growth of international travel and transport continues to pose a risk to spread of diseases all over the world in very short space of time. The International Health Regulations 2005 Annexe 1B, 5 [1] encourages States Parties to provide as far as practicable a programme and trained personnel for the control of vectors and reservoirs in and near Points of Entry (PoE). This control programmes should target vectors that may transport infectious agent which constitute a public health threat. Vector surveillance and control is therefore a key capacity required under IHR 2005 implementation at PoEs to limit such risks. Competent authorities are required to ensure that facilities used by travelers at PoE are maintained in a sanitary condition and are kept free of source of infection and contamination, including vectors & reservoirs. The Port Health Unit of the Ghana Health Service (GHS) is the competent authority in Ghana with the mandate to see to the implementation of IHR 2005 at all PoEs. The WHO Handbook for Vector Surveillance and Control at Ports, Airports, and Ground Crossings (2016) [2] provides guidance to Member States on the practical aspects of maintaining sanitary standards at international borders and points of entry (i.e. ports, airports, and ground crossings) as prescribed under International Health Regulations (Articles 3 & 9). A recent Joint External Evaluation established the existence of a weak vector surveillance system at PoEs in Ghana. Vector Surveillance at PoE had begun in March 2018 but was limited to reporting on density of vectors observed. Accordingly, the Japan Agency for Medical Research and Development (AMED) offered support under a grant (JP19jk0110012) to address the gaps as part of efforts to strengthen the implementation of IHR 2005 in the country. The GHS and the University of Ghana Noguchi Memorial Institute for Medical Research (NMIMR) in collaboration with the Mie National Hospital, Japan embarked on strengthening of vector surveillance and identification of associated viral pathogens with support from AMED. Resources were made available to enable training, collection and laboratory investigations of animal specimens. This program was initiated in October 2018 to enhance the ability of the GHS surveillance system to sample rodents and mosquitoes and identify viral pathogens of public health importance.

Surveillance Sites

The vector surveillance sites are located within the catchment areas of selected PoE across the country; namely Kotoka International Airport, Elubo Ground Crossing, Takoradi Port and Tema Port. Vectors targeted comprise rodents, adult mosquitoes and their larvae (immature) and other animals will be included in due course. The sites were carefully chosen to cover the 3 types of PoE, namely port, ground crossing and airport **[Figure 1].**

blue dots indicate selected Ports of Entry for the current program.

Figure 1: Map of Ghana showing vector surveillance sites.

Sample Collection

Staff from the selected PoEs had a refresher training at the NMIMR in November 2018, on rodent trapping and biological sampling plus mosquito collection and identification noting biosafety measures to be employed in field conditions. Rodents were trapped at various locations at the 4 PoEs with species identification and examination for the presence of ecto-parasites. Biological specimens including oral swabs, rectal swabs, blood, and tissues were collected. Mosquitoes collected were in 2 categories - adult and larva, which were pooled based on location and species documented. Samples were transported in cold boxes and triple packaged to the NMIMR, University of Ghana, Legon. From January 2019 to April 2019, 40 rodents (10 mice and 30 rats) with 3 ectoparasites and 75 pools of mosquitoes (1 pool of *Anopheles* mosquitoes and 74 pools of *Culex* mosquitoes) have been collected **[Tables 1 and 2].** Animal sampling with collection of biological specimens commenced in January 2019.

Figure 2: Training on sample collection from vectors

Figure 4: Trapped rodent in cage

Figure 3: Demonstration on preparations for shipment

Figure 5: Rodent captured with break-back trap

Table 1: Distribution of rodent and type of sample collected

	Type of Rodent		Sample type					
Facility	**Mouse**	**Rat**	**Rectal swab**	**Oral swab**	**Whole blood**	**Tissues**	**Ectoparasites**	**Total**
KIA	2	2	3	3	4	0	0	**10**
Tema	0	8	8	8	8	0	0	**24**
Takoradi	6	10	15	16	5	10	1	**47**
Elubo	2	10	12	12	9	3	2	**38**
Total	**10**	**30**	**38**	**39**	**26**	**13**	**3**	**119**

Table 2: Distribution of the mosquito species collected

	No. of mosquito pools (No. of mosquitoes)		
Facility	*Anopheles*	*Culex*	**Total**
KIA	0	5 (46)	**5 (46)**
Tema	0	60 (380)	**60 (380)**
Takoradi	1 (2)	6 (39)	**7 (41)**
Elubo	0	3 (5)	**3 (5)**
Total	**1 (2)**	**74 (470)**	**75 (472)**

Laboratory investigations for viral pathogens

Nucleic extracts from rodents were tested by molecular Polymerase Chain Reaction (PCR) methods for Lassa, Ebola, Marburg, Arenaviruses, Rift Valley Fever (RVF), Crimean Congo, Dengue, Zika, Chikungunya, and Yellow fever viruses. The nucleic acid extracts from the mosquitoes and rodent ectoparasites were also tested by PCR for RVF, Dengue, Zika, Chikungunya, Yellow fever, and Crimean Congo viruses [3-7].

Results

The rodent and mosquito specimens tested were negative for the presence of 9 viral pathogens with the exception of a positive detection of Rift Valley Fever virus as shown in **Table 3**. There were 3 rats and 6 *Culex* mosquitoes that showed the presence of RVF virus. It is worth noting these rodents and mosquitoes were trapped outside the terminals of the Points of Entry but within an extended 400-meter radius.

Table 3: Results of animal samples tested for viral pathogens

Surveillance Sites	Rodents* sampled	Rodents RVF positive	Mosquito pools* sampled	Mosquitoes pools RVF positive
KIA	4	0	5	1
Tema	8	0	60	4
Takoradi	16	2	7	1
Elubo	12	1	3	0
Total	**40**	**3**	**75**	**6**

**All the rodent and mosquito specimens were negative for the presence of Ebola, Marburg, Lassa, Arenaviruses, Crimean Congo, Dengue, Zika, Chikungunya, and Yellow viruses*.

Conclusion

The detection of Rift Valley Fever in both rodents and mosquitoes at these sites in the Greater Accra and Western regions suggests a possible wide presence of the virus in animals in Ghana. It was observed that, the current surveillance sites are within or close to the coastal belt. A comprehensive screening program for RVF in domestic animals such as livestock is necessary as this virus has been reported in other parts of Africa [8]. There is need for the extension of vector surveillance to cover various locations in the forest and savannah geographic regions of Ghana. The country has not yet documented any case of RVF in humans. We plan to enhance this vector surveillance program by the conduct of sentinel monitoring, specifically, an RVF viral watch programme of febrile illness cases presenting to health facilities within the environs of these 4 PoEs.

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Summary of Weekly Epidemiological Data for Week 21, 2019

Highlights:

- Nine regions achieve the annualized Non-Polio AFP rate of 2.0 per 100,000 population less than 15 years

DISEASES AND EVENTS - WEEK 21, 2019

The total all-cause notifiable disease morbidity for the week (as per IDSR Weekly Summary Reporting Form) was 951 with one maternal death. Acute watery diarrhoea in persons aged 5 years and above was the highest proportion of cases reported, contributing to approximately 59% of the notifiable diseases' caseload during Week 21 **[See Figure 1 and Annex 1]**

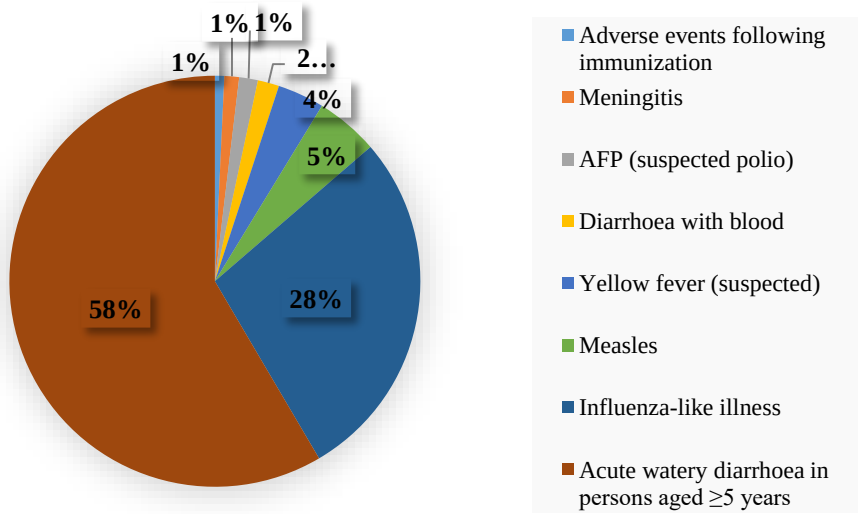

Figure 1: Reported notifiable disease conditions, Ghana, Week 21, 2019

REGIONAL PERFORMANCE BASED ON REPORTING

The best performing region in the week under review was Upper West region with a mean score of 98.8% whilst Central region had the lowest mean score of 80.3%. **[Table 1].** All regions achieved the expected targets (32.3%) for percentage of districts reporting at least a suspected case of Measles or Yellow Fever.

Timeliness and Completeness of reporting for all notifiable conditions for the Week were 98.2% and 99.6% respectively. All regions scored above 95% for both indicators **[Table 1].**

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Table 1: Ranking of Regional Performance based on selected Surveillance reporting indicators, Ghana, Week 21, 2019

Region	Timeli-ness (%) Week 21 A	Complete-ness (%) Week 21 B	Cum. AFP Cases Week 21	Annualized Non-Polio AFP Rate	AFP Score (%) C	Measles % District reporting D	YF % District reporting E	Average Score % (A+B+C+ D+E)/5	Position
Upper West	94.1	100	26	17.2	100	100.0	100.0	98.8	1st
Brong-Ahafo	98.8	100	30	5.4	100	100.0	85.2	96.8	2nd
Western	100	100	18	3.1	100	100.0	81.8	96.4	3rd
Volta	97.9	100	21	3.5	100	88.0	95.5	96.3	4th
Ashanti	97.9	99.5	30	2.3	100	93.3	86.7	95.5	5th
Greater Accra	98.9	100	29	2.3	100	100.0	68.8	93.5	6th
Eastern	99.9	100	22	3.0	100	100.0	61.5	92.3	7th
Northern	99.2	100	25	3.7	100	80.8	69.2	89.8	8th
Upper East	100	100	15	6.3	77.0	84.6	61.5	89.2	9th
Central	95.2	96.2	25	3.0	100	65.0	45.0	80.3	10th
Ghana	**98.2**	**99.6**	**241**	**3.6**	**100**	**89.8**	**72.2**	**92.0**	

INFLUENZA-LIKE ILLNESS (IDSR Weekly Report)

A total of 265 cases with no deaths were reported through IDSR weekly reporting **[Table 2]**. Laboratory samples were sent from sentinel sites to Noguchi Memorial Institute for Medical Research (NMIMR) and awaiting results.

Table 2: Reported Influenza-Like Illness cases by Region and District, Ghana, Week 21, 2019

Region	Districts	Cases	Deaths
Greater Accra	Accra	22	0
	Adentan	12	0
	Ga Central	12	0
	Ga East	20	0
	Ga West	1	0
	La-Dade-Kotopon	5	0
	Ledzokuku Krowor	22	0
	Shai Osudoku	66	0
	Tema	92	0
Upper East	Bolgatanga	2	0
Volta	Ketu South	7	0
Western	Sekondi Takoradi	4	0
Total		**265**	**0**

YELLOW FEVER

Thirty-five suspected cases of Yellow Fever were reported across the country [**Table 3].** Samples were sent to the National Public Health and Reference Laboratory for testing and awaiting results.

Table 3: Suspected Yellow Fever cases by Region, Ghana, Week 21, 2019

Region	District	Cases	Deaths
Ashanti	Adansi North	1	0
	Adansi South	1	0
	Atwima Nwabiagya	2	0
	Sekyere South	1	0
Brong-Ahafo	Sunyani	8	0
Central	Agona West	1	0
Greater-Accra	Ga South	2	0
	Ga West	1	0
	Shai Osudoku	1	0
Eastern	Akwapim South	2	0
	Denkyembour	1	0
	Yilo-Krobo	1	0
Upper East	Bongo	1	0
Upper West	Sissala East	2	0
	Sissala West	1	0
Volta	Akatsi North	1	0
	North Tongu	2	0
Western	Ellembelle	1	0
	Juabeso	1	0
	Nzema East	1	0
	Shama	2	0
	Wassa East	1	0
Total		**35**	**0**

MEASLES

During the Week, 47 suspected cases of Measles were recorded across the country **[Table 4]**. Samples were taken and sent to the National Public Health and Reference Laboratory [NPHRL] for testing and awaiting results.

Table 4: Suspected Measles cases by Region and District, Ghana, Week 21, 2019

Region	Districts	Cases	Deaths
Ashanti	Adansi North	2	0
	Afigya-Kwabre	1	0
	Sekyere South	1	0
Brong-Ahafo	Atebubu-Amanten	1	0
	Nkoranza South	1	0
	Sene West	1	0
	Tano North	1	0
Eastern	Akwapim South	1	0
	Akyemansa	1	0
	Birim North	1	0
	East Akim	1	0
	Kwaebibirem	1	0
	Kwahu South	1	0
	Kwahu West	3	0
Greater-Accra	Ashaiman	2	0
	Ga South	1	0
Northern	Karaga	1	0
	Saboba	1	0
	Sagnarigu	1	0
Upper East	Bolgatanga	1	0
	Bongo	2	0
	Nabdam	1	0
Upper West	Jirapa	1	0
	Lawra	2	0
	Sissala East	7	0
	Sissala West	2	0
Volta	Akatsi North	2	0
	Ketu South	1	0
	North Tongu	2	0
Western	Sekondi Takoradi	2	0
	Suaman	1	0
Total		**47**	**0**

CHOLERA

No cholera case was reported during the Week.

NEONATAL TETANUS

No case of Neonatal Tetanus was recorded during the week

HUMAN RABIES

No case of Human Rabies was recorded in Week 21

MATERNAL DEATHS

During the Week 21, one maternal death was recorded in the New Juaben Municipality.

MENINGITIS

A total of 11 cases of meningitis were recorded with no deaths during Week 21. No district was in either alert or epidemic phase. Lumbar Punctures were done for all 11 cases with none confirmed positive for meningitis. **[Table 5]**.

Table 5: Meningitis cases and deaths by Region, Ghana, Week 21, 2019

Region	Cases	Cerebrospinal Fluid (CSF)	Cerebrospinal Fluid (CSF) Lab Test Positive	Deaths	CFR (%)	District in Alert	District in Epidemic
Ashanti	0	0	0	0	-	0	0
Brong-Ahafo	4	4	0	0	0	0	0
Central	0	0	0	0	-	0	0
Eastern	0	0	0	0	-	0	0
Greater Accra	0	0	0	0	-	0	0
Northern	0	0	0	0	-	0	0
Upper East	2	2	0	0	0	0	0
Upper West	1	1	0	0	0	0	0
Volta	0	0	0	0	-	0	0
Western	4	4	0	0	0	0	0
Total (Ghana)	**11**	**11**	**0**	**0**	**0**	**0**	**0**

ACUTE FLACCID PARALYSIS (SUSPECTED POLIOMYELITIS)

Fourteen cases of Acute Flaccid Paralysis (AFP) were reported in the country in Week 21 **[Table 6]**. The stool specimen was tested at the Polio Laboratory at NMIMR were negative for wild poliovirus.

Table 6: Suspected Polio cases by Region and District, Ghana, Week 21, 2019

Region	Districts	Cases	Deaths
Brong-Ahafo	Jaman South	1	0
	Kintampo South	2	0
Central	Abura-Asebu-Kwamankese	1	0
Greater Accra	Accra	1	0
	Ga East	1	0
Upper East	Nabdam	1	0
Upper West	Sawla-Tuna-Kalba	1	0
	Sissala West	1	0
Volta	Akatsi North	1	0
	Ho	1	0
	Ketu South	1	0
Western	Bibiani-Anhwiaso-Bekwai	1	0
	Jomoro	1	0
Total		**14**	**0**

Summary on Acute Flaccid Paralysis (AFP) Indicators, Week 1 – 16, 2019

All regions achieved the annualized Non-Polio AFP rate of 2.0 per 100,000 population less than 15 years as at the end of Week 21 **[Table 7].** All regions achieved timeliness and adequacy of stool received by the laboratory except Greater Accra (69.0%) which failed to achieve for adequacy of stool submission.

Table 7: Summary on Acute Flaccid Paralysis Surveillance, Ghana, Week 1 – 21, 2019

Region	Population Under 15 years	Expected Non-Polio AFP for the year	Reported AFP	Compatible	Discarded	Annualized Non-Polio AFP Rate	% Timely Stools	% Adequate Stools
Ashanti	2,559,248	52	30	0	24	2.3	90.0	83.3
Brong-Ahafo	1,199,191	24	30	0	26	5.4	86.7	86.7
Central	1,216,036	25	25	0	15	3.0	100.0	100.0
Eastern	1,345,144	27	22	0	16	3.0	90.9	81.8
Greater Accra	2,148,065	43	29	0	20	2.3	69.0	69.0
Northern	1,348,239	27	25	0	20	3.7	92.0	88.0
Upper East	498,068	10	15	0	13	6.3	100.0	100.0
Upper West	353,090	7	26	0	25	17.2	100.0	100.0
Volta	1,116,490	23	21	0	16	3.5	95.2	81.0
Western	1,204,310	24	18	0	15	3.1	83.3	83.3
Ghana	**12,987,880**	**261**	**241**	**0**	**190**	**3.6**	**89.7**	**86.3**

ANNEX 1: SUMMARY OF REPORTED CASES/ EVENTS: WEEK 21 (WEEK ENDING 26 MAY 2019)

Disease/Health Event (suspected/confirmed)	Week 20			Week 21			Cumulative to Week 21		
	Cases (susp)	Deaths	CFR (%)	Cases (susp)	Deaths	CFR (%)	Cases (susp)	Deaths	CFR (%)
AFP (suspected polio)	13	0	0	14	0	0	241	0	0
Acute haemorrhagic fever syndrome	0	0	-	0	0	0	0	0	-
Adverse events following immunization	11	0	0	7	0	0	104	0	0
Anthrax	0	0	-	0	0	0	0	0	-
Acute watery diarrhoea in persons aged ≥5 years	1,096	0	0	556	0	0	20,309	0	0
Cholera	0	0	-	0	0	0	0	0	-
Dengue fever	0	0	-	0	0	0	0	0	-
Diarrhoea with blood	24	0	0	16	0	0	899	0	0
Dracunculiasis (Guinea worm)	0	0	-	0	0	0	0	0	-
Influenza-like illness	321	0	0	265	0	0	9,639	0	0
Maternal deaths	-	1	-	-	1	-	-	48	-
Measles	46	0	0	47	0	0	1,088	0	0
Meningitis	17	0	0	11	0	0	658	20	3.0
Neonatal tetanus	0	0	-	0	0	0	6	2	33.3
Plague	0	0	-	0	0	0	0	0	-
Public health event of international concern (PHEIC)	0	0	-	0	0	0	0	0	-
Human rabies	0	0	-	0	0	0	2	2	100
SARS	0	0	-	0	0	0	0	0	-
Smallpox	0	0	-	0	0	0	0	0	-
Yellow fever (suspected)	38	0	0	35	0	0	2,421	0	0
NATIONAL TOTAL	**1,566**	**1**	**0.0**	**951**	**1**	**0**	**35,367**	**72**	**0.1**

***CFR does not include maternal deaths**

This report and subsequent ones should be shared with regional and district heads as well as heads of other agencies. A feedback addressed to the Editor-In-Chief is welcome

Editorial Board & Team