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April - June 2016 Highlights

A Sure Pathway to Stronger Disease Surveillance:
Uganda Frontline Field Epidemiology Training Program graduates the first cohort

By Dr. Hasifa Bukirwa, Frontline FETP, AFENET

The Field Epidemiology Training program (FETP) Frontline Surveillance Training is a 3-month in-service program focused on equipping health workers with practical skills necessary to manage all aspects of the disease surveillance cycle including data use for decision making at the primary healthcare level. By targeting managers and health workers responsible for handling data at primary health care level, the frontline FETP strengthens routine disease surveillance and ultimately enables healthcare systems to detect and respond to diseases and events of public health importance or international concern.

The newly graduated Frontline FETP cohort share a light moment with the US Ambassador and MOH Officials

In Uganda, implementing Frontline FETP commenced in January 2016 with the full support and involvement of the Ministry of Health. Participants of the inaugural class which commenced in April 2016 were drawn from four central districts of Mukono, Kayunga, Nakaseke and Nakasongola. They included district health officers, biostatisticians as well as surveillance and HMIS focal persons.

The benefits of the training which are expected to include increased capacity among health staff to recognize public health problems pertinent to the population and increased capacity among staff to provide a descriptive analysis of a public health problem among others. including typhoid and cholera during their fieldwork projects. The close collaborating relationship between the frontline and advanced FETP program has seen the advanced FETP fellows take an active role in training and mentoring of frontline participants . Additionally the joint investigation of suspected disease outbreaks has ensured an early reality of building a network of well-trained surveillance officers in the country. With the graduation of the first cohort of trainees in July 2016, an occasion that was graced with presence of the US Ambassador to Uganda, the training team is already looking ahead and will immediately be starting to train the next group of districts which will target six districts in northern Uganda.

Uganda adapts the WHO medical eligibility wheel for improved quality Family Planning care

By Emily Atuhaire Barigye, Reproductive health

The medical eligibility wheel is a simple tool recommended by the World Health Organization for use by family planning providers. The tool utilizes information on the woman's health or medical condition to determine the most suitable option for contraception basing on scientific evidence.

Women desiring to prevent unintended pregnancy or short birth intervals are encouraged to use contraceptives. However, before initiating contraceptives, it is recommended that providers work with the individual clients to identify the most suitable method based on the individual requirements.

Until recently, the national family planning policy on contraceptive was not up to date on the criteria used by providers when handling different client needs. This impacts on the uptake of family planning services by women in cases where certain methods are not recommended. The incentive for using the medical eligibility criteria (MEC) is that it empowers both provider and client with necessary information thus building confidence in the quality of services rendered .

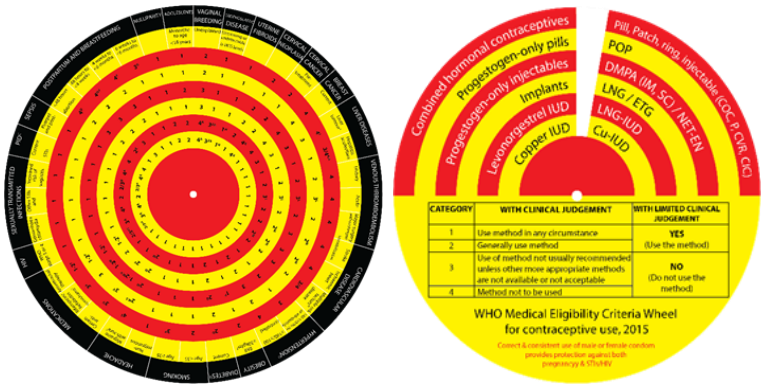

Fig 1: The Adapted Uganda Medical Eligibility Criteria Wheel

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EDITORIAL

Dear Reader,

Welcome to the third issue of the quarterly epidemiological bulletin of the Uganda National Institute of Public Health (UNIPH). This bulletin aims to inform district, national and global stakeholders on the public health interventions undertaken in disease prevention and control. In this issue, we share updates from some of the host placement sites for the Uganda Public Health Fellowship Program - Field Epidemiology Track. We bring you highlights on a number of outbreaks responded to and investigated such as the Yellow Fever outbreak in Masaka, Cholera outbreak caused by drinking river water in Bwikhonge, Bulambuli district, and the Rift Valley Fever outbreak in Kabale district. We also present highlights on missed opportunities for Yellow Fever surveillance for the period July 2015 to May 2016. In case you would like to access references used in this issue, feel free to contact us at: inabukenya@yahoo.com OR ckihembo@musph.ac.ug. We will appreciate any feedback regarding the content and general out-look of this issue and we will be delighted to hear from you. Have a nice read

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It is against this back ground that the Reproductive Health Division of the MoH embarked on the journey to adapt the 2015 WHO criteria for improved quality of care for family planning users. The Uganda MEC guidance is in advanced stage following a series of stakeholder meetings by the RH division and partners during which it was customized to suit the local needs.

How to use the tool: The wheel matches up contraceptive methods shown in the inner disk, with specific medical conditions or characteristics shown in the outer rim. The numbers in the viewing slot indicate whether the woman who has this known condition or characteristic is able to start use of the contraceptive method. Recommendations on the choice of contraceptive are grouped into 4 categories based on availability of clinical judgment as shown below.

CATEGORY	WITH CLINICAL JUDGEMENT	WITH LIMITED CLINICAL JUDGEMENT
1	Use method in any circumstance	YES (Use the method)
2	Generally use method	
3	Use of method not usually recommended unless other more appropriate methods are not available or not acceptable	NO (Do not use the method)
4	Method not to be used	

Fig 2: Categories of contraceptive choices

The beauty with this wheel is that is empowers the average woman to make an informed decision on their choice of contraceptive without coercion. If implemented, the medical eligibility criteria will go a long way to build confidence and encourage uptake of Family planning methods by women.

EDITORIAL TEAM

PHEOC spearheads Yellow Fever enhanced surveillance in 18 at risk districts

By Lydia Nakiire, FETP Fellow PHEOC

Between March and April 2016, Yellow fever outbreaks were confirmed in Masaka and Kalangala districts in central region and Rukungiri district in Western Uganda. Yellow fever is an acute viral hemorrhagic fever transmitted by bites of infected Aedes mosquitoes. The disease initially presents with sudden onset of fever, chills, headache, backache, myalgia, prostration, nausea and vomiting. 15% of the cases progress to the more severe form which presents with jaundice, hemorrhage, shock and multiorgan failure. The case fatality rate ranges from 20-50% among the cases with hepatorenal dysfunction. A total of 22 cases were documented including seven (7) laboratory confirmed cases with a case fatality rate of 40%. Subsequently, the Ministry of health (MOH) together with partners instituted measures to prevent the spread of the outbreak to neighboring districts., A comprehensive response plan was implemented which included treatment of cases, strengthening surveillance, creation of public awareness, assessment of mosquito distribution in the three districts and epidemiological assessment of other high risk districts.

As part of this response, the Public Health Emergency operation Centre (PHEOC) with support from the CDC went ahead to implement enhanced surveillance in 18 neighboring high risk districts with the goal of strengthening surveillance. This was through training of health workers and strengthening of the laboratory system to collect and transport specimen of suspected yellow fever cases. The workshops aimed at highlighting the distribution, clinical presentation of yellow fever, and the differential diagnoses The training also highlighted the national laboratory specimen transport system and national communication system for public health events. The workshops were facilitated by a team from PHEOC, the Public Health fellowship Pro-

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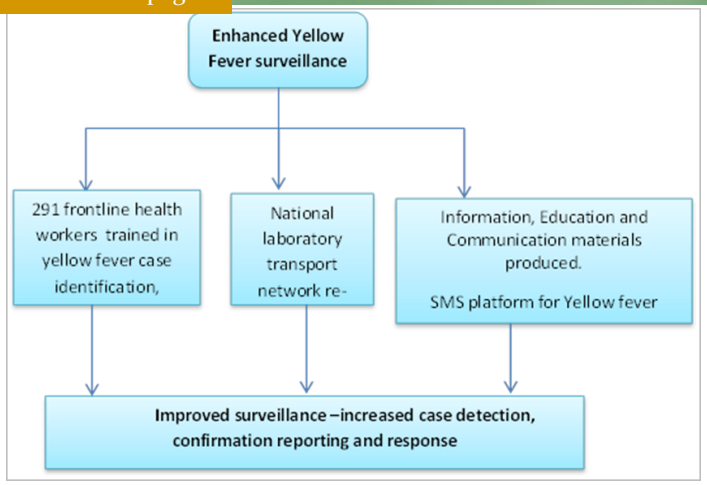

Fig1: Enhanced Yellow fever surveillance activities

-gramme, Central Public Health Laboratories and laboratory specialist from the Uganda Virus Research Institute. This activity kicked off on 23/05/16 with workshops on yellow fever and Onyong Nyong fever in 18 districts neighboring the three high risk districts. The Enhanced yellow fever surveillance workshops were hosted in Masaka, Mbarara and Kabale districts with a total of 291 health works trained. The workshops lasted for three days and attracted frontline health workers from 18 districts in the Masaka and Mbarara health regions.. The cadres trained included district surveillance focal persons, district laboratory focal persons, Hub system coordinators, clinicians from hospitals, health centre IV and health centre III.

The National Specimen Transport and Laboratory referral Network-Hub system plays a central role in confirming and monitoring the course of an outbreak. The Hub-system which is PEPFER funded was established in 2013 to improve efficiency of specimen transportation and turnaround time of the results from the laboratory. During the workshop participants were trained on role and functioning of the Hub-system.

Communication is vital to link the districts to the national level once a sample for a suspected case is taken off until results are sent back to clinicians from the laboratory. The communication system which is hosted by the national data base, District Health Information System 2 (DHIS2) is managed by the PHEOC. The registered district health workers were provided with toll free sms codes "AlertYF" and AlertON which are to be sent to 8228. For unregistered cadres the sms code PHEOC was provided to be sent to 8228.

The national surveillance system can detect the yellow fever cases in the neighboring districts when there is case identification, the national specimen transport network and communication are emphasized at health facilities and the community. Efficiency of these three platforms will improve surveillance in the district.

A missed opportunity for early cancer diagnosis

By Dr. Kusiima Joy, FETP Fellow, Uganda Cancer Institute

Mary (not real name) is a young lady who looked towards a happy motherhood when she discovered she was pregnant with Suubi (not real name). Mary's pregnancy and delivery were all normal and smooth with no complications. Suubi achieved all her milestones as per expected timelines until at one year of age, when Mary noted that Suubi's gait looked rather unusual. Immediately, she visited a renowned doctor specialist in caring for children and all basic tests turned out normal. Mary was reassured that Suubi was alright. Suubi was scheduled for follow up review at four years of age. However, at three years, the mother noted that Suubi's speech was a little slower than expected compared to other children of her age (in the neighborhood) and she could not hold a pencil firmly when scribbling. Mary had a bad feeling about these startle symptoms but she held onto the health workers' reassurance. At four years of age, the mother faithfully returned to this renowned specialist for review with similar complaints. This time, the specialist not only repeated the tests conducted three years ago but also referred to another specialist who had advanced skills in children ailments. Suubi was finally diagnosed with an advanced malignancy in the brain approximately three years after initial contact with a health worker.

This story represents a significant number of cancer patients who have interacted with the health system early enough but due to health system related factors, opportunities for early cancer diagnosis were missed. These patients have finally made it to the recommended cancer treatment centers with advanced disease and they have to pay a lot of money to have a good quality end of life care (palliative care).

Early detection is the hall mark of effective successful cancer treatment, however majority of cancer patients at treatment institutions in Uganda usually present at designated treatment centers with disease in advanced stages. While it is true that patient related factors may be responsible for late diagnosis, there are health system barriers that more than often also result in late diagnosis of cancer patients even when the patients interact with a health system in time. Health worker related factors that may result into delayed cancer diagnosis include; a low index of suspicion, lack of adequate cancer knowledge ("the eye see what it knows"), absence of cancer screening guidelines and unclear referral systems.

Early cancer diagnosis can only happen when a health worker maintains a high index of suspicion for any patients who present at their desk. A high index of suspicion can be achieved by enhancing cancer related knowledge levels among health workers. A study conducted among medical workers in Mulago National referral teaching hospital showed that only 29% of the workers were knowledgeable about the risks of a common cancer (cancer of the cervix) [1].

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If a health worker in a teaching institution has such knowledge levels, what would we expect of health workers who reside in rural institutions and serve over 80 percent of the Ugandan population?

The Ugandan health system is made up of the public and private sectors. All these players need to be constantly sensitized about the increasing number of cancer cases and the importance of early diagnosis.

Cancer awareness programmes among health workers should take a bottom up approach. With such an approach, sensitization starts at the lowest health care unit and slowly moves up the tier in the health care system. The lowest healthcare units in our system include the Village Health Team (VHTs) and health workers at HCII level. VHTs are responsible for the welfare of the community. They have been involved in many integrated health programmes such as the integrated management of child hood illness, responses to the HIV AIDS response and care for orphans and vulnerable children. They have been involved in many integrated health programmes such as the integrated management of child hood illness, responses to the HIV AIDS response and care for orphans and vulnerable children.

There is need to design programmes to increase cancer awareness among this group. Knowledge of cancer among the VHTs and health workers at HC11, will translate into increased sensitization of the family unit and timely referral to higher diagnosing units.

Cadres at the health center HCIII levels are mandated to provide basic preventive, promotive and curative care. These cadres need to be equipped with key information on the likely presentations of common malignancies. They should be given skills on how to conduct proven screening techniques such as self-breast examination, visual inspection of the cervix. This will contribute to timely referral of cancer suspects to higher units.

Increased awareness of cancer among health workers at the HCV level general and regional hospitals, will result into active screening of population at risk, improvement in specimen collection and follow up. This bottom up approach in improving cancer diagnostic knowledge among health workers will also foster strong collaborations between specialized cancer treatment units and the lower health units. This will contribute to timely diagnosis of cancer among patients who interact with the health workers early enough.

Risk Factors for Yellow Fever Transmission in Masaka district, March-April 2016

Leocadia Kwagonza[1], Ben Masiira[1],Daniel Kadobera[1], Alex R. Ario[1], Bernard Lubwama[2]

1Public Health Fellowship Program- Ministry of Health
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On 28th March, 2016, the IDSR Focal Person of Masaka district alerted Ministry of Health of a cluster of three deaths from a hemorrhagic strange disease all from the same family. We investigated the extent and risk factors for the disease. We found that the population was not vaccinated against Yellow Fever. Cultivating in forested or swampy areas were associated with Yellow Fever transmission (OR; 5.7, 95% CI: 1.5-22.0) and (OR; 5.2, 95% CI: 1.5-17.5) respectively. The entomological assessment revealed evidence of the vectors (Ae. africanus), the reservoir (Sylvatic monkeys) and the breeding sites for the vectors seen around the cultivation areas. This was suggestive of sylvatic Yellow Fever transmission. We recommended Mass Yellow Fever vaccination and enhanced surveillance to prevent future outbreaks.

Introduction: Yellow fever is an acute viral hemorrhagic disease transmitted by the Aedes mosquito. The Yellow fever virus is an RNA virus that belongs to the flavivirus genus and is commonly found in tropical regions of Africa and South America. Yellow fever is considered to be a re-emerging disease due to its increased outbreaks in the recent years. This may be attributed to declining population immunity, increased human activities such as deforestation, population movements and climate change. On 28th March, 2016, the IDSR Focal Person of Masaka district alerted Ministry of Health of a cluster of three deaths from a hemorrhagic strange disease all from the same family. We investigated the epidemiologic characteristics, risk factors for the transmission and developed recommendations to control future outbreaks.

Methods: We defined a suspect case as any person who lived in Masaka District from January 2016 onwards presenting with acute onset of fever (T>37.5°C) AND had failed to respond to malaria treatment with at least two of the following: Abdominal pain/diarrhea, Headache, Jaundice, Unexplained bleeding; A confirmed case was a suspect with a positive PCR or IgM laboratory test. We actively identified cases through visiting affected communities, responding to alerts and reviewing health facility records. We assessed for history of Yellow Fever vaccination, cultivation in forested and swampy areas.

We conducted descriptive analysis on the 19 cases to generate hypotheses which were tested using a case control study. The analytical study was composed of 19 cases and 73 controls. We matched one case-patient to four village controls of same sex and similar age-group (±5 years). We defined a control as any person who had no life history of symptoms that match with suspected case definition above.

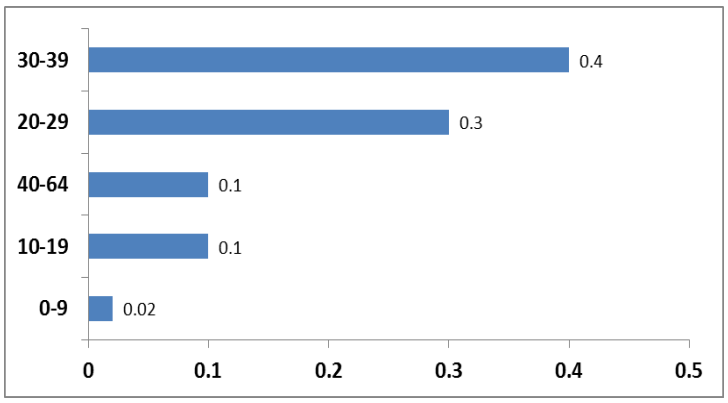

Fig1: Attack rates (per 1,000) by age group during the yellow fever outbreak in Masaka district

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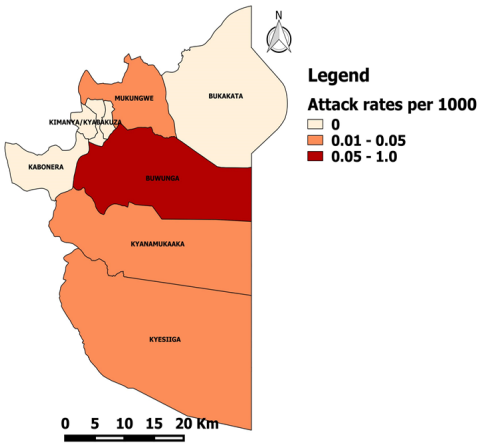

Fig 3:Distribution of Yellow Fever cases and attack rates by sub-county

Results: A total of 19 cases were identified. Their mean age was 29 (SD=13), ranging from 9 to 64 years. Males were more affected, attack rate = 0.3/1,000 compared to females, attack rate = 0.1/1,000. 30- 39 year olds were more affected, attack rate =0.4/1000 compare to the other age groups (Figure 1). Their main occupation was subsistence farming. Buwunga Sub-county was the most affected with an attack rate of 0.4 per 1000 as shown in figure....

The first case had a date of onset in the week of 14th to 20th February 2016 and the highest number of cases had date onset of symptoms during the week of 20th to 26th March, 2016 (Figure 1).

Environmental findings: Entomological investigations revealed presence of both the vector (Aedes egypti) and the sylvatic monkeys (the host) with abundant breeding sites.

Case control findings: Yellow Fever was strongly associated with; cultivating in swampy areas (OR 6.6; 95% CI: 2.0-21.0), cultivated in forests (OR 5.7; 95 % CI: 1.5-25.0), visiting more than one forests (OR 5.2; 95% CI: 1.5-17.5) and visiting more than one swamp (OR 8.1; 95% CI: 1.8 -45.2). All participants were not vaccinated against Yellow Fever.

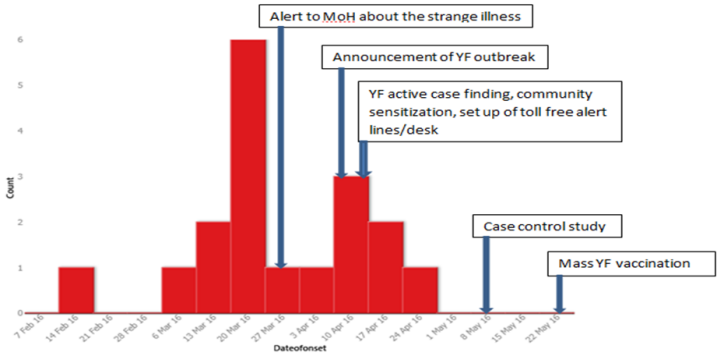

Fig 3: Epidemic curve showing distribution of yellow fever cases in Masaka District

Discussion: In this area of the outbreak, it is majorly the young male adults that undertake activities around forests and swamps including clearing of forests and swamps for agricultural activities. This may explain the higher risk observed among young males in this study. This is similar to what was observed during the 2010 large outbreak of yellow fever in the Northern part of Uganda [1].

Entomological investigations and observations made by the investigation team showed that both the vector (Aedes mosquitoes) and Sylvatic monkeys (a host for yellow fever) are present in forests, swamps and homes around the outbreak area. This case control study was able to epidemiologically link these forests and swamps to increased risk of development of yellow fever among people who cultivate or visit these ecosystems. To our knowledge, there are no studies that have assessed human activity around forests and swamps as a risk factor for development of yellow fever in Uganda and elsewhere. The findings of this study indicate that this outbreak was possibly as a result of Jungle (Sylvatic) mode of yellow fever transmission.

In the population where this outbreak occurred, no one was vaccinated against yellow fever. This implies that there is little or no immunity against yellow fever and therefore this area remains prone to future outbreaks if no intervention is put in place. WHO recommends Yellow fever mass vaccination as the most effective means of controlling yellow fever outbreaks [2]. To prevent transmission in a region with an outbreak, mass vaccination should target vaccinating ≥80% of the population. However, immediate interventions should include sensitizing the community to reduce the risk of mosquito bites while engaging in activities in and around forests or swamps and seeking early treatment. On 19th May 2016, Ministry of Health and its partners implemented the Mass Yellow fever vaccination too the affected/ susceptible communities and reached a coverage of over 90%.

Table 1: Assessment of factors associated with yellow fever

Variable	Case N (%)	Control N (%)	OR	95% CI
Cultivates in forested areas				
Yes	11 (57.9)	20 (27.0)	5.7	1.5-22.0
No	8 (42.1)	54 (73.0)	1.0	-
Visiting forested areas				
Yes	10 (52.6)	15 (20.3)	5.2	1.5-17.5
No	9 (47.4)	59 (79.7)	1.0	-
Cultivates in swampy areas				
Yes	13 (68.4)	20 (27.0)	6.6	2.0-21.0
No	6 (31.6)	54 (73.0)	1.0	-
Visiting swampy areas				
Yes	8 (42.1)	11 (14.9)	8.1	1.8-45.2
No	11 (57.9)	63 (85.1)	1.0	-
Presence of monkeys on farm				
Yes	11 (57.9)	22 (29.7)	3.0	1.0-8.4
No	8 (42.1)	52 (70.3)	1.0	-
Vaccinated against Yellow Fever				
Yes	0 (0)	0 (0)	-	-
No	19 (100)	74 (100)		

Conclusions and recommendations: This was a yellow fever outbreak that occurred in a population without immunity against yellow fever virus. The outbreak was linked to working or travelling to forests and swamps which is suggestive of Jungle Sylvatic transmission. We recommended mass yellow fever vaccination and community sensitization focusing on reducing the risk of mosquito bites. Yellow fever surveillance system should be strengthened so that cases if any are detected early enough and further spread prevented.

References.

1. Joseph F. Wamala a, et al., Epidemiological and laboratory characterization of a yellow fever outbreak in Northern Uganda, October 2010–January **2011**

2.WHO, Yellow fever Fact sheet Updated **March 2016. 2016.**

A cholera outbreak caused by drinking contaminated river water, Bulambuli District – Eastern Uganda, March 2016.

Paul. E. Okello1, L. Bulage1, A.R.Ario1

1Public Health Fellowship Program – Field Epidemiology Track

On 25th March 2016, Bulambuli district reported a sharp increase cholera cases. We conducted an investigation to determine the scope of the outbreak, mode of transmission, and to inform control measures. Cases were identified using standard case definitions. In a case control study we compared drinking water practices among 100 suspected case persons and 100 asymptomatic neighborhood control persons matched by age. Direct consumption of contaminated Cheptui river water was significantly associated with contracting cholera (ORMH = 7.8, 95% C.I 2.7-23.0). Direct consumption of borehole water was protective (ORMH = 0.31, 95% C.I = 0.13-0.65). We recommended health education, including treatment of river water before drinking in the short term, and the construction of protected boreholes in the long run.

Introduction: Bulambuli district and its neighbouring districts in Eastern district had been experiencing a cholera outbreak since February 2016 documenting sporadic cases over this period. However, on 24th March 2016, Bulambuli district alerted the ministry of health of sharp increase in the cholera cases. We investigated the outbreak in Bwikhonge sub-county in Bulambuli district in March 2016 to establish the scope of the outbreak, identify the mode of transmission, and inform control measures.

Methods: We defined a suspected case as sudden onset of watery diarrhea from 1 March 2016 onwards in a resident of Bulambuli District. A confirmed case was a suspected case with positive stool culture for V. Cholerae. We conducted active case-finding when? We conducted all the investigations in Bwikhonge sub-county in Bulambuli district since the line-list revealed that over 80% of the cases were located in that sub-county. There were few cases in the other sub-counties but time and resources did not allow the coverage of those other areas. Hypothesis generation: We performed descriptive epidemiologic analysis, and conducted hypothesis-generating interviews of 40 suspected case-patients. To test hypothesis, we conducted a case-control study involving 100 suspected case-patients and 100 asymptomatic controls, individually-matched by village of residence and age. We also conducted an environmental assessment for possible contamination of Cheptui river water.

Results: We identified a total of 108 suspected cases and 7confirmed cases. All age groups ranging from 5 to 86 years were affected, with equal distribution of the sexes. Cholera is spread via the fecal–oral route; water is a candidate but not food because the village residents did not share food that was centrally prepared and eaten within a short time like in a social gathering. Interviews revealed that cases ate hot food (in principle devoid of pathogens).Bwikhonge parish was the most affected, attack rate 3.1/100 and the overall attack rate in Bwikhonge sub-county was 1.3/100 as s hown in table 1.

The epicurve (figure 1) showed a continuous common source outbreak as evidenced by a steep increase in the number of cases, multiple peaks between 25th March and 03rd April and a gradual decrease in the number of cases lasting more than the longest incubation period of 05 days for cholera. There were sporadic cholera cases between 2nd March and 21st March involving one or two cases per day but within one incubation period of each other.

Parish	Freq	Population	Attack rate/100
Bwikhonge	83	2689	3.1
Bulumera	23	1849	1.2
Bunalwere	1	1597	0.1
Buwabwala	1	756	0.1
Buwekanda	0	1513	0
Total	**108**	**8404**	**1.3**

Table 2: attack rates in the affected sub-counties in Bulambuli district.

Preventive and control interventions were already on-going in the area and could have contributed to the few cases. Transmission mode varied in this period.

Taking the longest incubation period of cholera to be 05 days and the mean as 03 days, one can count backwards three days from the 25th March when the majority fell sick, to 22nd march as the most likely date of exposure. Given that 22nd March was the most likely date of exposure, the curve cannot depict a point source outbreak because the last case in the cluster was 03rd April and counting backwards 05 days should lead one to 22nd March but does not. Instead, counting back 05 days points to 29th March and the disagreement in these dates point to continuous common source outbreak.

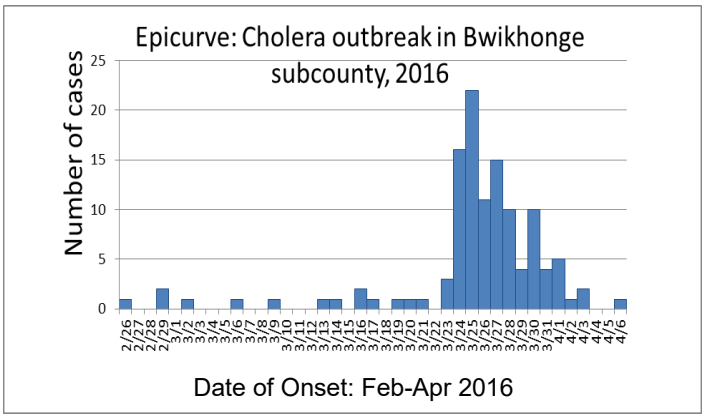

Figure 1: Distribution of cholera cases over time (Epicurve) in Bwikhonge sub-county

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The 12-day period between 23rd March and 03rd April depicting the intense phase is longer than 5 days (the longest incubation period of cholera). It would have been 05 days had it been a point source scenario . This therefore makes it a continuous common source outbreak. The last cholera case on 06th April is an outlier and might not be linked to the larger cluster.

Environmental assessment findings. There was evidence of open defecation s noted around most of the homesteads in the study area. Additionally, the village folk wash their soiled clothes at the drinking water collection points. Two out of seven water collection points along River Cheptui yielded Vibrio cholera 01 ogawa on culture.

Case control study. In the case-control study, 78% (78/100) of case-patients versus 51% (51/100) of control-persons usually collected drinking water from the nearby Cheptui River (ORMH=7.8, 95%CI=2.7-22); conversely, 35% (35/100) of case-patients versus 54% (54/100) of control-persons usually collected drinking water from boreholes (ORMH=0.30, 95%CI=0.13-0.65).

Variable	Cases-n (%)	Controls-n (%)	OR_{MH}	95%CI
Cheptui river water routine work				
No	17(17)	31(31)		
Yes	81(83)	69(69)	3.8	1.4-10.0
Swamp water for routine work				
No	86(88)	97(97)		
Yes	12(12)	3(3)	5.5	1.2-25.0
Borehole water for drinking				
No	63(64)	46(46)		
Yes	35(36)	54(54)	0.31	0.13-0.65
Untreated Cheptui river water for drinking				
No	22(22)	49(49)		
Yes	76(78)	54(51)	7.8	2.7-22.0

Table 2: Risk factors for transmission (n=100 Cases, n = 100 controls)

Persons drinking untreated river water were 8 times more likely to contract cholera. Bore hole water consumption was protective. Vibrio cholera 01 Ogawa was isolated in 2 of the 7 river water samples.

Conclusion and recommendations: This was a continuous common source cholera outbreak caused by drinking unboiled, contaminated water from Cheptui River. We recommended boiling and/or treating water, restriction on washing clothes near drinking-water collection points, sanitation improvement, and provision of chlorine tablets to the affected villages, and construction of more boreholes in the long term. After implementing the short term measures, cases declined and completely stopped after 6 April 2016.

Rift Valley Fever outbreak in Kabale district, March-April 2016: The first reported human outbreak in Uganda

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In what appears to be a new emerging viral infection in Uganda, two non-fatal human confirmed Rift Valley Fever Virus (RVFV) infections were reported in Kabale district, Southwestern Ugandan in March-April 2016. These are the first reported human cases of RVF in Uganda following a suspected spillover of a missed RVF outbreak among livestock in the region. There was no clear epidemiological link between the two cases as noticed in the apparent modes of transmission. This outbreak highlights the potential of zoonotic diseases crossing the livestock-human interface to cause diseases in humans. We recommend acute febrile illness sentinel surveillance in abattoirs as a proxy for RVF transmission in this district for early detection of RVF in humans.

Introduction: On 7th March 2016, the Uganda Ministry of Health received a report of a suspected case of viral hemorrhagic fever (VHF) in Kabale Regional Referral Hospital, Kabale district South West Uganda. Two cases were subsequently confirmed as Rift Valley Fever Virus (RVFV) by Reverse Transcriptase Chain Reaction (RT-PCR) at Uganda Virus Research Institute, Entebbe. A subsequent RVF sero-survey in 1051 domestic animals in Kabale and the neighboring districts showed strong evidence of RVF IgG seroprevalence in cattle (27%), goats (6.5%) and sheep (5.7%). Prior to the current outbreak, no reported RVF human cases had been reported in Uganda.

Here we report the findings of an epidemiological investigation on the extent of the outbreak in the human population and identification of sources of infection and the risk factors in order to inform interventions for controlling the outbreak.

Methods: We defined a suspect RVF case as acute onset of fever (>37.50C) in Kabale district resident? and a negative malaria test and at least two of the following symptoms: headache, muscle or joint pain and plus any gastrointestinal symptom. A confirmed case was a suspected case that is laboratory confirmed by detection of RVF nucleic acid by RT-PCR or demonstration of serum IgM or IgG antibodies by ELISA. We actively identified cases by visiting affected communities, abattoirs and reviewing of clinical records in

Results: Between 10th March to 23rd April 2016, we identified 24 suspect cases including two confirmed cases.

Confirmed cases. The dates of onset of symptoms for a 50-year old schoolboy and the 42-year old butcher were February 13th and 18th 2016 respectively. Infection of the index case appears to be vector-borne transmission as opposed to meat handling in the second case. There was no clear epidemiological link between the two cases.

A records review in 10 health centers in the vicinity of the area where the primary case originated also did not reveal any noticeable increase in number of acute febrile illnesses, hemorrhagic manifestations, central nervous system or ocular lesions. Similarly, there were no reported similar symptoms among other abattoir workers in the area. Three weeks prior to onset of symptoms of the primary case, 3 cow abortions within the same week were reported in a nearby farm. That, in addition to multiple successive goat first-trimester abortions from October 2015 in the nearby farms.

Conclusion : We report the first two independent cases of human RVF infections in Uganda in a small-scale outbreak. These observed human cases appear to have been a random spillover of a RVF outbreak among the livestock population into the human population that manifested largely as first trimester abortions in goats stocks in the area. The progression and the extent of this outbreak appear to have been self-limiting .

The high RVF sero-prevalence among most of the susceptible domestic animals in the area shows the likelihood of similar spillovers and sustained vectorial transmission in the human population to be high. Human RVF infections appear to be an emerging disease in Uganda with paucity of information on transmission and spectrum of clinical manifestations ranging from: asymptomatic presentation to hemorrhagic manifestations and neuro-ocular lesions and lasting complications to potential death. This is coupled with infrequent nature of the outbreaks requires deeper understanding.

Zoonotic disease surveillance at the human-livestock interface is key for early identification of RVF from livestock. Acute febrile illness sentinel surveillance amongst abattoir workers in the area is recommended for detection of RVF transmission in humans in this setting.

Long term trends and geographical distribution of animal bite injuries and deaths due to human rabies infection: analysis of 2001-2015 epidemiological surveillance data in Uganda.

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In absence of accurate data on trends and burden of human rabies infection in developing countries, animal bite injuries provide useful information to bridge that gap. Rabies is one of the most deadly infectious diseases, with a case fatality rate approaching 100%. We describe trends and geographical distribution of animal bite injuries, a proxy of human rabies, and deaths due to suspected human rabies in Uganda from 2001 to 2015. A total of 208,720 cases of animal bites were treated at health facilities in Uganda; Central region 27%, Eastern region 22%, 27% in Northern region and 23% in Western region. Of the 48,720 bites treated from 2013 – 2015, 59% were among males; 19% were children ≤5 years. Overall incidence was 58.1 per 100,000 with a significant

Introduction.

The burden and trends of human rabies infection in developing countries is poorly understood due to limited diagnostic capacity and lack of accurate data. Animal bites injuries in humans provide an important source of epidemiological information which is crucial in detecting trends in rabies incidence and enhancing surveillance systems.. Despite of availability of effective post exposure vaccine treatment, rabies is estimated to kill 50,000 to 60,000 people worldwide each year and it was responsible for 1,460,000 Disability Adjusted Life Years in 2010.. Canine rabies has been eliminated in most off the western world but still remains an under-reported public health problem in the African region.. The African region also faces a challenge of paucity of information about human rabies infection yet this is essential in planning and implementation of effective control strategies. We describe trends and geographical distribution of animal bite injuries and suspected rabies deaths in Uganda using weekly epidemiological surveillance (health management information system) data collected between 2001 and 2015.

We used maps to describe geographical distribution of rabies cases by district.

Results.

A total of 208,720 cases of animal bites were reported during the study period of which 27% (n=57,252) were in Central region, 22% (n=46,742) in Eastern region, 27% (n=56,382) in Northern region and 23% (n=48,344) in Western region. Out of 48,720 animal bite injuries treated at health facilities between 2013 and 2015, 59% were inflicted on males and 19% were children aged below 5 years. The overall incidence of animal bites in Uganda was 58.1 per 100,000. The incidence (per 100,000 population) of animal bites by region was 78 in Northern region, 58 in Central region, 53 in Western region and 50 in Eastern region. The incidence of animal bites increased from 21 to 47 ($p<0.001$) in Central region, 27 to 34 ($p<0.001$) in Eastern region, 23 to 70 ($p<0.001$) in Northern region and 16 to 46 ($p<0.001$) in Western region (Figure 1).

A total of 457 suspected human rabies deaths were reported from health facilities, of which 29% were reported from Eastern region, 27% from Northern region, 27% from Central region and 17% from West region. The highest incidence was observed in the districts of Wakiso, Kabarole, Kotido and Moroto. Many of districts in Northern Uganda had higher incidence of animal bite injuries compared to

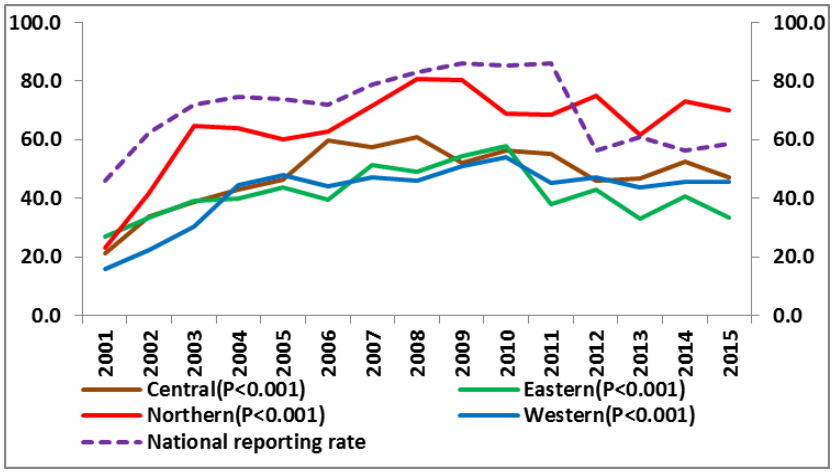

Fig1: Trends of incidence (per 100,000) of animal bites injuries by region; 2001-2015.

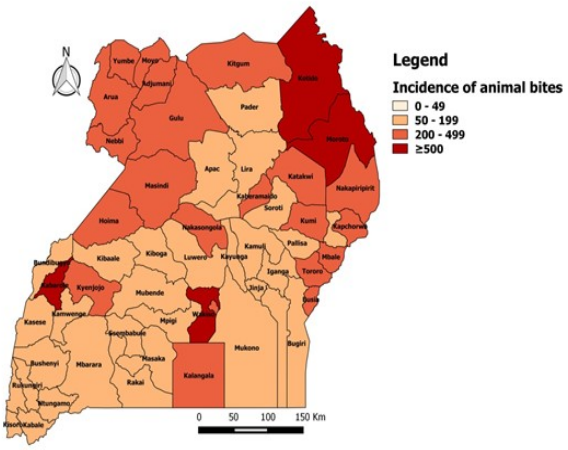

Fig2: Geographical distribution of animal bites by district; 2001-2015

districts in other regions (Figure 2).

Discussion and Recommendations.

This study provides evidence of a high burden of animal bite injuries in Uganda. The finding that most of the animal bite injuries in our study were inflicted on males is consistent with results reported from other studies conducted elsewhere (6, 7). Gender differences in the distribution of animal bites are possibly related to occupational activities that expose individuals to dog bites and such activities are more common among males compared to females (8). Variations in the incidence of animal bites across different regions are likely to be due to different dog populations in different districts. The northern region which had the highest incidence of animal bites had the highest dog population during the animal Census of 2008 (9). Additionally, regional geographical differences, population density and possible differences in local epidemiology of rabies may explain variations in incidence of animal bites (10). This study found that the number of deaths due to suspected rabies was higher than the 20 deaths estimated in 2005 (11). The number of suspected deaths due to rabies significantly increased only in the Central region. Increase in incidence of animal bites in all regions of Uganda implies that rabies remains an important public health challenge that requires special attention during planning of national health priorities. There is need to strengthen rabies community sensitization and improve rabies surveillance in order to collect more reliable information that can effectively guide public health interventions.

References.

1.Cleaveland S, Fevre EM, Kaare M, Coleman PG. Estimating human rabies mortality in the United Republic of Tanzania from dog bite injuries. Bulletin of the World Health Organization. 2002; 80 (4):304-10.

2. Belotto A LL, Schneider MC, Tamayo H, Correa E. Overview of rabies in the Americas. Virus Res 2005;111(1):5-12.

3. Hotez PJ, Alvarado M, Basanez MG, Bolliger I, Bourne R, Boussinesq M, et al. The global burden of disease study 2010: interpretation and implications for the neglected tropical diseases. PLoS neglected tropical diseases. 2014;8(7).

4. Dodet B, Adjogoua EV, Aguemon AR, Baba BA, Bara Adda S, Boumandouki P, et al. [The fight against rabies in Africa: from recognition to action]. Bulletin de la Societe de pathologie exotique (1990). 2010;103(1):51-9.

5. World Health Organization. WHO Expert Consultation on Rabies, 2013. Second report.

6. Lai P, Rawat A, Sagar A, Tiwari K. Prevalence of dog-bites in Delhi: knowledge and practices of residents regarding prevention and control of rabies. Health and Population perspectives and Issues. 2005;28(2):50-7.

7. MAJID REZA ERFANIAN TAGHVAII AND SEYED MOHSEN SEYEDNOZADI. An Epidemiologic Survey on Animal Bite Cases Referred to Health Centers in Mashhad During 2006 to 2009. Biomedical & Pharmacology Journal. 2013;6 (2):301-6.

8. Uganda Bureau of Statistics. THE NATIONAL LIVESTOCK CENSUS REPORT 2008.

9. Tenzin, Dhand NK, Gyeltshen T, Firestone S, Zangmo C, Dema C, et al. Dog bites in humans and estimating human rabies mortality in rabies endemic areas of Bhutan. PLoS neglected tropical diseases. 2011;5(11).

10. Fevre EM, Kaboyo RW, Persson V, Edelsten M, Coleman PG, Cleaveland S. The epidemiology of animal bite injuries in Uganda and projections of the burden of rabies. Tropical medicine & international health : TM & IH. 2005;10(8):790-8.

Food poisoning and death after eating chapatti made of wheat flour contaminated with organophosphate powder, Tororo District, November 2015

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On 30 October 2015, three students in Mukuju Primary Teacher's College, Tororo district, died of suspected food poisoning after eating chapattis (locally made flat bread). We investigated this cluster of illness to identify the cause and recommend prevention measures. Using a standard case definition, we reviewed medical and police records and interviewed survivors, health workers, and police officers for case-finding and hypothesis generation. We tested the chapattis and flour for poisons. We identified 7 cases with 3 deaths (case-fatality ratio=43%). Clinical manifestations included mental confusion (100%), constricted pupils (43%), frothing of saliva (43%), and low blood pressure (43%). The epidemic curve indicated a point-source exposure. The majority (86%; 6/7) of the cases were men; the mean age was 24 (range: 20–32) years. The deceased ate more of the chapattis than the survivors. Autopsy findings were consistent with organophosphate poisoning. Lab analysis of the flour and the chapatti indicated organophosphate contamination. This cluster of food-poisoning was caused by eating chapatti made of flour contaminated with organophosphate pesticide. We recommended stricter control of pesticides in Tororo District and throughout Uganda.

Background: Organophosphate poisoning results from exposure to organophosphates (OPs) commonly insecticides, which leads to symptoms of visual disturbances, tightness in chest, wheezing due to bronchoconstriction, increased bronchial secretions, increased salivation, lacrimation, sweating, and urination [1]. The onset and severity of symptoms, whether acute or chronic, depends upon the specific chemical, the route of exposure, the dose, and the individual's ability to degrade the compound [2]. OPs are one of the commonest causes of poisoning worldwide, and are frequently intentionally used in suicides and homicides [3]. There are around 1 million Organophosphate (OP) per year with several hundred thousand resulting in fatalities annually [3]. Unintentional OP has been caused by ingestion of contaminated flour or leafy vegetables [4, 5]. In some cases it is accidentally ingested by children. In Uganda it has been estimated that 1,250 – 2,500 deaths per year due to OP [6].

On 30th/10/2015, at about 16:00 hours 3 students of Mukuju Core Primary Teachers' College (PTC) in Tororo District bought and ate chapatti from a local food vendor at Mukuju trading centre adjacent to the school. Within approximately 20 minutes, they developed profuse sweating, foaming of saliva, confusion, vomiting and difficulty in breathing. After a short while, they vomited blood and had diarrhoea. Two of the students were rushed to Mukuju HC IV for first aid before referral to Tororo Hospital where they were pronounced dead on arrival. The third was taken straight to Tororo Hospital but also passed away. Four other people who had eaten chapatti from the same vendor and developed similar though milder symptoms have since recovered following treatment. The recovered people included a student, the chapatti vendor himself, a bodaboda rider and a salon operator in the fateful trading centre of Mukuju. Preliminary information suggested that all identified people with these symptoms had eaten chapatti from this particular vendor before developing symptoms. The vendor reported that he made the chapattis as he always did and started selling them. When one of the students came back complaining about a strange smell from the chapattis, he decided to taste the chapatti himself and soon developed similar symptoms. Having been alerted about this, the Ministry of Health sent out a team to characterize the clinical, lab and post-mortem details of the deceased and survivors in order to identify the cause and prevent any further risk of contamination.

Methods: We defined a suspected case as onset of foaming of saliva or low blood pressure or loss of consciousness or constricted pupils in a resident of Mukuju from 24th/10/2015 onwards. A confirmed case was any suspected case with confirmed toxicological results. We found cases systematically by reviewing all the information of the deaths and patients and creating a line list. We visited the nearby health centres and district hospitals to identify patients fitting the case definition. With the help of the school administrators we searched for any other students who may have suffered from similar symptoms and fit the case definition. We also used the help of Local Council chairmen to search for any new cases especially among people living near the chapatti vending area. Patients' clinical records were reviewed. Postmortem results were followed up with Police to identify the cause of death. The Police Surgeon undertook postmortem and shipped samples for toxicological tests to the Government Chemist in Kampala. An environmental assessment of the chapatti vending business was carried out to assess for possible sources of contamination. Samples of the left over chapatti, baking flour, cooking oil and mixed chapatti pastry dough were also sent for toxicological testing.

Results: Six of the seven people affected were male. The mean age was 24 years and the ages ranged between 20 and 32 years. Four were students of whom 3 died and one survived leading to a Case Fatality Rate (CFR) of 3/7 (43%). The characteristics of these cases are summarised in table 1 below. The 3 who passed away developed symptoms consistent with organophosphate poisoning while the survivors had similar but milder symptoms. They all developed dizziness within approximately 20 minutes of eating the chapatti. This was followed by profuse sweating, confusion and loss of consciousness. The salon operator who only tasted the baking flour used for making the chapatti reported that she felt dizzy almost immediately, and shortly after developed irritation in the throat. The Medical Superintendent of Tororo Hospital stated that as he attended to one of the students, he noticed a strange smell on the student. The student was in coma, had low blood pressure and his pupils were constricted. All the affected people lived in the same village close to the chapatti vendor's place.

We therefore deduced that some organophosphate poison had been introduced into the flour used to make the chapattis during the afternoon hours, after the 1st batch of chapattis were made in the morning. The reasons supporting the conclusion were:

The chapatti vending place is just outside the school gate and students as well as several other community members usually bought chapatti from there. There was no history of movement by the affected persons outside the school compound by the affected students on the 30th/10/2015 or within the past week.

We therefore deduced that some organophosphate poison had been introduced into the flour used to make the chapattis during the afternoon hours, after the 1st batch of chapattis were made in the morning. The reasons supporting the conclusion were:

The sudden onset of symptoms similar to those expected in OP and recovery after prompt organophosphate poisoning management at Tororo hospital strongly support OP.

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The post-mortem and lab findings all confirmed organophosphate poisoning.

-All cases/deaths had eaten chapatti from this one vendor on that afternoon, indicating a point source exposure.

-All cases had eaten lunch with other people (fellow students or family members) and were fine before eating the chapatti. This eliminates any possibility of having been poisoned prior to eating the chapatti.

-People who had eaten chapatti from the same vendor in the morning had not developed any symptoms suggesting that the poison was introduced sometime in the afternoon.

-The 3 students who died had eaten a whole chapatti each while their colleague who survived had only eaten a portion of a chapatti before getting concerned about its smell. This demonstrated a dose response relationship.

Characteristics (N=7)	Frequency	Percentage (%)
Sex		
Male	6	86
Female	1	14
Occupation		
Student	4	58
Boda Boda (motorcycle)	1	14
Saloon worker	1	14
Chapatti vendor	1	14
Symptoms		
Mental confusion	7	100
Constricted pupils	3	43
Frothing of saliva	3	43
Low blood pressure	3	43

Table 1: Characteristics of the cases of organophosphate poisoning in Tororo town in November 2015

There were no new cases from the time the chapatti business was banned.

Samples of the chapatti and flour tested from the National Analytical Laboratory (NAL) in Kampala were positive for the organophosphate pesticide Malathion. Post-mortems performed at Mbale Regional Referral Hospital showed results consistent with organophosphate poisoning.

There were no lab tests conducted on any of the patients and no specimens had been collected by the hospital.

At the time of the investigation, there were rumours in the village that the poison might be the chemicals used for Indoor Residual Spraying (IRS), an activity that was being conducted by the Ministry of Health at the time.

Discussion and public health actions taken: This cluster of food poisoning was caused by consumption of chapatti baked using flour contaminated by organophosphate powder. Several cases of organophosphate poisoning caused by contaminated flour have been reported in the past [4]. On banning of chapatti vending in the area, the cases ceased immediately. We recommended stricter control of pesticides in Tororo and the whole of Uganda. Due to rumours in Mukuju town that the chemicals implicated might be IRS chemicals, community members were reassured by the district health officials that the chemicals used for IRS were tightly protected and were not the ones implicated. This prevented community-wide resentment of the IRS program that was ongoing at the time. We also noted that delays in early recognition of symptoms and prompt referral may have worsened the prognosis of the patients who died. The health workers of Mukuju HCIV were therefore briefed on the importance of early referral of patients in such scenarios. We explained to the health workers that early recognition of such life threatening conditions and prompt referral can greatly improve the chances of survival of such patients.

References: Vale, A. and M. Lotti, Organophosphorus and carbamate insecticide poisoning. Handb Clin Neurol, 2015. 131: p. 149-68.

Malangu, N., Acute poisoning at two hospitals in Kampala-Uganda. J Forensic Leg Med, 2008. 15(8):p. 489-92.

WHO. Clinical management of acute pesticide intoxication: prevention of suicidal behaviours. 2015; Available from: http://www.who.int/mental_health/publications/9789241596732/en/.

Diggory, H.J., et al., Fatal parathion poisoning caused by contamination of flour in international commerce. Am J Epidemiol, 1977. 106 (2): p. 145-53.

Goh, K.T., et al., Acute organophosphorus food poisoning caused by contaminated green leafy vegetables. Arch Environ Health, 1990. 45 (3): p. 180-4.

Tibbutt, D., Poisoning with organophosphates. South Sudan Medical Journal 2008.

Trends in Weekly Surveillance Data of Priority Diseases/Events for the Quarter of April-June 2016

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Analysis of the MoH Weekly Epidemiological Surveillance April to June 2016 data revealed; that weekly surveillance reporting rates increased slightly over the quarter and the Central Region is still pulling the national average below the minimum target of 80%. There was a lot of variation in MMR and PMR across districts. Kisoro district reported one of the highest cholera attack rates, yet it did not report an outbreak. The North-Eastern districts were the most more affected by Dysentery. Abim had an unusually high MMR justifies an investigation. It was noted that HMIS data still has major quality issues. Several districts reported unreasonably high numbers of cases or deaths while denominator data in the DHIS2 system is incorrect.

Introduction: On a weekly basis, the Ministry of Health Division of Health Information (MoH-DHI) analyses and disseminates weekly epidemiological data so as to monitor for changes in disease/event trends. This ensures early detection of possible disease outbreaks, prompt investigation and response. It also monitors the effect of public health interventions. Several priority diseases and events were selected to be monitored on a weekly basis through the mobile phone-based weekly surveillance data collection system commonly known as mTRAC. These reportable disease/events are the priority under the Integrated Disease Surveillance and Response (IDSR) framework [1, 2]

Methods: We abstracted national weekly Health Management Information System (HMIS) surveillance data for the period April-June 2016 as compiled in the District Health Information System (DHIS2) database [3]. This data is collected through the health facility weekly surveillance report known as HMIS report

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Results. Weekly Epidemiological Surveillance (HMIS 033b) Reporting Rates. Much as the national reporting rate has been slightly increased from 70% to 75% though this is still below the target of 80%. Northern Region has consistently had the best reporting rates while Kampala remains way below the other Regions. Over the quarter, Buliisa, Maracha and Moyo districts maintained 100% reporting rates. Central Districts of Kampala and Wakiso had the lowest reporting rates (Fig 1).

Maternal and Perinatal Mortality Rates: Districts in the North and Eastern Uganda reported the he highest Maternal Mortality Rates (MMR). Abim District reported the highest MMR (267/100,000). The Perinatal Mortality Rates (PMR) were concentrated in West Nile reported, Western and South Western Districts (Figure 2). Mubende had the highest PMR (3.3/1000).

Attack Rates of Selected Priority IDSR Diseases: Typhoid had high attack rates in several districts as can be seen in Figure 3. Oyam and SSembabule had the highest attack rates. The highest dysentery attack rates were concentrated in North Eastern Uganda. The highest attack rate was in Bukwo. Kalangala was the only District with a high AR in the rest of Uganda. Several districts reported Cholera cases during this quarter.

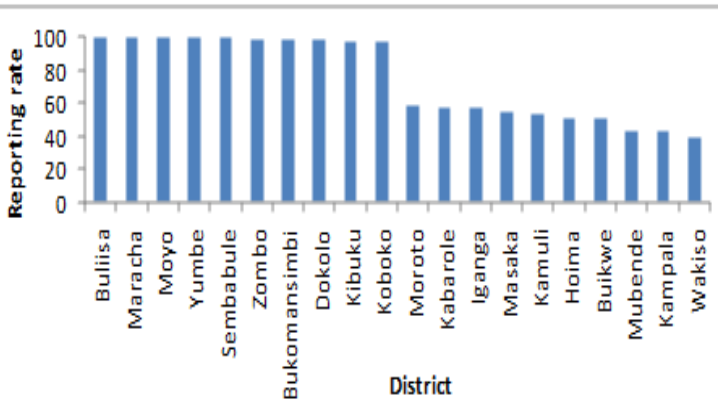

Fig 1: Weekly Epidemiological Surveillance Reporting Rates for Top and Bottom 10 Districts, April-June 2016.

The highest cholera ARs were in Kisoro and Namutumba. The highest measles attack rates were in Namutumba, Nakaseke and Lyantonde (Fig 3)

Yellow Fever: Some districts reported yellow fever cases through HMIS though these cases were not investigated. Yellow fever surveillance requires case based reporting with laboratory verification of every suspected yellow fever case.

However as expected, the highest attack rates were in Masaka Sub-

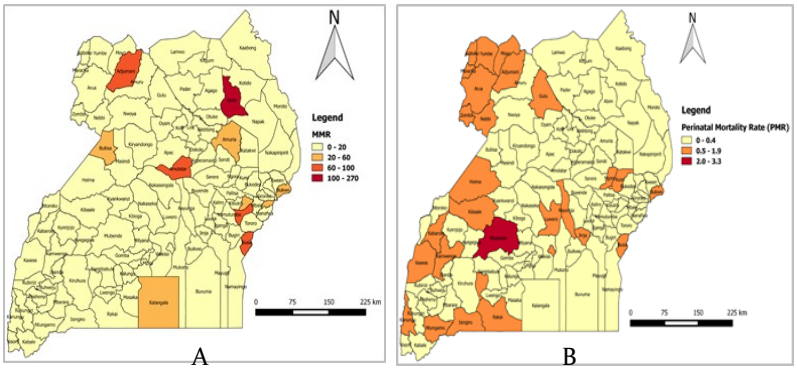

Fig 2: District Maternal Mortality Rates, (A) and Perinatal Deaths (B) April-June 2016

Region and Rukungiri where yellow fever outbreaks were confirmed in this reporting period. Kabale District had the highest Case Fatality Rate (CFR) for Malaria. Buvuma District had the highest Typhoid CFR while Nakasongola had the highest Cholera CFR (Table 1).

Discussion and Conclusions. Although the weekly surveillance reporting rates have slightly increased over the quarter, Central Region is still pulling the National average below the minimum target of 80%. This has been mainly attributed to the many private facilities in Kampala which do not prioritise HMIS reporting because it does not generate revenue for them yet it requires time and personnel. Northern Uganda has always performed better than the other

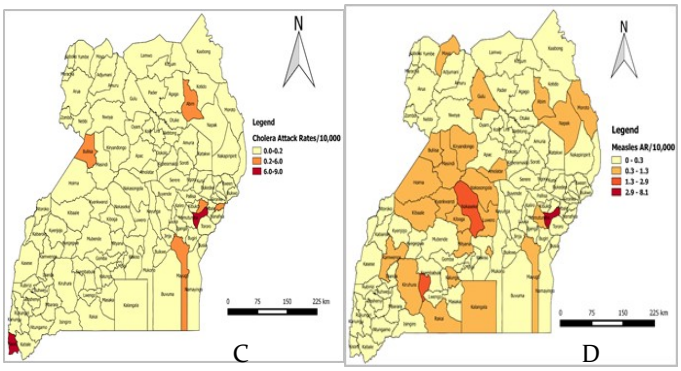

Fig 3: District Cholera Attack Rates, (C) and Measles attack (rates (D) rates April-June 2016.

regions in HMIS reporting and this trend is likely to continue.

Most of the District reporting highest numbers of maternal deaths were from Northern Uganda. This could be due to the good reporting rates although several other factors could explain it. The CFR for malaria were highest in Northern Uganda Districts. This is likely due to the ongoing malaria outbreak in the region.

Just like most surveillance data, HMIS data still has major issues in quality and its ease to analyse. Several districts reported abnormal numbers of cases or deaths. Another weakness is that the population data in the system is incorrect and thus could not be used to calculate incidence rates, mortality rates and attack rates. These indicators would have provided stronger epidemiological evidence.

Table 1: Districts with Highest Case Fatality Rates of Selected Diseases, April-June 2016

Cholera CFR(%)		CFR Dysentry		Measles CFR	
Nakasongola	50.0	Kapchorwa	7.7	Kiryandongo	14.3
Ibanda	33.3	Busia	5.6	Amuru	1.6
Pader	12.9	Mbarara	5.3	Buvuma	0.0
Nakapiripirit	12.3	Soroti	1.5	Tororo	0.0
Kamwenge	3.2	Butambala	1.3	Bundibugyo	0.0
Rubirizi	2.5	Moyo	1.1	Busia	0.0
Kotido	2.0	Agago	1.1	Butambala	0.0

Recommendations/Public Health Actions: HMIS reporting from private facilities must be improved by providing them with tangible benefits when they report. An example could be recognition of the best reporting private facilities in each Region and District.

There is an urgent need to incorporate accurate and up to date population data to enable the calculation of stronger epidemiological statistics.

References: WHO, Integrated disease surveillance and response in the African Region: a guide for establishing community based surveillance. 2014.

Kasolo, F., et al., IDSR as a platform for implementing IHR in African countries. Biosecurity and bioterrorism: biodefense strategy, practice, and science, 2013. 11(3): p. 163-169.

MOH. District Health Information System (DHIS2) dashboard. 2016; Available from: http://hmis2.health.go.ug/dhis-web-commons/security/login.action.