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Dear Reader,

Welcome to the third volume Issue 3 of the Uganda National Institute Public Health (UNIPH) Quarterly Epidemiological Bulletin.

This bulletin aims to inform the district, national, and global stakeholders on disease outbreak investigations, public health surveillance and interventions undertaken in detecting, preventing and responding to public health events in the country.

In this issue, we present reports on investigations of suspected Black Water Fever in Manafwa District; a prolonged anthrax outbreak in Arua District, achievements of the Oral Cholera Vaccination campaign in Hoima District and notes from the field about a cluster of deaths in Malaba township in Tororo District. Also in the issue are policy briefs on: Integrating a suicide prevention strategy into the Mental Health Policy of Uganda and using the One-Health Approach to control tick-borne diseases among humans: A Case of recurrent Crimean-Congo Hemorrhagic Fever outbreaks in Uganda

In case you would like to access original references used in this issue, feel free to contact us at: **cnanziri@musph.ac.ug OR dkadobera@musph.ac.ug**

We will appreciate any feedback regarding the content and general outlook of this issue and look forward to hearing from you. We hope this will be both an informative and enjoyable reading to you.

Thank You

Inside this issue:

Ministry of Health-Uganda Public Health Fellowship Program (MOH/PHFP) showcase its scientific work at the 14th Joint Annual Scientific Health (JASH 2018) conference in Kampala

By: Dr. Carol Nanziri

The **Joint Annual Scientific Health (JASH) conference** organized by Makerere University College of Health in conjunction with Uganda National Association of Community and Occupational Health (UNACOH), World Health Organization (WHO), Ministry of Health (MoH), and other partners was held at the Golf Hotel Kampala, for 3 days (26th-28th of September 2018). The theme was "Research, Innovations and Resources for meeting the Health-Related Sustainable Development Goals (SGDs). The MoH/PHFP presented 7 abstracts; 3 posters and 4 oral presentations including the 2017 methanol poisoning in Wakiso District; the 2018 large cholera outbreak in Hoima District; distribution of common mental health disorders in Uganda; the 2018 cutaneous anthrax outbreak in Kiruhura District; the 2017 Cluster of deaths due to quinalphos in Sironko District, and the burden of road traffic injuries in Uganda.

Ebola Virus Disease (EVD) Preparedness in Western Uganda, 2018

After the declaration of the 10th EVD outbreak in Ituri and North Kivu Provinces of the Democratic Republic of Congo on 1st August 2018, the Uganda National Rapid Response Team (NRRT) has conducted rapid risk assessments in the high risk districts on the western border of Uganda starting with Kasese, Bundibugyo, Ntoroko, Kabarole and Bunyangabu districts. The MOH with support from development partners has built capacity to enhance EVD preparedness in these districts through training, risk communication and provision of administrative and logistical support. As a result, several VHF alerts have been evaluated with no confirmed case of EVD yet.

The Kabarole Ebola Preparedness team undergoing IPC simulation exercise supported by Joint Mobile Emerging Disease Intervention Clinical Capability Program (JMEDICC)

Upcoming Events

The 4th National Field Epidemiology Conference, 2018

The Ministry of Health, Uganda and Makerere University School of Public Health is organizing the 4th National Field Epidemiology Conference. It will be held on **Friday 02 November, 2018 at Imperial Royale Hotel**, Kampala, Uganda. The theme of this conference will be "Building a Resilient Workforce to Strengthen Disease Surveillance and Outbreak Response". This conference presents an opportunity for national and international experts to hear and discuss the role of Field Epidemiology in influencing public health policy and practice through strengthened health systems.

The 7th AFENET Scientific Conference

The 7th AFENET Scientific Conference will be held from 12 - 16 November 2018 at the Joaquim Chissano Conference Center, Maputo, Mozambique. The 2018 Conference is jointly organized by the National Institute of Health (INS) under the Mozambique Ministry of Health in collaboration with the Mozambique FELTP. The theme of the Conference "Building Resilient and Sustainable Public Health Systems in Africa through Field Epidemiology Training" with topics that will strengthen the need for collaboration amongst public health experts with vast professional backgrounds.

Dissemination of Tuberculosis (TB) Operational Research findings

The Uganda Public Health Fellowship Program has organized a dissemination meeting for TB Operational Research to the MoH Leadership and NTLP. The meeting will take place on the 4th of December 2018 at the UNIPH boardroom at Lourdel Towers.

Suspected Black Water Fever among children in Manafwa District, Eastern Uganda, 2018

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Summary

On 23 May 2018, Bubulo East Member of Parliament reported a strange disease affecting children in Manafwa District in Parliament of Uganda. We investigated to determine the existence, scope, nature of the strange disease and recommend evidence-based control measures. We line listed 500 cases with case fatality rate of 6.4% (32/500). Cases increased gradually over years from 2013 to 2018 but markedly from 2015 to June 2018. Children 0 to 4 years and male sex were most affected. Of the 11 (both blood and urine) samples analyzed, 9/11 tested positive for malaria and had anemia, 8/11 had neutropenia and leukopenia. We concluded that the strange disease was likely to be black water fever (BWF). We recommended further investigations to establish the true exposures, and support for emergency management of case-persons.

Background

Black water fever is a serious complication of malaria infection with haemolysis releasing haemoglobin directly into the blood and the urine leading to severe jaundice, anuria, kidney failure and death in the majority of cases(1). It is thought to be an autoimmune reaction caused by the interaction of the malaria parasites (Plasmodium Falciparum) and antimalarial drugs like quinine (2). On 23 May 2018, Bubulo East Member of Parliament reported a strange disease affecting children in Manafwa District in Parliament of Uganda. We investigated to determine the existence, scope, nature of the strange disease and recommend evidence-based control measures.

Methods

We defined a suspected case as onset of dark /red urine and any of the following: high grade fever, loss of appetite, fatigue, abdominal pain, abdominal distention, anemia, jaundice, headache, vomiting, palpitations and painful urination in a resident of Manafwa District since 2013. We reviewed medical records and conducted active community case-finding. We described cases by time, place and person characteristics. We collected and analyzed blood and urine samples for 11 suspected cases.

Findings

From January 2013 to June 2018, we line listed 500 case-persons of which 32/500 were reported to have died. (Case fatality rate=6.4%). Cases admitted at health facilities increased gradually over years from 2013 to 2018. **(Figure1).** More case-persons were reported in 2017 (AR=9.84, 114/169861) **(Figure 2).**

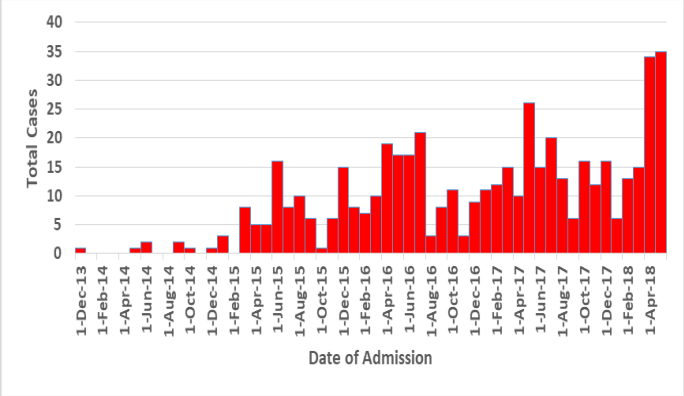
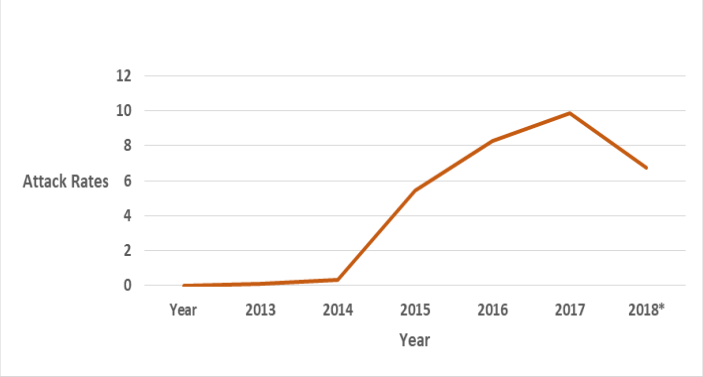


Figure 1: Distribution of case-persons by date of admission to health facility (N=500)



***includes cases up to June 2018 only**

Figure 2: Attack rates of black water fever per year

All Case-persons presented with dark/red urine (100%), high grade fever (95%), anemia (86%) and jaundice (68%)` presented with jaundice. The number of the affected sub-counties increased over years from only one in 2013 to sixteen by June 2018. Incidence was higher in 0-4 than in 5-15 year age group **(Figure 3)** and males had slightly higher rate than females.

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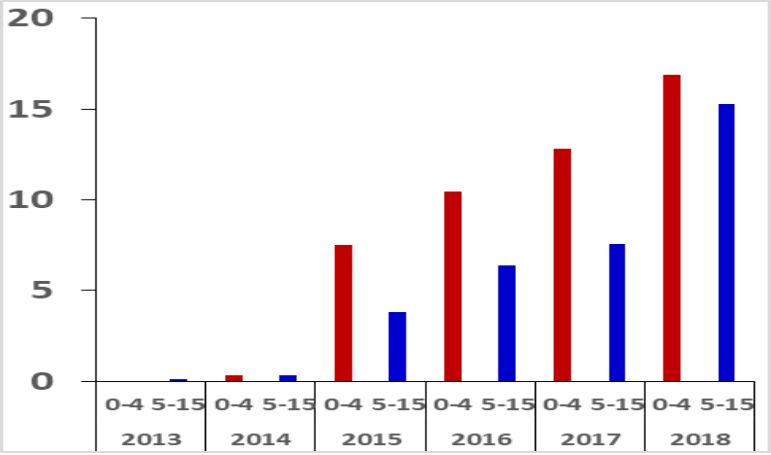

Fig 3: Attack rate by age-group per year (N=500)

Based on the 32 care takers interviewed, 69% (22/32) case-persons started getting episodes of the illness between 1 to 2 years and all case-persons have been having recurrent episodes which subsided on treatment with anti-malarials and antibiotics. 50% (16/32) of the case persons had ≥10 episodes since onset of illness and 44% (14/32) of the case-persons experienced episodes every 1 to 2 weeks. Bugobero (945/10,000) was the most affected followed by Bukhofu (22/10,000), Sisuni (22/10,000), Busukuya (20/10,000), and Butiru (18/10,000). **(Figure 4)**

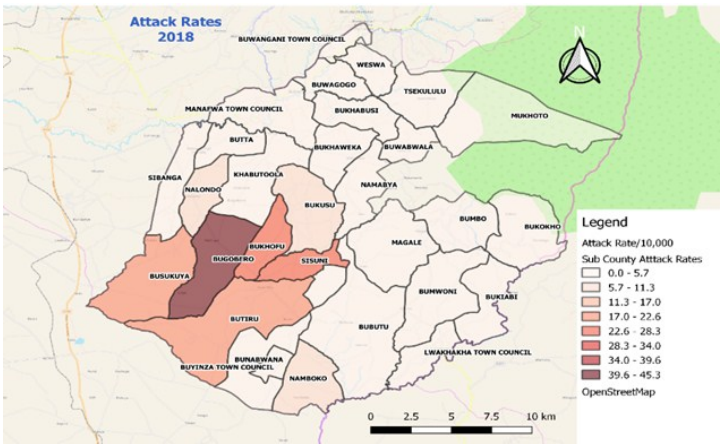

Figure 4: Map showing most affected sub-counties

Laboratory findings

There was anemia in 9/11 samples, neutropenia and leukopenia in 8/11, 9/11 tested positive for malaria by RDT, 3/11 tested positive for plasmodium falciparum by microscopy and Sickle cells in 1/11 samples. There was no schistosoma haematobium ova, protein, and bilirubin in all urine samples.

Discussion: Cases presented with dark /red urine and any of the following: high grade fever, loss of appetite, fatigue, abdominal pain, abdominal distention, anemia, jaundice, headache, vomiting, palpitations, sweating and painful urination typical of black water fever a serious complication of severe malaria (5).

While there is little information on black water fever in Uganda, we found that this disease has occurred in Manafwa District since 2015. We found that it affected children (4 months to 16 years) with frequent episodes of severe malaria who got treated with intravenous antimalarial drugs like quinine and artesunate. Several studies have revealed that treatment with antimalarial drugs such as quinine, artesunate, halofantrine, mefloquine, artemether-lumefantrine can trigger the occurrence of black water fever among non-immune individuals (6). However our investigation was not able to identify trigger factors for this disease.

Conclusion & Recommendations

Our findings revealed that the strange disease was likely to be black water fever. We recommended, further investigations to establish the true exposures to the disease and provision of logistical support for emergency management of case-persons.

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Prolonged animal anthrax outbreak amplified by slaughtering infected carcasses on the pastureland in Arua District, Uganda, 2016 - 2018

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Summary; *In 2017, Uganda Ministry of Health reported a human anthrax outbreak in Arua District. Subsequent epidemiologic investigations conducted confirmed animals as the source of the infection.*

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We conducted an investigation to assess the scope of anthrax in domestic ruminants; identify possible exposures and recommend evidence based control measures. We identified 140 case-kraals and line listed 1600 animal cases by 22nd July, 2018. Rigbo sub-county was the most affected (AR/1000= 37). We conducted a frequency matched case control study . We found that skinning infected carcasses on the pastureland (OR=7.5; CI = 3.9 - 14) and grazing animals near the river bank where previous suspected anthrax animals died (OR=2.3; CI=1.2 - 4.4) were the main exposures. We recommended immediate anthrax vaccination of domestic ruminants at risk followed by annual vaccinations and sensitization of communities; animal and medical health workers about anthrax.

Introduction

In 2017, Uganda Ministry of Health reported a human anthrax outbreak in Arua District. Subsequent epidemiologic investigations confirmed animals as the source of infection. We conducted an investigation to assess the magnitude of anthrax infection in domestic ruminants; identify possible exposures and recommend evidence based control measures.

Methods

We defined suspected case as sudden death in a domestic ruminant of Arua District with un-clotted blood from body orifices between January 1, 2016 to July, 2018. A probable case was a suspected case with a positive RDT test consistent with *B. anthracis.* A confirmed case was a suspected case tested positive by PCR. We reviewed district veterinary anthrax records and conducted active community animal-case finding to update the line list. We conducted environmental assessment of the anthrax affected areas, including laboratory testing of specimens from dead animals. We conducted a case control study in which we defined a case-kraal as one with sudden death of animal (s) with un-clotted blood from body orifices between January, 2016 to July 2018 in the selected villages. We defined a control-kraal as a kraal which had not had any sudden animal (s) death (s) with un-clotted blood from body orifices in the same period from the selected villages. We matched cases and controls by frequency in each village in a ratio of 1:1.

Results

We identified 140 case-kraals and line listed 1600 animal cases and found that distribution of the kraals showed an epidemic curve of a continuous common source pattern. Animal deaths due to suspected anthrax increased gradually and peaked in the month of April. There was an increase in animal deaths in the months of January and February in 2017 and 2018 **(Figure 1).**

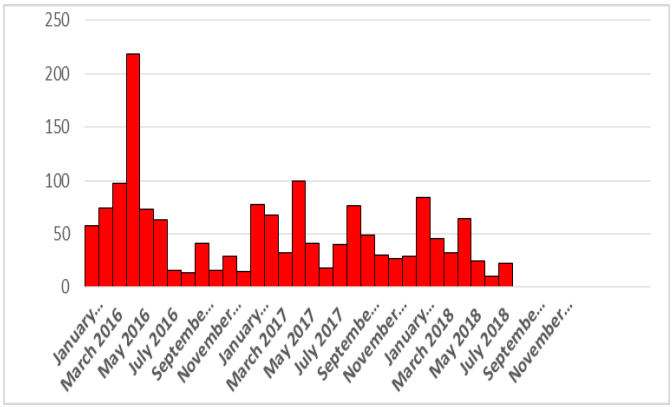

Figure 1: Epidemic curve showing distribution of animal cases by date of death, Arua District

Rigbo sub-county (AR/1000=37) was the most affected followed by Pawor (AR/1000=12)and Rhino camp (AR/1000=1.4). The case-kraals were distributed mainly along the Nile river, with majority of them situated in Ajai game reserve in Arua District (**Figure 2**)

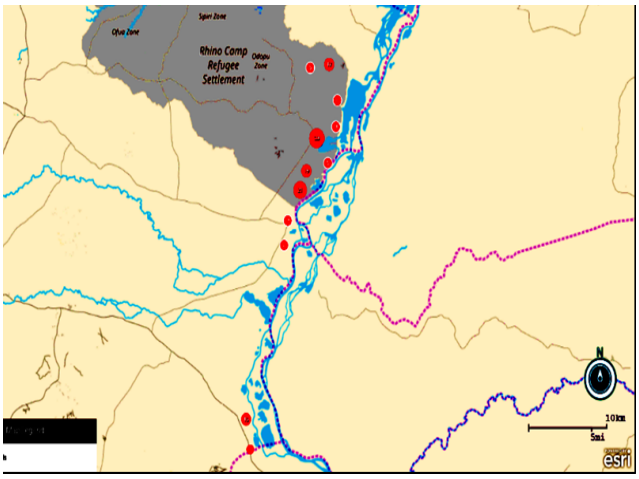

Figure 2: A case cluster map showing anthrax suspected cases by cluster, 2016-2018

Environmental assessment and laboratory: We observed remains of animal carcasses in the grazing fields. Migration routes in the pasture land were evident. We saw animals graze near the river bank of the Nile river. We witnessed communal grazing in affected sub counties. 5/6 livestock carcasses tested positive by rapid diagnostic test (RDT) consistent with B. anthracis.

Case-control findings: Slaughtering infected carcasses on the pasture land (OR= 7.5; CI=3.9 – 14) , buying animals from another sub-county or district (OR=4.5; CI=2.2-9.2), grazing animals near the river bank were previous suspected anthrax animals died (OR=2.3; CI=1.2 - 4.4) and giving animals antibiotic treatment before the outbreak were associated with anthrax infection in animals.

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Discussion

Our investigation found that the outbreak in Arua District was associated with slaughtering anthrax infected dead animals on the pastureland, and grazing animals near the river bank were previous animal deaths due to suspected anthrax occurred. Slaughtering anthrax infected dead animals on the pastureland exposes anthrax spores that contaminate the pastureland posing a risk to cattle, goats and sheep. Similarly, grazing animals on the pastureland where an anthrax animal case died also poses a risk to animals since a dead anthrax animal oozes blood with spores from all body orifices that remain viable on the pastureland for decades. The spores shed by an animal dying or dead from anthrax are the source of infection for other animals (2). Our findings are consistent with other studies in Bhutan, Asia Bangladesh and North Dakota, USA (3,4,5). We also found more animal cases towards the end of the dry season (March to May) and beginning of the rainy season (August to September) indicating seasonality of the anthrax outbreak. During prolonged dry season the animals congregate at the water points along the river bank and graze close to the ground hence ingesting the anthrax spores. Cattle were more affected than goats probably because they ingest more soil while grazing but goats typically browse on grass only making them less exposed to anthrax spores in soil. This is consistent with findings from a study in China.(8).

Conclusions and Recommendations

Slaughtering anthrax infected animals on the pastureland, grazing animals near the river bank were previous animal deaths due to suspected anthrax occurred and buying animals from another sub-county or district were associated with anthrax infection among animals in Arua district. We recommended immediate and annual anthrax vaccination of domestic ruminants at risk by MAAIF and Arua District. Also enhanced sensitization of the communities; animal health workers and medical health workers about anthrax exposure.

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Achievements and Lessons Learned from the First Oral Cholera Vaccination in Uganda, July 2018

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Summary: *On 23 February 2018, Ministry of Health (MoH) Uganda declared a cholera outbreak in Hoima District coinciding with a level 3 humanitarian emergency in Uganda linked to areas in DRC that were experiencing active cholera outbreaks. Uganda implemented a comprehensive strategy to respond to this outbreak which included; provision of safe water; improvement of sanitation, health education, strengthening disease surveillance, among others. To further strengthen cholera prevention, Uganda conducted two reactive mass oral cholera vaccination campaigns in five hotspot sub-counties of Hoima District. A 97% coverage was achieved in round 1, followed by a 90% coverage in round 2 of the campaign. Of the 367,899 people targeted for vaccination, 305,065 received 2 doses of OCV, representing an 83% proportion of people fully protected from Cholera, for the next 3 -5 years in known cholera outbreak hotspots in Hoima District.*

Background: On 15 February 2018, Ministry of Health (MoH) Uganda was alerted of a cholera outbreak in Hoima District which coincided with a Level 3 humanitarian emergency in the Democratic Republic of Congo (DRC). This led to an influx of over 22,000 refugees into Uganda from areas in DRC that were experiencing active cholera outbreaks. MoH declared a cholera outbreak in Hoima District on 23rd February 2018. Uganda implemented a comprehensive strategy to respond to this outbreak including provision of safe water and improvement of sanitation, health education, strengthening disease surveillance, among others. To strengthen cholera prevention, Uganda planned reactive and proactive mass oral cholera vaccination campaigns in a phased manner, starting with Hoima District. The main objective was to reduce transmission and mortality due to cholera in hotspots of Hoima District by achieving 95% coverage of the target population.

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Implementation strategy: We received 360,650 doses of OCV and planned a two round reactive vaccination campaign. We targeted 96% of the total population, i.e. all persons aged 1 year and above, in the five hotspot sub-counties of Kigorobya Town Council, Kigorobya, Buseruka, Kabwoya and Kyangwali. We used a combination of house to house house/mobile and static strategies. Round 1 was held from 2nd to 6th May 2018 and round two, from 27th June to 1st July 2018. We trained and deployed a teams of 15 national supervisors who worked with the district to plan and train the supervisors at district, sub-county, parish level and health workers. We trained district leaders and Village Health Teams (VHTs) to conduct community social mobilization. We deployed 3 person teams i.e. a health worker, health inspector and a VHT to vaccinate household members, conduct WASH assessments and conduct sensitization in each village. The parish supervisors provided daily logistics and also summarized vaccination data. Sub-county supervisors maintained functionality of the cold chain and distributed vaccines at all service points while district and central level supervisors provided overall support

Achievements: A 97% coverage was achieved in round 1 and 90% coverage was achieved in round 2. Among the people vaccinated, 83% (305,065/367,899) received a second dose of the OCV, there by representing a proportion of the target population that is fully protected for the next 3 – 5 years **(Figure 1).**

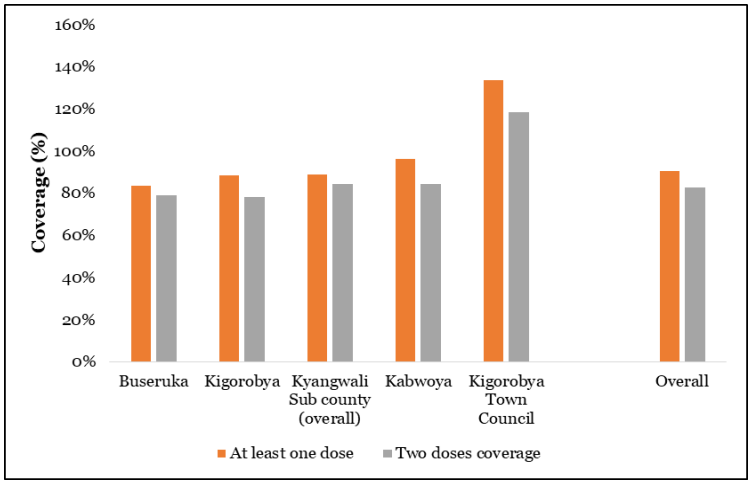

Figure 1: OCV coverage by number of doses received, Hoima District, Uganda, May – July 2018

Lessons Learned:

Planning: Involving the lowest level of the community comprehensively in bottom up planning strategy highlighted strategies for hard to reach populations in institutionalized settings like prisons. This prioritized populations in most need (i.e. high risk communities in the five sub-counties identified as cholera hotpots) for phase 2 of the OCV roll out . The demand driven nature of the OCV campaign overwhelmed the vaccination teams in round one of the campaign.

Coordination: Supervision at parish, sub-county, district and national level with support from an international consultant provided a well planned , coordinated and quality assured vaccination campaign.

Funding: The MOH made timely transfer of funds to the district, which has been a challenge for past vaccine activities, for planning this vaccination campaign .

Cold-chain and logistics: The Euvichol PlusTM, a bivalent whole cell killed oral cholera vaccine, is given in 2 doses, with a minimum interval of 2 weeks not beyond 6 months. The 1.5ml plastic single dose vials packages limit wastages. It is also remains stable outside the cold chain up to 42°C (2,3). The bulk used in this campaign made proper waste disposal difficult for the static teams, due to the high turn up at the vaccination sites.

Social mobilization: We used mobile mega phones in fishing and refugee communities and found it more effective in comparison to radio announcements. Community level dialogues in resistant communities enabled participation in the campaign. Political involvement played a critical role in social mobilization during round 1 of the campaign. Local Council 5 Chairman, receive the vaccine first during the district launch of the OCV.

Surveillance: The vaccination teams conducted active case search at household level . This enabled household active case search. And immediate reporting of any new cases. This provided opportunity to build capacity of the Village Health Teams in cholera surveillance.

Integrating of WASH in the OCV campaign: The campaign teams assessed and strengthen the Water, Sanitation and Hygiene (WASH) practices . This created opportunity for household sensitization, a strategy to be emulated in subsequent campaigns which are known to register only 65% protection against cholera (3).

Conclusion:

In light of the planned phase 2 of OCV roll out in other hotspot districts, it is pertinent that the country builds on the experiences of phase 1 of the introduction to inform the implementation process. The program will have to compare the reactive and proactive contexts of OCV vaccination campaigns and develop guidelines for OCV use in the country.

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Notes from the Field

Cluster of Sudden Deaths due to Carbon Monoxide Poisoning in Malaba Township, Tororo District, Uganda, August 2018

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Summary; *On 8 August 2018, there were media reports of sudden death of two young women who had locked themselves up in a metallic makeshift container in Malaba Township, Tororo District which served as a restaurant in which both worked. We visited Malaba Police Station, where the Police Office in Charge of Criminal Investigations, explained the event scenario. We visited the scene with the help of a police officer and interviewed a number of persons including the co-workers of the deceased case-persons, local area chairman, landlord and neighbours. Two female teenagers died of unintentional carbon monoxide poisoning caused by suffocation overnight while sleeping in a metallic makeshift structure. Acute poisoning resulted in 100% case fatality rate among female teenagers due to suffocation caused by Carbon Monoxide poisoning.*

Background; Acute poisoning has been reported to occur in residential homes with no proper ventilation, people staying in overcrowded places, mining grounds, septic tanks and saloon cars due to poor air circulation (2) (3). Over 325,000 Ugandans are short of proper housing unit (2). Temporal housing structures in form of metallic makeshift containers are used as homes and restaurants and are commonly seen in small trading centres, taxi parks and along busy high ways. On 8 August 2018, there were media reports of sudden death of two young women who had locked themselves up in a metallic makeshift container in Malaba Township, Tororo District which served as a restaurant in which both worked. We set out to establish the cause of their death and recommend evidence based control measures.

Methods: We visited Malaba Police Station, where the Police Office in Charge of Criminal Investigations, explained the event scenario. We visited the scene with the help of a police officer and interviewed a number of persons including the co-workers of the deceased case-persons, local area chairman, landlord and neighbours.

Results; On 7 August 2018, at 6:00 am, two females aged 13 and 14 years old, known to operate a mini restaurant in Malaba taxi park, reported to work and lit charcoal stoves with "kabani" a local stick used to light stoves fast. They cooked and got ready to serve however due to the scarcity of customers during day, they worked through the evening to sell more food. At 6:00 pm, they carried their food and stoves to the street . They rested on wooden benches as they waited for their customers. They sold food till midnight and due to exhaustion from the days work, they carried the charcoal stoves and left over food to the metallic makeshift container where they slept. They left food cooking on the charcoal stove while sleeping. The following day, 8 August 2018, they were found dead in the container at 6:00am.Their metallic container rests on a concrete basement and is roofed with iron sheets. The container is a solid compartment with a door and no windows, chimney or any other form of ventilation. The door is locked during the night. These females usually slept elsewhere after work and this was the first time they had spent a night in the metallic container.

Discussion: We found a cluster of sudden deaths of two females who were operating a mini restaurant in a metallic makeshift in Eastern Uganda. Their death was attributed to carbon monoxide suffocation from a burning charcoal stove in a small unventilated metallic makeshift structure. Their death is likely to have resulted from suffocation from CO. CO is associated with death , mental illnesses and morning fatigue (5). Restaurants in containers are mushrooming and they employ people of all age groups. The targeted customers are usually busy men who get limited or no time to run back home for their daily meals and work in taxi parks, along highways and in busy trading centres. Because of the nature of the business, food vendors will occasionally extend their working hours to late in the night. This makes them spend some nights in the metallic containers exposing them to suffocation from the Carbon Monoxide produced by burning charcoal stoves. There are limited studies associating Carbon monoxide poisoning to public health implications in Uganda. Malangu (2008), reported that Carbon monoxide poisoning contributed 20% towards the total hospital admissions in two hospitals in Kampala (6).

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Conclusion: The cluster of deaths in Malaba township was caused by CO poisoning which suffocated the 2 young girls who had slept in an unventilated metallic makeshift structure with a burning charcoal stove.

Public health actions and Recommendations

Community education about dangers of sleeping in **me**tallic makeshifts containers and houses with poor ventilation; and avoidance of lighting charcoal stoves inside sleeping rooms was carried out. Local leaders and landlords were advised to ensure construction of structures with proper ventilations and separate kitchen sections from sleeping rooms.

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Policy Brief

Integration of Suicide Prevention Strategy into the Mental Health Policy in Uganda

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Executive summary: *Uganda has a high suicide rate of 19/100,000 and was ranked 17th for suicide as cause of death worldwide and 4th in Africa. We analysed surveillance data reported from all levels of health facilities into the Health Management Information System (HMIS) to identify the populations at risk and evaluate geographical distribution of suicide attempts and deaths following suicide attempts in Uganda between July 2016 and June 2017. Our results revealed that prevalence of suicide attempts was higher for males (7.1/100,000) compared to females (6.7/100,000) and the proportion of deaths among attempted suicide case persons was higher among males (38/1000) than females. This revealed that Suicide attempts and deaths due to attempted suicide attempts and deaths due to attempted suicide are prevalent in Uganda with male individuals and Northern region most affected. Therefore, recognizing the burden of suicide and incorporating its prevention within mental health programs through a national suicide prevention strategy is key to scale up care for mental health disorders in Uganda.*

Introduction: Suicide remains a significant social and public health problem with nearly one million deaths attributed to suicide around the world [1].Suicide rates have increased by 60% worldwide in the last 45 years and predictions show that by 2020 suicide deaths will increase to 1 in every 20 seconds [2]. Low and middle income countries bear the larger burden of the global suicide and are relatively less equipped to prevent it. Unable to keep pace with the rising demand for mental health care, they are especially hindered by inadequate infrastructure and scarce economic and human resources [6]. Suicidal behaviours are a complex process that range from ideation through verbal or non-verbal communication, to planning ,attempting and committing suicide. Suicidal behaviours are influenced by interacting biological, genetic, psychological, social, environmental and situational factors [4]. It has been reported that suicide attempts are up to 20 times more frequent than completed suicides [1] and a prior suicide attempt is the single most predictor of death by suicide. Factors that predispose one to attempt suicide which eventually culminates into a suicide death range from mental and physical illnesses, alcohol or drug abuse, chronic illness, acute emotional distress, violence, a sudden and major change in an individual's life, such as loss of employment [1]. In 2008, suicide was recognized as a priority condition in the Mental Health Gap Action Program (mhGAP), the program to scale up care for mental, neurological and substance use disorders, particularly in low-and middle-income countries [5]. The World Health Organization (WHO) recommended an urgent need for countries to develop a comprehensive national suicide prevention strategy that contextualizes the problem and highlights specific actions that can be taken at multiple levels [1]. Furthermore, suicide is largely preventable therefore it is crucial that countries invest in human and financial resources for suicide prevention. Without a suicide prevention strategy, countries cannot put in place mechanisms to address this issue in a sustained manner [1].

Context and importance of the problem

Uganda ranks 17th in the WHO global suicide ranking of 2014. More than 19 per 100,000 deaths are attributed to Suicide [7]. The main activities in the prevention and control of suicide in Uganda are surveillance of suicide attempts, sensitization of the general public on suicide prevention and imprisonment of suicide attempt offenders. However, Uganda has low budgetary allocations for mental health and as a result, there are few sustained efforts and activities that focus on suicide prevention. Also, considering suicidal attempts as a criminal offence poses additional challenges for suicide prevention activities. This is because suicide attempt offenders could have underlying risk factors such as physical illness or emotional distress that will not be in prison.

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Therefore, there is an urgent need to recognize the burden of suicide and incorporate its prevention within mental health programs through a national suicide prevention strategy.

Approaches and Results: We conducted descriptive secondary data analysis to determine the burden and distribution of attempted suicide and suicide deaths among the population in Uganda using the District Health Information System (DHIS2). We defined a suspected attempted suicide case as an intended conscious act of self-destruction, usually associated with feelings of hopelessness, helplessness and conflicts between survival and death. Monthly and annual district level aggregated data on attempted suicide prevalence was obtained from HMIS for 112 districts. The population estimates were based on the 2014 census data extrapolated using an annual growth rate of 3.03%. We calculated prevalence rates and distribution of case persons by age and sex, and used Q-GIS software to map attempted suicide by district. The prevalence of attempted suicide was higher among males(7.1/100,000) compared to females (6.7/100,000). The prevalence of deaths among attempted suicide cases was 28 per 100 deaths. The prevalence of deaths among attempted suicide cases was higher among males (38/1000) than females. The prevalence of attempted suicide between July 2015 and June 2017 was highest in the Northern region of Uganda (15/100,000).

Conclusion and implications: Uganda has a high burden of suicide attempts that potentially culminate into suicidal deaths. Male and the northern region are most affected. Investing in suicide prevention is important in saving lives, prevention of stigma following attempted suicide and saving financial resources. Therefore, there is need to incorporate a national suicide prevention strategy that fits within the overall mental health policy.

Critique of policy options: Uganda does not have a national suicide prevention strategy that is integrated within the overall mental health policy given the magnitude of the public health problem of suicidal attempts that eventually culminate into suicide. Without a suicide prevention strategy, Ugandan government cannot put in place mechanisms to promoting access to comprehensive services for those at risk , **o**r affected by suicidal behaviours; to address this issue in a sustained manner. There is no established integrated surveillance system, which serves to identify at-risk groups, individuals, and situations. The HMIS only encompasses suicide attempts without appropriate protocols for public reporting of suicidal attempts.

Policy recommendations: There is urgent need to develop a comprehensive National Suicide Prevention strategy that contextualizes the problem, outlines specific actions that can be taken at multiple levels and fits within the overall Mental Health Policy.

Establish an integrated surveillance system within the HMIS, which serves to identify the types of suicidal behaviours, most at-risk groups, individuals, and situations. There is urgent need to develop standardized protocols that are cross-culturally acceptable for detection of all suicidal behaviors in health facilities.

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Policy Brief

Control of tick-borne diseases among humans using the One-Health Approach: A case of recurrent Crimean-Congo Hemorrhagic Fever outbreaks in Uganda

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Executive summary: *Currently there is no policy on the control of tick-borne diseases in livestock and humans yet ticks pose a serious threat to humans and the livestock industry in Uganda. Globally CCHF is the most widely occurring tick-borne viral infection affecting humans. It causes viral hemorrhagic fever of which a single human case indicates an outbreak. Uganda has had 12 CCHF outbreaks in 6 years, nine of which occurred in 2018 alone in 5 districts found in the cattle corridor region. This has left more than a dozen people infected with four deaths. The need for a policy in use of acaricides to control ticks for effective reduction in tick-borne diseases. This policy brief addresses the problem of increasing CCHF outbreaks among humans in Uganda and provides recommendations to reduce the burden of tick-borne diseases through collaborative efforts of the Ministry of Health, National Drug Authority, Ministry of Agriculture Animal Industry and Fisheries, and other partners in support of the One-Health Approach.*

Background: Currently there is no policy on the control of ticks and tick-borne diseases among human or livestock yet ticks pose an increasing threat to human life and livestock trade.(1). This is evidenced by increasing tick-borne disease outbreaks like Crimean-Congo Hemorrhagic Fever (CCHF). CCHF is a severe epidemic-prone zoonotic viral hemorrhagic fever (VHF) transmitted to humans by tick bites and direct contact with fluids or tissues of infected animals (2,3). Since its first identification in 1944, human CCHF outbreaks have increasingly occurred in Africa, Asia and Europe(2,4,5). The main control and prevention measures against ticks include preventing contact with ticks as well as application of acaricides to control ticks among livestock (8).

According to the current draft national policy on ticks and tick-borne diseases by Ministry of Animal Industry and Fisheries (MAAIF), Uganda has an objective to control ticks and tick-borne diseases using cost effective and sustainable methods. The likelihood of tick-borne disease outbreaks among livestock or humans will reduce if ticks are controlled using well regulated environmentally friendly interventions through a "one health approach". The policy brief aims to recommend evidence-based one-health interventions to both the animal and health sectors of Uganda to control ticks and tick-borne diseases.

Approaches and Results: In August 2017, the MOH reported a CCHF outbreak in districts of Kyankwanzi and Nakaseke in central Uganda. We investigated the outbreak to identify risk factors and to develop evidence based recommendations for prevention and control for future outbreaks. We defined a suspected CCHF case as sudden onset of high fever (>38oC) for ≥3 days between July 1 and September 30, 2017, plus any of the following: spontaneous bleeding or bruising, laboratory evidence of low leucocyte and platelet counts unexplained by other causes in a resident of the two affected districts. We defined a confirmed CCHF case was a suspected VHF case that tested positive for CCHF by both RT-PCR and IgM serology(9). We conducted case finding by reviewing medical records and community active case-search in case-patients homes and villages. We conducted 1:4 matched case-control study. Neighborhood controls were matched by sex and age (±10 years). We also collected farm livestock blood samples from confirmed case-patients communities to test for CCHF infection using IgG ELISA. We identified seven male case-patients (2 confirmed and 5 suspected) and 28 controls. Tick exposure (i.e. being bitten by a tick or squashing ticks with bare hands) was reported by 57% (4/7) of case-patients and 11% (3/28) of controls (OR=11, 95% CI=1.1-112). Sero-positivity for CCHF was found in 60% (37/62) of cattle and 24% (5/21) of goats. Farm animals were reported to have been sprayed with common acaricides available on the market.

Conclusion: The CCHF outbreak in August 2017 was most likely caused by exposure to infected ticks. Ticks remain the main vectors and reservoirs of tick-borne diseases like CCHF and need to be dealt with to avoid recurrent disease outbreaks for both human and animal health.

Policy implications : There is need for a one-health approach in controlling tick-borne diseases(2,8). This is a multi-sectoral approach where experts in human and animal health jointly work for the control of ticks and tick-borne zoonotic diseases. Policies guiding the access, distribution, and use of acaricides should be developed; veterinary health education to veterinary extension workers and farmers on use of acaricides should be conducted as well as ecological studies and further research in tick control.

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Policy Brief

Reducing Mercury Exposure among the Artisanal Gold Miners using a modern gold processing technology: A Case study of Amudat District in Uganda

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Executive summary: *Currently there is no policy on the application of Mercury (Hg) in Artisanal Gold Mining (ASGM) and processing industries in Uganda. Hg is a toxic metal that can cause a variety of adverse health effects when exposed to the body. Artisanal gold miners (AGM) use Hg to extract gold from Ore. On 28 Nov 2017, Ministry of Health received notification through Daily Monitor newspaper of over 100 suspected Skin infections among AGM in Amudat District. The miners were reported to be engaged in massive use of mercury in purifying gold. We conducted an epidemiological investigation to quantify mercury exposure among residents of an AGM in Amudat District, determine risk factors for mercury exposure and recommend evidence based control measures. Symptoms included fever (52%), headache (33%), muscle ache (33%), cough (29%), malaria (28%) as well as skin rashes, peeling skin on hand and numbness among 5% of the respondents (figure1. All the participants interviewed appeared to be healthy during the time of this survey. 63% of the miners had ever used mercury during gold processing. 50% had stood in a dam of water mixed with mercury, while 42% had mixed mercury with gold and water. Dumping of Wastes (water, sand, gold and mercury) in the nearby river was also observed. Our findings suggest that mercury exposure may be widespread in AGM industries in Uganda. All residents, including children and adults had exposure to mercury during the various stages of gold processing. Thus, our findings recommended the need for a policy to reduce the use of mercury exposure in artisanal gold mining communities.*

Background: Currently there is no policy on the application of Mercury in Artisanal Gold Mining (ASGM) industries in Uganda and yet Mercury is a toxic metal that can cause a variety of adverse health effects when exposed to the body depending on the form of mercury, the pathway, quantity, and duration of exposure [2]. Mercury (Hg) is a naturally occurring element found in air, water, and soil. It is distributed throughout the environment by both natural and human processes.

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Mercury is found in various Inorganic (elemental) and organic forms (Methyl mercury). Once in the environment, elemental mercury can be transformed by bacteria into methyl mercury. Methyl mercury then bio accumulates in fish, shellfish and plants which can be consumed by Humans [1]. Artisanal Gold Miners use mercury to extract gold from ore by forming "amalgam"—a mixture composed of approximately equal parts of Mercury and gold[3]. To remove the mercury, its typically heated in an amalgam furnace. The mercury evaporates into the environment, while the gold stays behind. When it enters the water, it can transform into organic mercury compounds, such as methyl mercury, and bio accumulate in fish. This process presents three major potential routes of mercury exposure(1) miners can have dermal exposure when they mix elemental mercury with gold ore; (2) elemental and inorganic mercury vapors can be inhaled when amalgams are heated; and (3) methyl mercury can be consumed from contaminated fish [3]. In developing countries, the ASGM industry, which produces approximately 300–400 tons of gold annually, has rapidly expanded over the last two decades and is estimated that more than 15 million people depend directly, and 100 million people depend indirectly, on the gold mining sector[4]. The ASGM sector is responsible for 37% of all anthropogenic mercury emissions to the environment [4]. The aim of our policy brief is to recommend control interventions to both the Ministry of Health and Ministry of Water and Environment of Uganda to control the wide use of Mercury in ASGM industries in Uganda.

Approaching and results: On 28 Nov 2017, Ministry of Health received notification through Daily Monitor newspaper of over 100 suspected Skin infections among ASGM in Kabisha and Chepkarat parishes, Amudat District. Eight goats were also reported dead after drinking water contaminated with mercury a fortnight ago. The case-patients presented with skin pain, itching, and dark skin. The miners were reported to be engaged in massive use of mercury in purifying gold. We set out to conduct an epidemiological investigation to quantify mercury exposure among residents of an artisanal gold mine in Amudat District, determine risk factors for mercury exposure and recommend control measures.

Mining Processes: The gold mining process starts with survey and identification of potential sites by the locals. This is followed by manual digging of holes which is later supported by a generator to power further drilling until the hole reaches stone linings (gold ore) which contains gold. At Cheptekol mine, the processing of gold involves crushing the ore using stone milling machine which turn the ore into powder. This process normally generates a lot of dust and exposes miners who don't have protective gears. After crushing, the powder is then taken into a dam of about $3m^3$ approx-2000 litres of water and washed in the basin using mercury and water by women using bare hands. About 200 grams of mercury is applied at this stage to amalgamate the small particles of gold. Hg is then squeezed from the gold into the main dam and re used for about four times. The gold amalgam is then burnt using gas to remove the remaining mercury. This is normally done by the specialist employed by the association. The gold is then ready for sale.

Descriptive findings of the investigation:

65 gold miners were interviewed about their exposure to mercury and possible infections related to mercury exposure. 36 (55%) of the gold miners were females and 29 males (44%). The median age was 28 years (Range 12-60). 21 (32%) of respondents had ever fallen sick from 1st August 2017 till the time of interviews. Symptoms included fever (52%), headache (33%), muscle ache (33%), cough (29%), malaria (28%) as well as skin rashes, peeling skin on hand and numbness among 5% of the respondents. Majority of the gold miners (63%) had ever used mercury during gold processing. 51% had stood in a dam of water mixed with mercury, while 42% had mixed mercury with gold and water.

Conclusions: Mercury exposure may be widespread in ASGM industries in Uganda. All residents, including children and adults had exposure to mercury during the various stages of gold processing. Once absorbed, Mercury is transported to the circulatory system, where it attacks red blood cells, the kidneys, and the central nervous system.

Implications: The inhalation of mercury vapour can produce harmful effects on the nervous, digestive and immune systems, lungs and kidneys, and may be fatal. The inorganic salts of mercury are corrosive to the skin, eyes and gastrointestinal tract, and may induce kidney toxicity if ingested. Neurological and behavioural disorders may be observed after inhalation, ingestion or dermal exposure of different mercury compounds(5).

Recommendations:

a-Warning community members about adverse health effects from mercury exposure.

b-Creating centralized amalgamation centers located away from commercial and residential areas with amalgam furnace retorts to decrease emissions of mercury

c-Introducing modern gold processing technology which does not utilize mercury.

d-There is also urgent need to measure the long term health outcomes of mercury exposure among the gold miners through conducting a follow up study.